

Ling 566  
Nov 23, 2011  
Auxiliaries cont: NICE

# Overview

- Brief review of our analysis so far
- NICE properties of auxiliaries
- The auxiliary *do*
- NICE properties (lexical rules)
- Reading questions

# Descriptive Summary of the NICE Properties

## Negation

Sentences are negated by putting *not* after the first auxiliary verb; they can be reaffirmed by putting *too* or *so* in the same position

## Inversion

Questions are formed by putting an auxiliary verb before the subject NP

## Contraction

Auxiliary verbs take negated forms, with *n't* affixed

## Ellipsis

Verb phrases immediately following an auxiliary verb can be omitted

# Negation (and Reaffirmation)

- Polar adverbs (sentential *not*, *so*, and *too*) appear immediately following an auxiliary

*Pat will not leave*

*Pat will SO leave*

*Pat will TOO leave*

- What about examples like *Not many people left*?

- What happens when you want to deny or reaffirm a sentence with no auxiliary?

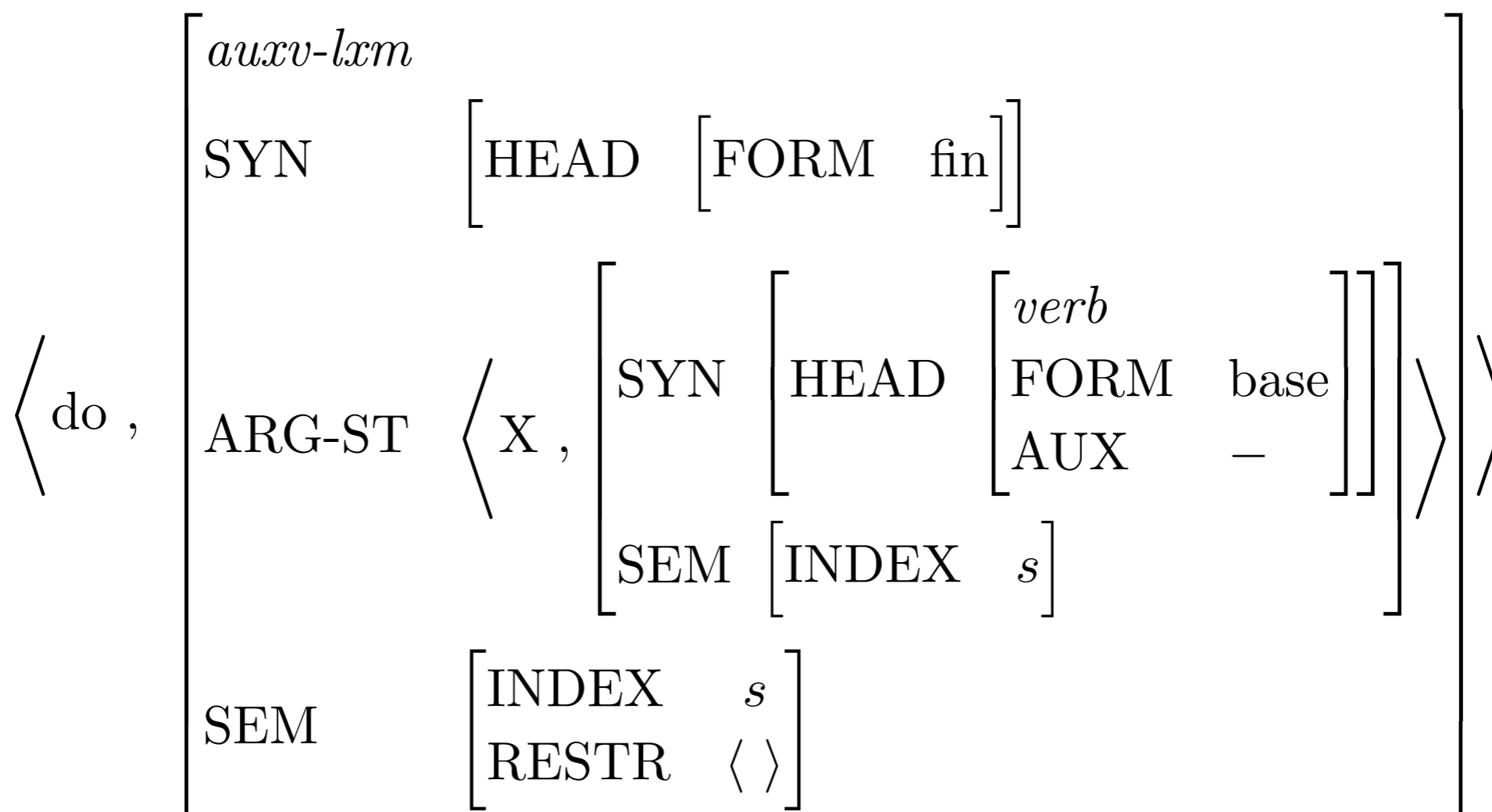
*Pat left*

*Pat did not leave*

*Pat did TOO leave*

# The Auxiliary *do*

- Like modals, auxiliary *do* only occurs in finite contexts:  
*\*Pat continued to do not leave*
- Unlike modals, *do* cannot be followed by other auxiliaries:  
*\*Pat did not have left*

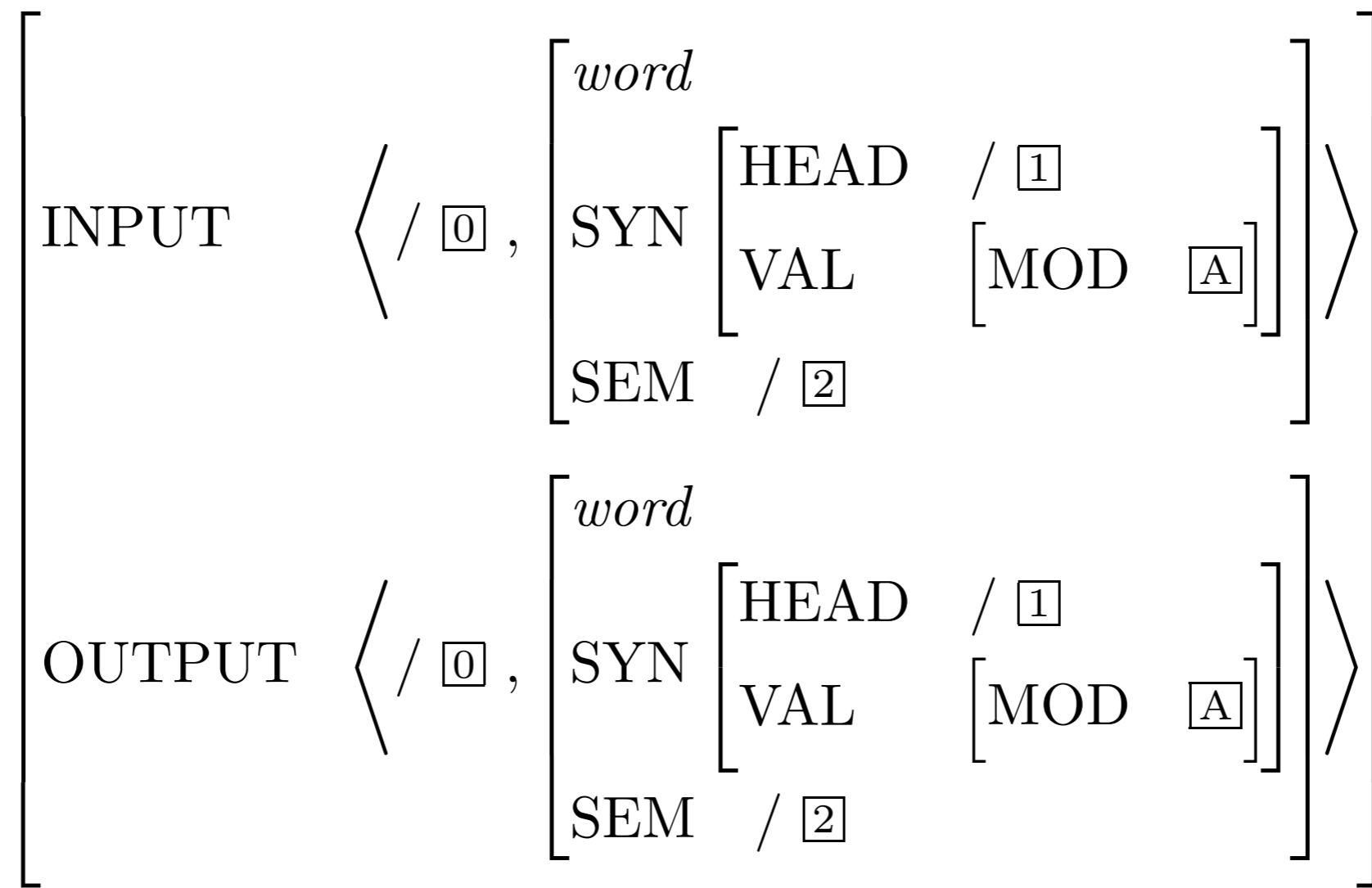


# The $ADV_{pol}$ -Addition Lexical Rule

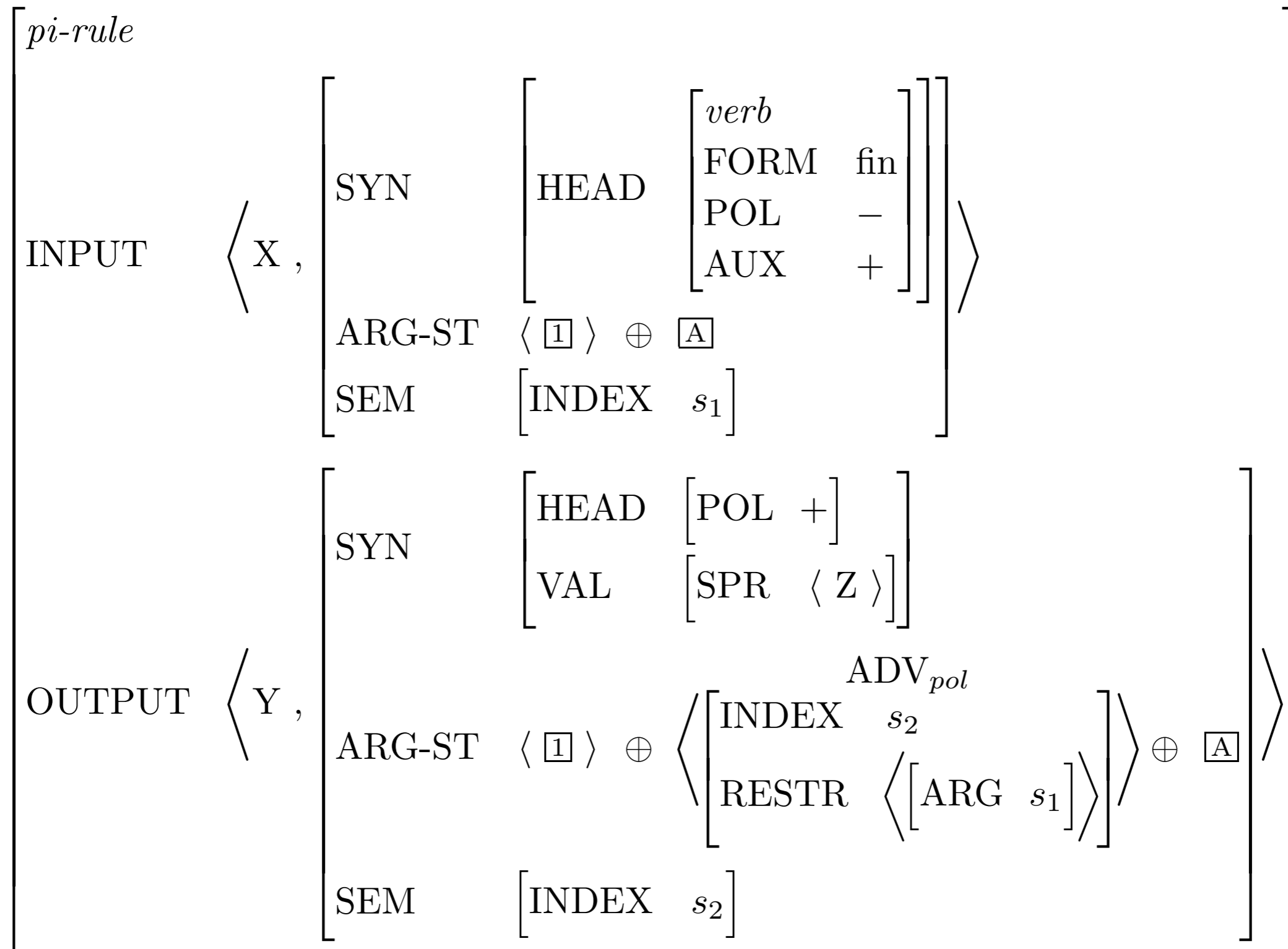
$$\left[ \begin{array}{l} \textit{pi-rule} \\ \\ \\ \end{array} \right]
 \left[ \begin{array}{l} \text{INPUT} \\ \\ \text{OUTPUT} \end{array} \right]
 \left\langle \begin{array}{l} X, \\ \\ Y, \end{array} \right.
 \left[ \begin{array}{l} \text{SYN} \\ \text{ARG-ST} \\ \text{SEM} \end{array} \right]
 \left[ \begin{array}{l} \text{HEAD} \\ \langle \boxed{1} \rangle \oplus \boxed{A} \\ \text{INDEX } s_1 \end{array} \right]
 \left[ \begin{array}{l} \left[ \begin{array}{l} \textit{verb} \\ \text{FORM } \textit{fin} \\ \text{POL } - \\ \text{AUX } + \end{array} \right] \\ \\ \left[ \begin{array}{l} \text{HEAD} \\ \text{POL } + \\ \text{VAL} \\ \text{SPR } \langle Z \rangle \end{array} \right] \end{array} \right]
 \left\langle \begin{array}{l} \left[ \begin{array}{l} \text{INDEX } s_2 \\ \text{RESTR } \left\langle \left[ \text{ARG } s_1 \right] \right\rangle \right] \\ \\ \text{INDEX } s_2 \end{array} \right] \oplus \boxed{A} \end{array} \right\rangle
 \left. \right]$$

# What does the type *pi-rule* mean?

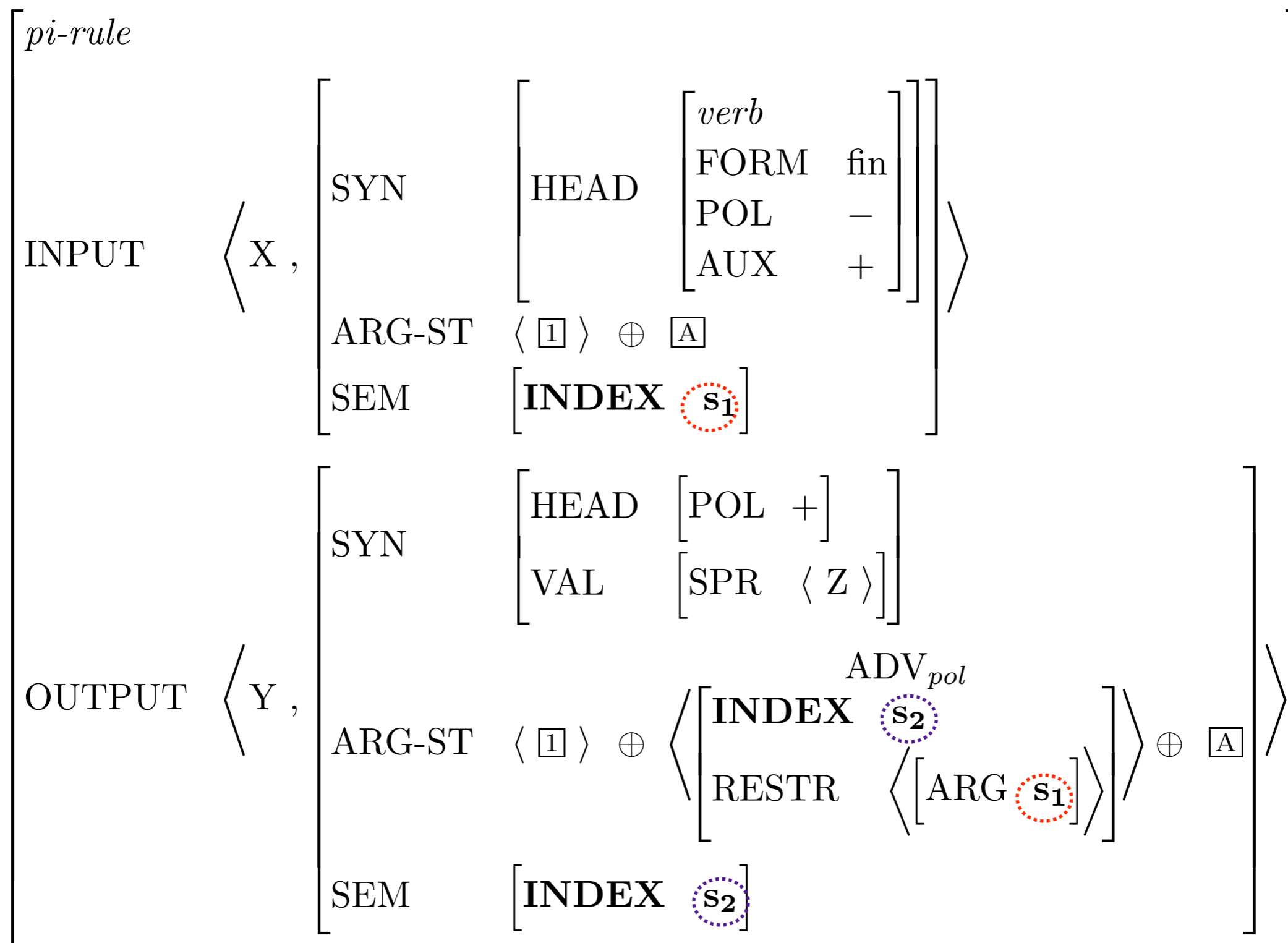
- It maps words to words (hence, “post-inflectional”)
- It preserves MOD values, HEAD values as a default, and (like other lexical rule types) SEM values as a default



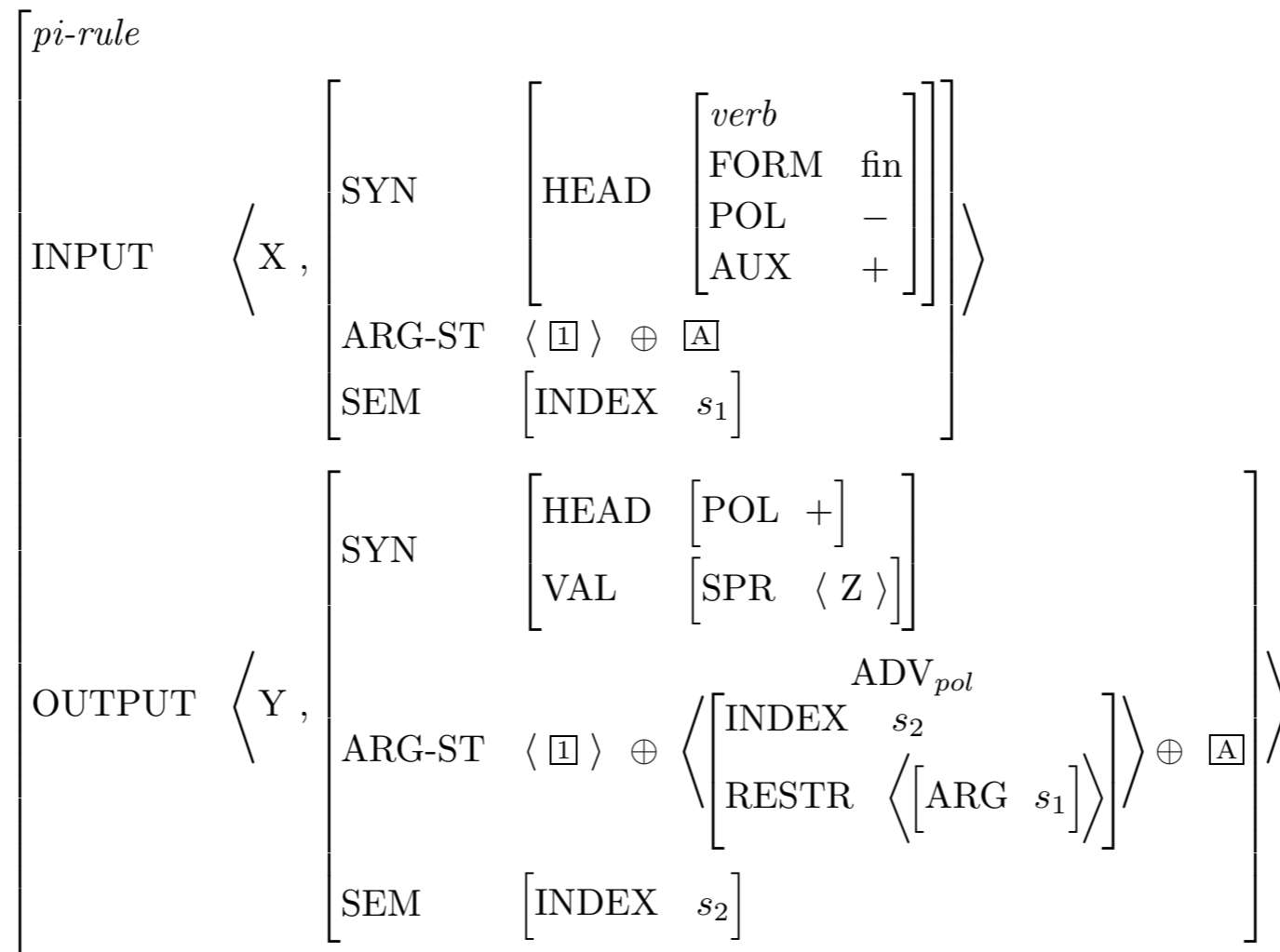
# Why doesn't $ADV_{pol}$ -Addition LR mention VAL?



# What is the role of these indices?



# Which *nots* does the rule license?



*Andy must not have been sleeping?*

✓

*Andy must have not been sleeping?*

✗

*Andy must have been not sleeping?*

✗

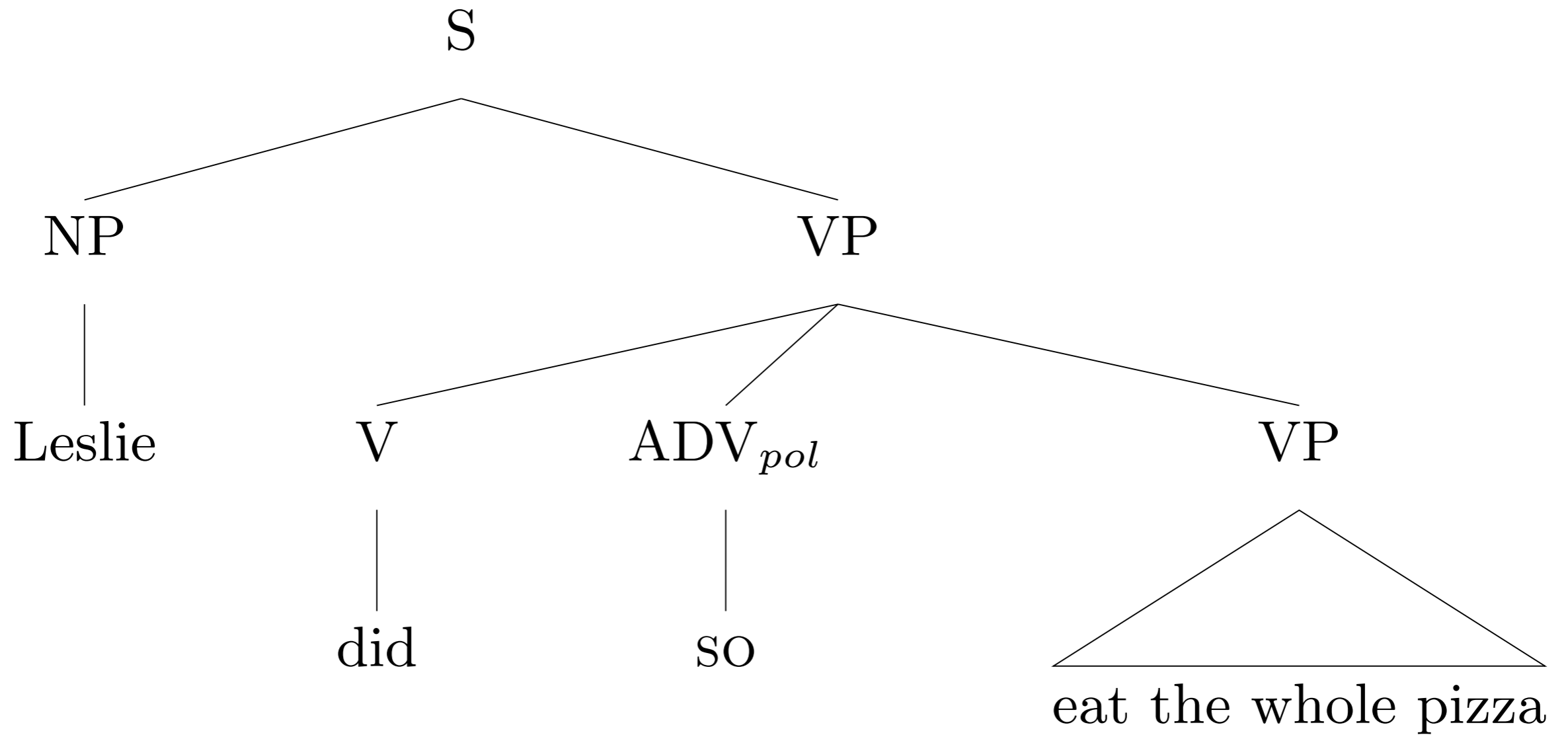
*Kleptomaniacs cannot not steal.*

✓

*Kleptomaniacs cannot not steal.*

✗

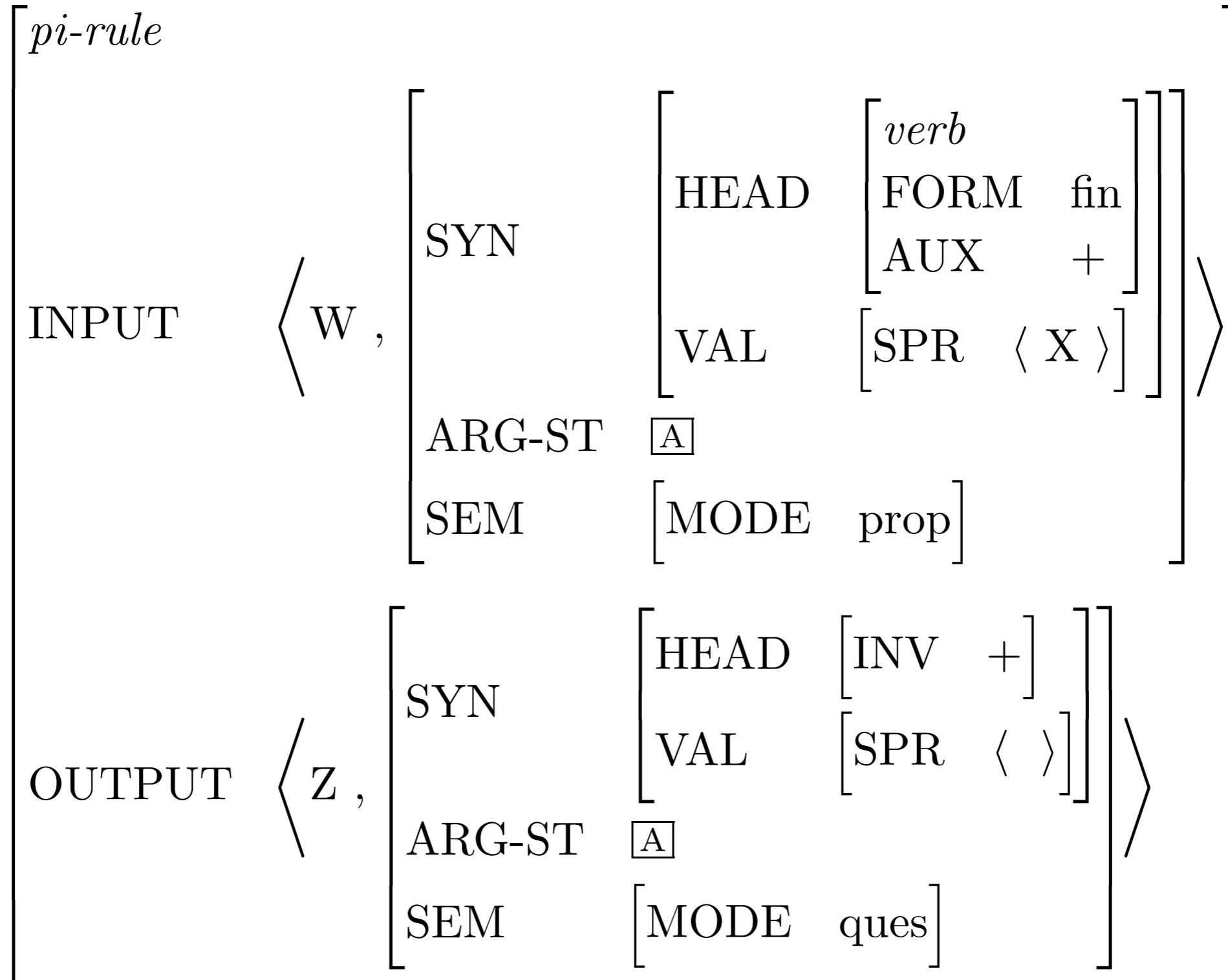
# Negation and Reaffirmation: A Sample Tree



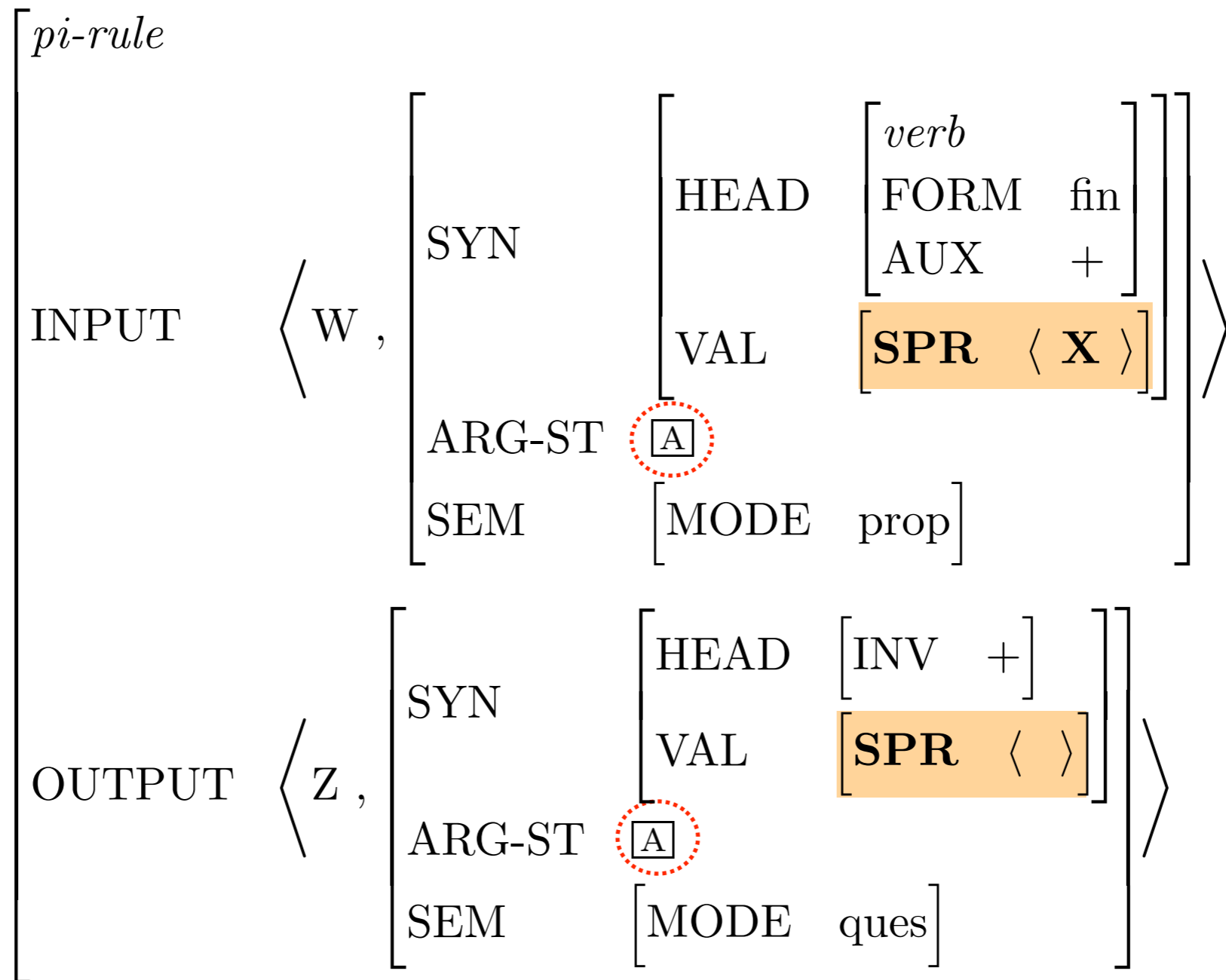
# Inversion

- Yes-no questions begin with an auxiliary:  
*Will Robin win?*
- The NP after the auxiliary has all the properties of a subject
  - Agreement: *Have they left?* vs. *\*Has they left?*
  - Case: *\*Have them left?*
  - Raising: *Will there continue to be food at the meetings?*
- What happens if you make a question out of a sentence without an auxiliary?  
*Robin won*  
*Did Robin win?*

# The Inversion Lexical Rule



# How the Rule Yields Inverted Order



...plus the ARP

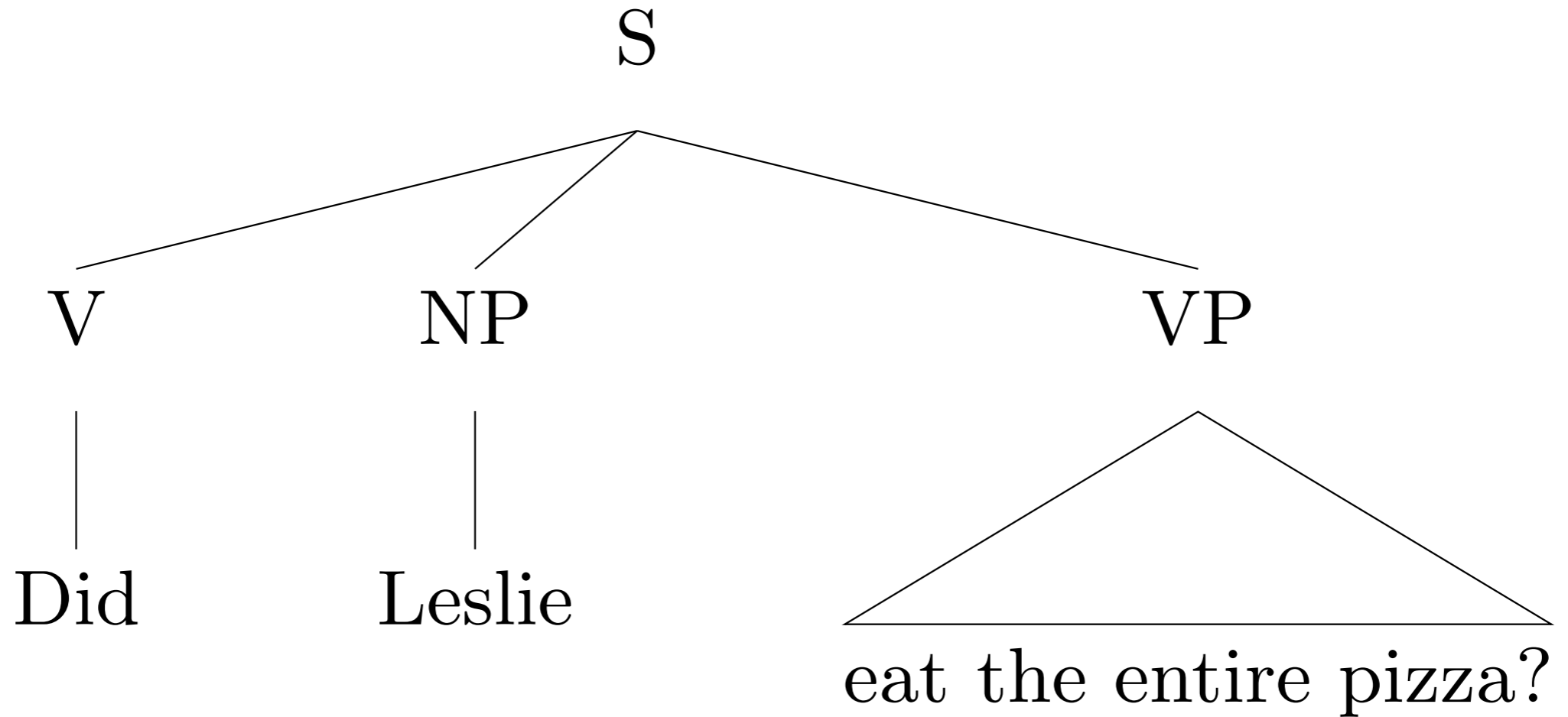
# The Feature INV

- What is the INV value of inputs to the Inversion LR?
  - Perhaps surprisingly, the input is [INV +]
  - Word-to-word rules (*pi-rules*) have default identity of HEAD features, and no INV value is given on the input
- Then what work is the feature doing?
  - It's used to mark auxiliaries that can't or must be inverted  
*You better watch out* vs. *\*Better you watch out*  
*I shall go* (*shall* ~ 'will') vs. *Shall I go?* (*shall* ~ 'should')

# Other Cases of Inversion

- Inversion is not limited to questions
  - Preposed negatives: *Never have I been so upset!*
  - Conditionals: *Had we known, we would have left.*
  - Exclamations: *May your teeth fall out!*
- Does our rule account for these?
  - No. Our rule's output says [MODE ques]. And each construction has slightly different idiosyncrasies.
- How might we extend our analysis to cover them?
  - Define a type of inversion lexical rules, sharing certain properties, but with some differences.

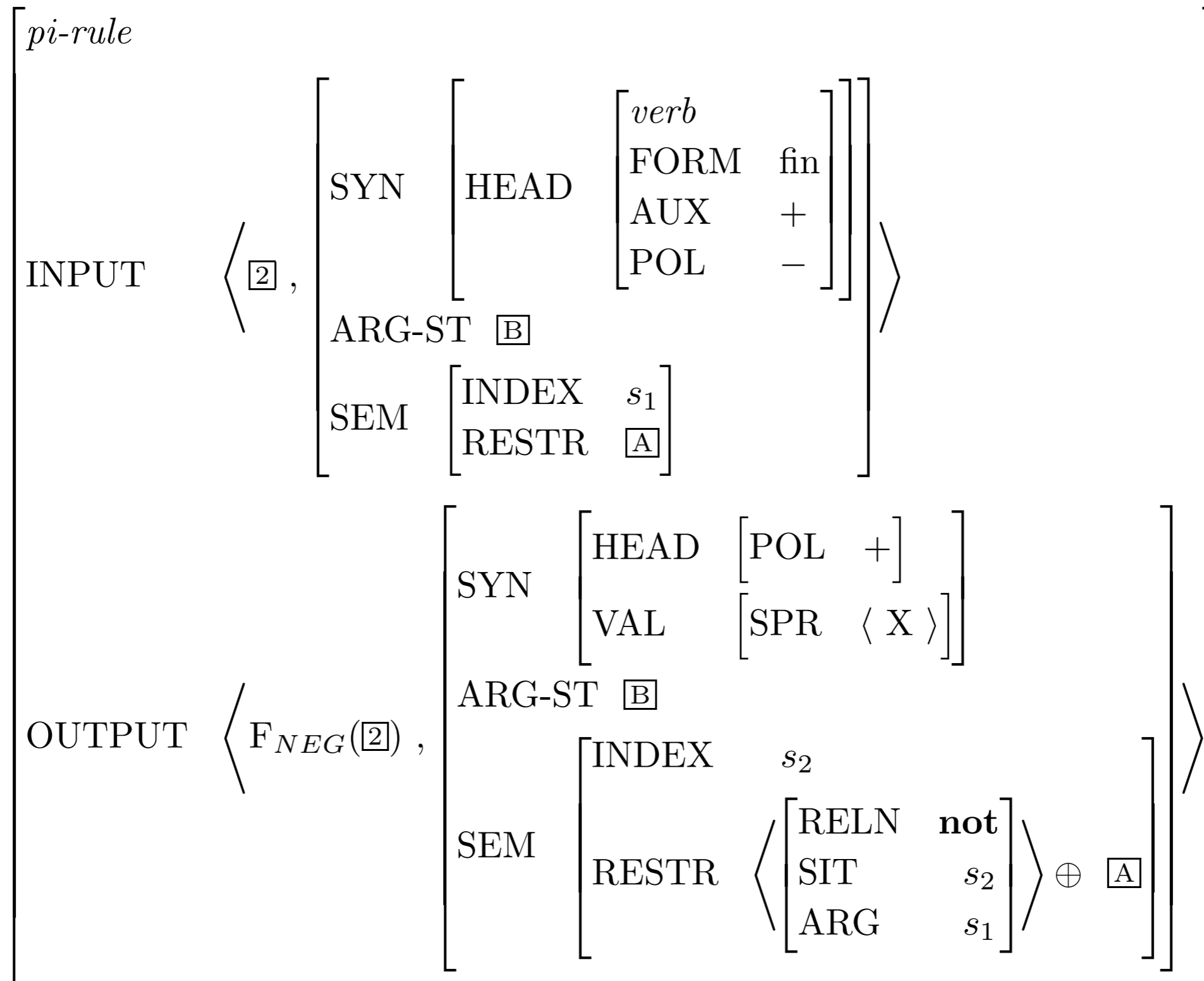
# Inversion: A Sample Tree



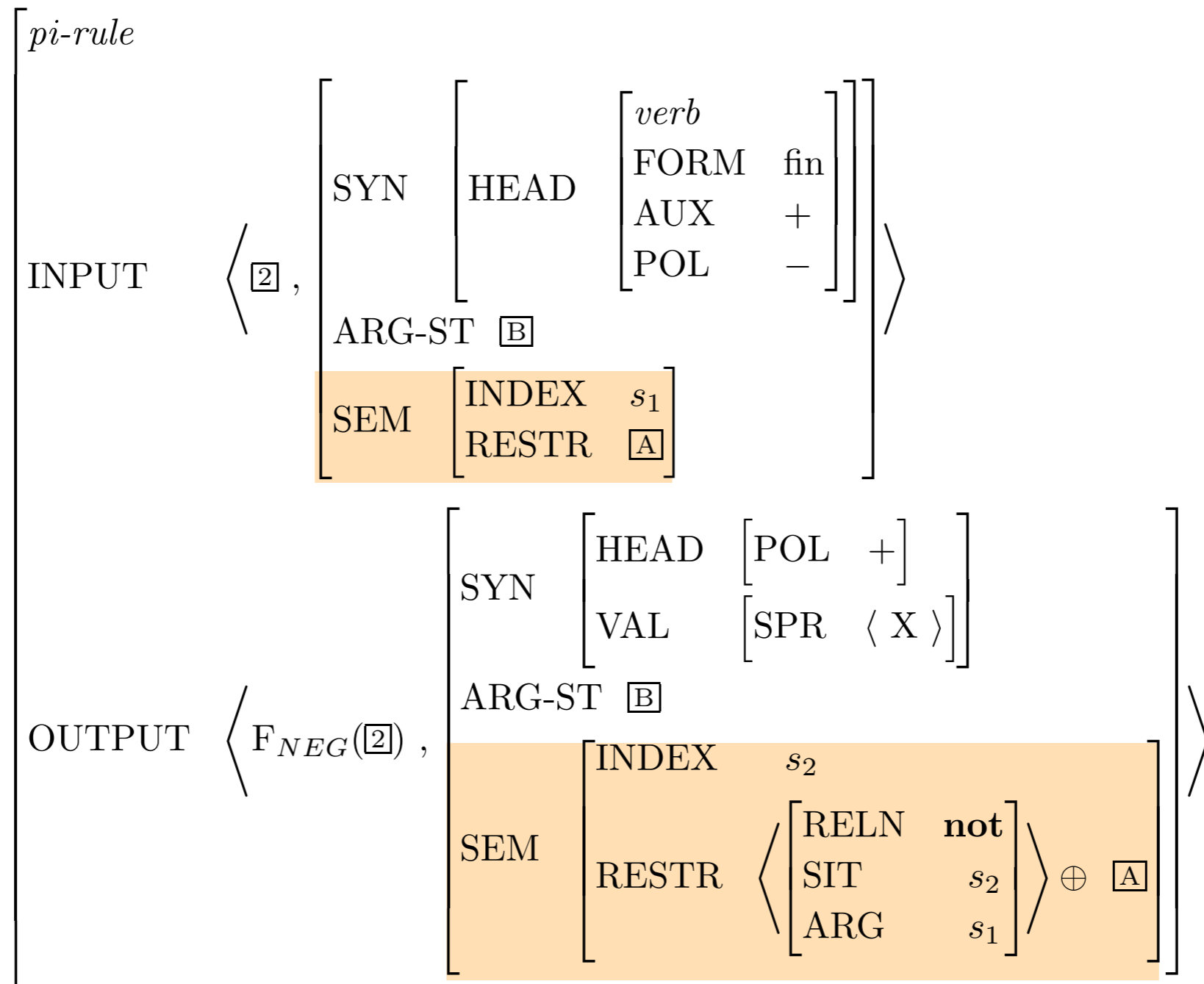
# Contraction

- There are several types of contraction in English, but we're only talking about words ending in *n't*
- It may seem like just *not* said fast, but there's more to it
  - Only finite verbs can take *n't*:  
*\*Terry must haven't seen us*
  - There are morphological irregularities:  
*won't*, not *\*willn't*      *%shan't*, not *\*shalln't*  
*mustn't* pronounced *mussn't*  
*don't* pronounced *doen't*, not *dewn't*  
*\*amn't*

# The Contraction Lexical Rule

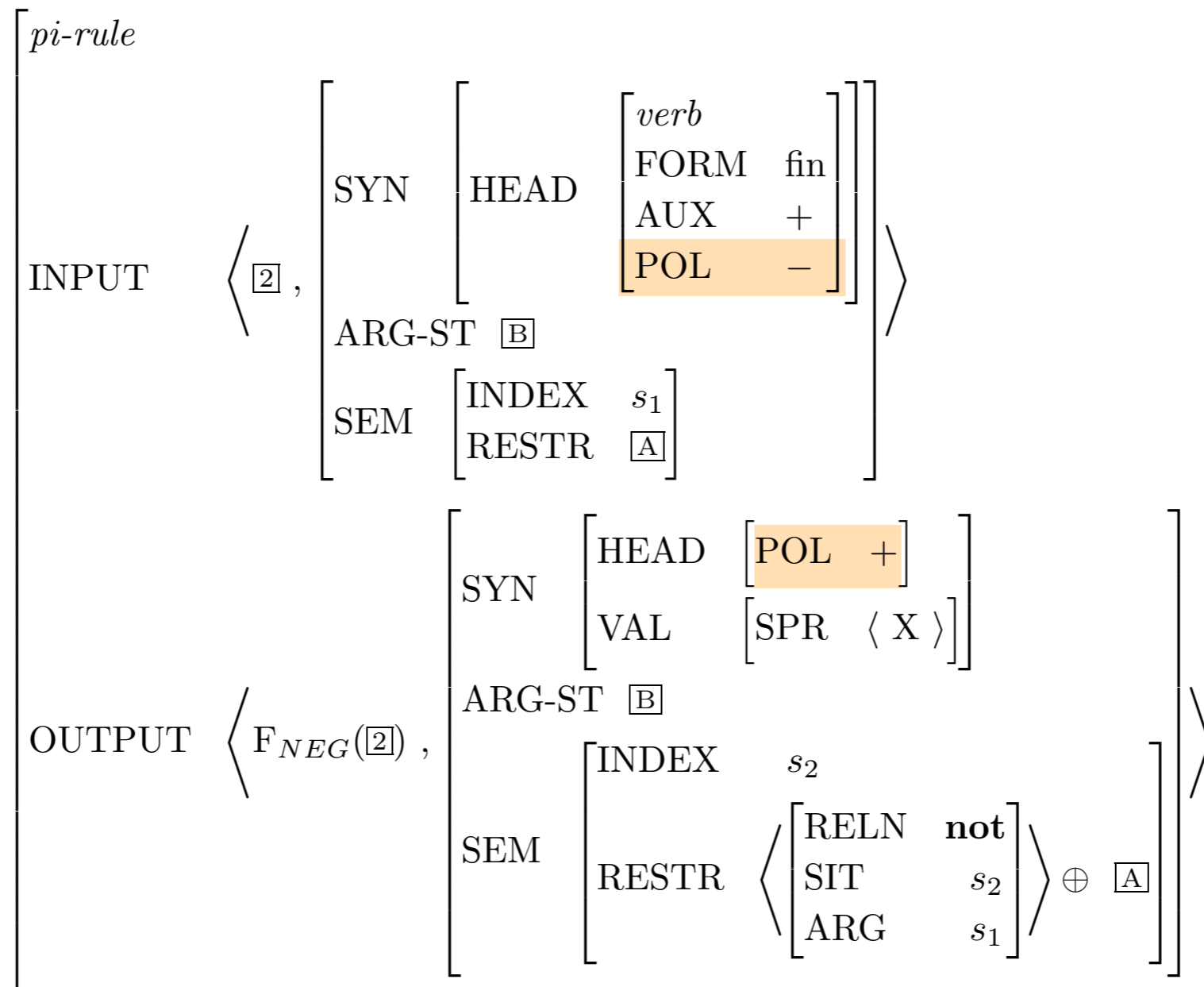


# Most of the work is in the semantics



Why?

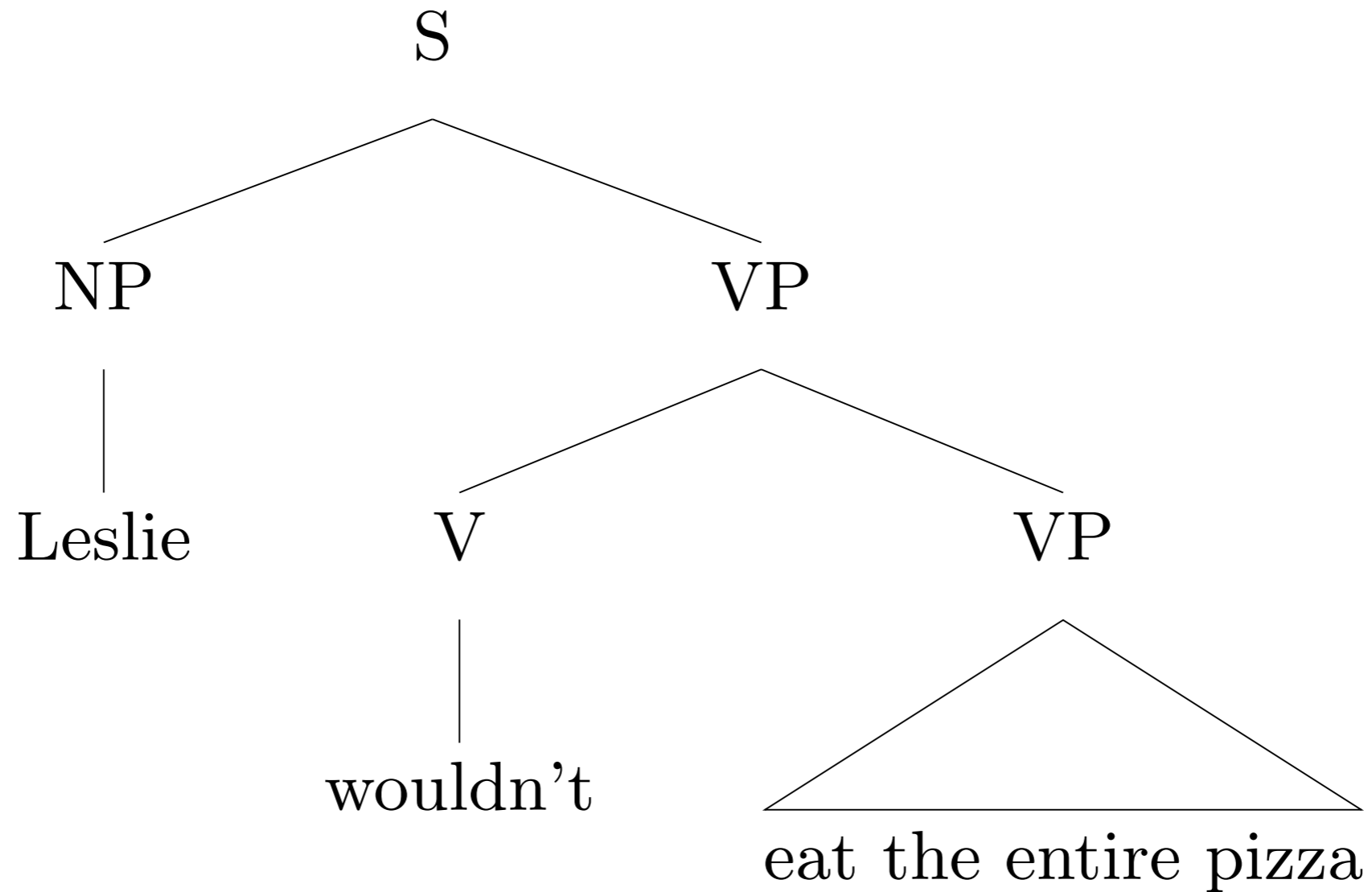
# What does POL do?



*\*We can't stop*

*\*They won't TOO mind*

# Contraction: Sample Tree



# Ellipsis

- Ellipsis allows VPs to be omitted, so long as they would have been preceded by an auxiliary

\* *Pat couldn't have been watching us, but  
Chris*

- Unlike the other NICE properties, this holds of all auxiliaries, not just finite ones.
- What is the elliptical counterpart to a sentence with no auxiliary?

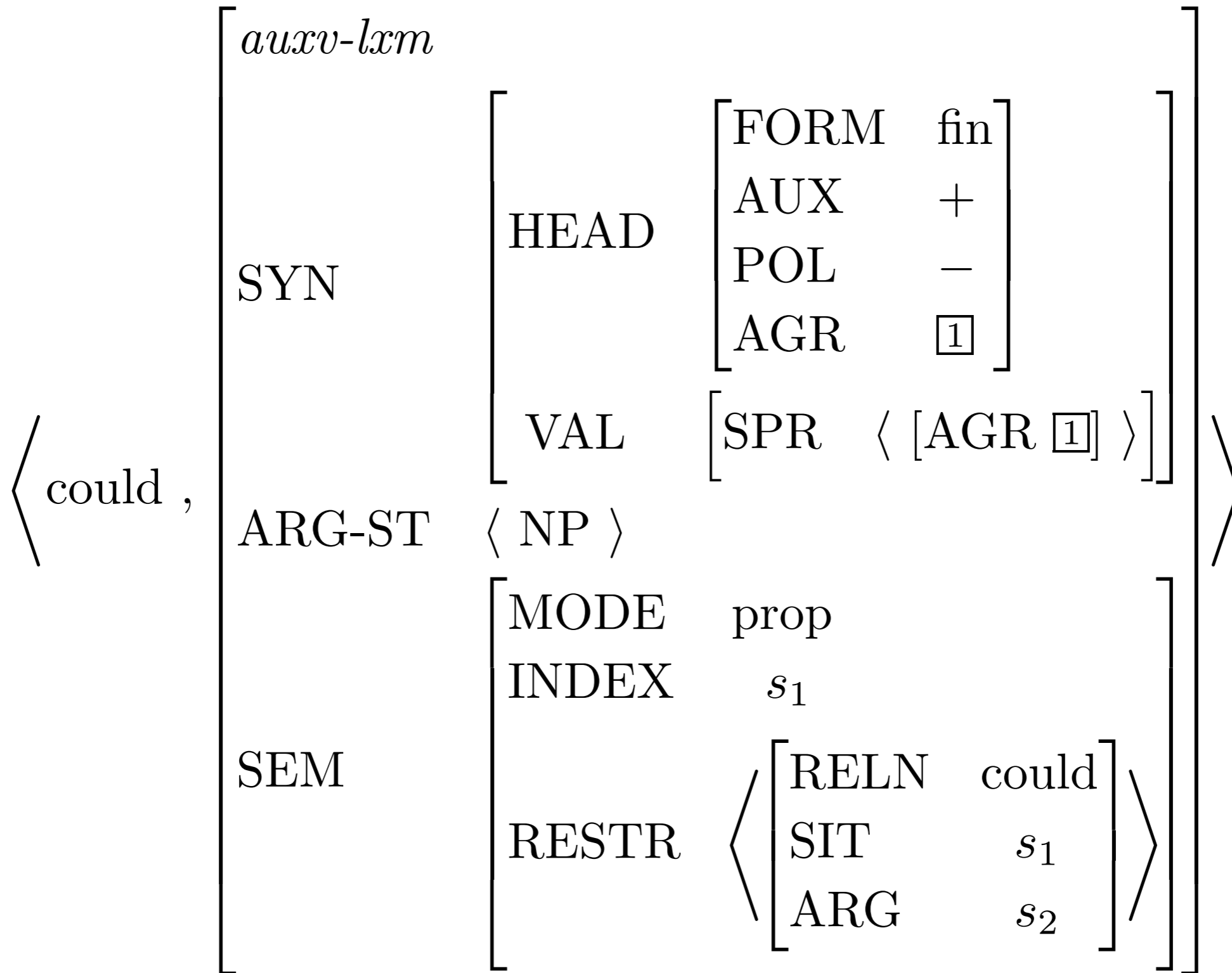
*Whenever Pat watches TV, Chris watches TV*  
*Whenever Pat watches TV, Chris does*

# The Ellipsis Lexical Rule

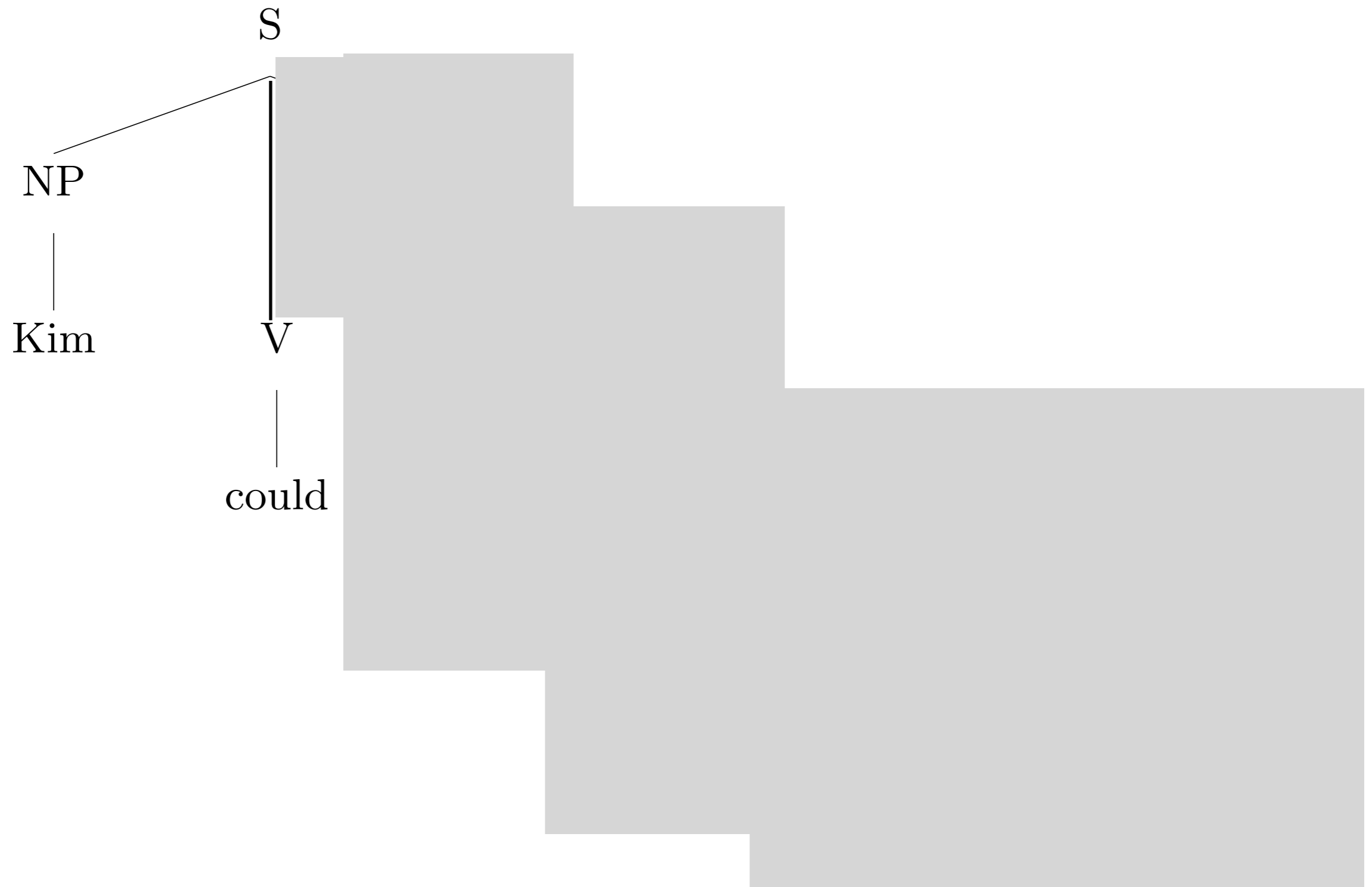
$$\left[ \begin{array}{l} d\text{-rule} \\ \text{INPUT} \left\langle \boxed{1}, \left[ \begin{array}{l} \text{auxv-lexm} \\ \text{ARG-ST} \langle \boxed{2} \rangle \oplus \boxed{A} \end{array} \right] \right\rangle \\ \text{OUTPUT} \left\langle \boxed{1}, \left[ \begin{array}{l} \text{dervv-lexm} \\ \text{ARG-ST} \langle \boxed{2} \rangle \end{array} \right] \right\rangle \end{array} \right]$$

- Note that this is a derivational LR (*d-rule*) -- that is, lexeme-to-lexeme
- This means that SYN and SEM are unchanged, by default

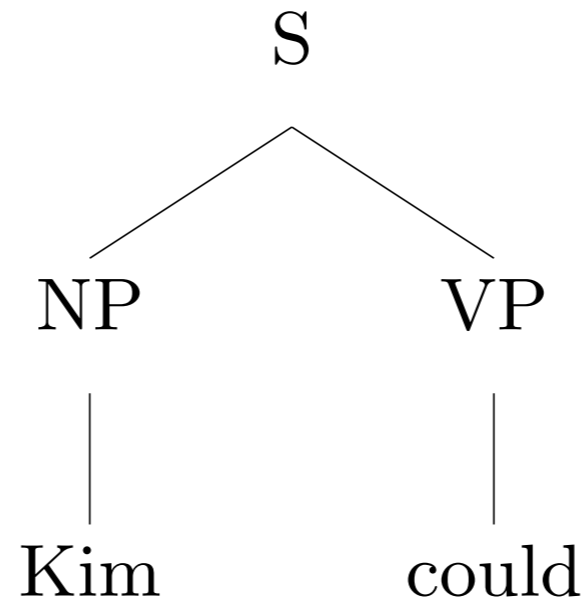
# Ellipsis: A Sample Output



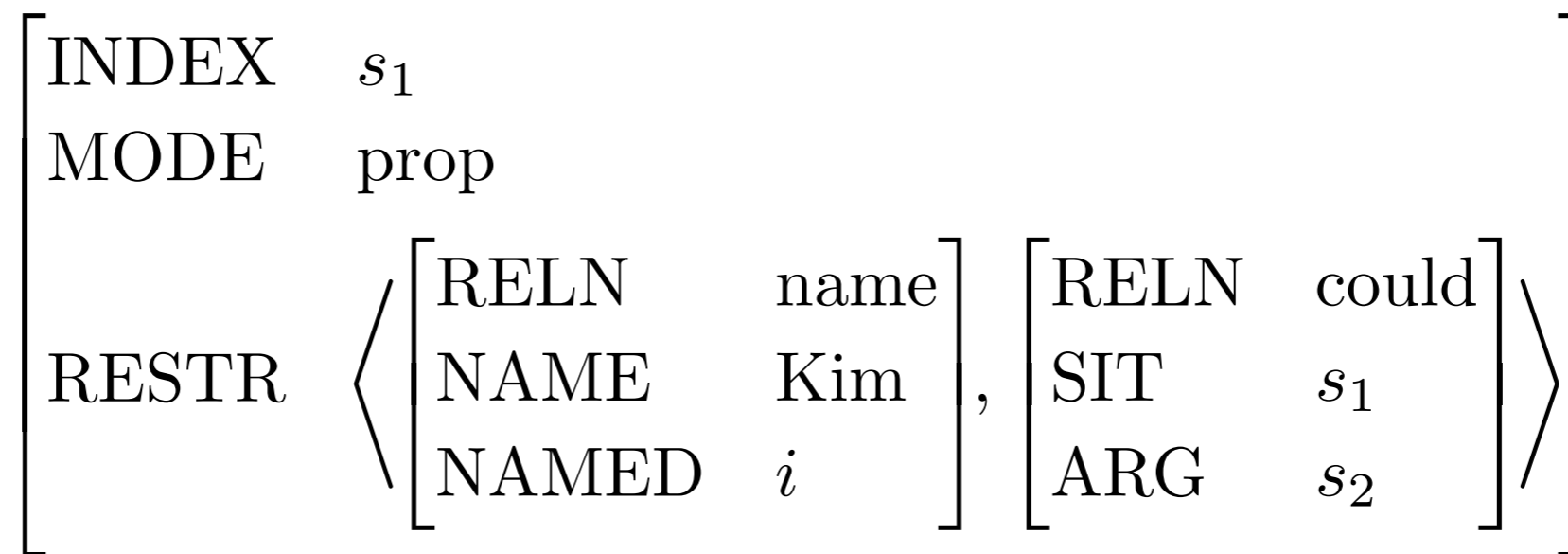
# Ellipsis: A Sample Tree



# Semantics of Ellipsis



What is the SEM value of the S node of this tree?



Note:  $s_2$  has to be filled in by context.

# Infinitival *to* Revisited

- VP Ellipsis can occur after *to*:

*We didn't find the solution, but we tried to.*

- This is covered by our Ellipsis LR if we say *to* is [AUX +].
- Since AUX is declared on type *verb*, it follows that *to* is a verb.

# *do* Revisited

- Chomsky's old analysis: in sentences w/o auxiliaries...
  - Tense can get separated from the verb in various ways
    - Negation/Reaffirmation inserts something between Tense and the following verb
    - Inversion moves Tense to the left of the subject NP
    - Ellipsis deletes what follows Tense
  - When this happens, *do* is inserted to support Tense
- Our counterpart:
  - NICE properties hold only of auxiliaries
  - *do* is a semantically empty auxiliary, so negated, reaffirmed, inverted, and elliptical sentences that are the semantic counterparts to sentences w/o auxiliaries are ones with *do*.

# Summary

- Our analysis employs straightforward mechanisms
  - Lexical entries for auxiliaries
  - 3 new features (AUX, POL, INV)
  - 4 lexical rules
- We handle a complex array of facts
  - co-occurrence restrictions (ordering & iteration)
  - the NICE properties
  - auxiliary *do*
  - combinations of NICE constructions

# Overview

- Brief review of our analysis so far
- NICE properties of auxiliaries
- The auxiliary *do*
- NICE properties (lexical rules)
- Reading questions

# Reading Questions

- If *dervv-lxm* doesn't apply any constraints beyond those inherited from *verb-lxm*, why can't we just call the result a *verb-lxm*? Is it simply because *verb-lxm* is not a leaf node? Or are there derivational rules that we don't want to accidentally apply to a *dervv-lxm* that would apply to *verb-lxms*?

# Reading Questions

- In (51) on p. 406 (*ADV<sub>pol</sub>-Addition LR*), why is does the output have SPR  $\langle Z \rangle$  instead of SPR  $\langle [1] \rangle$  to match the ARG-ST?

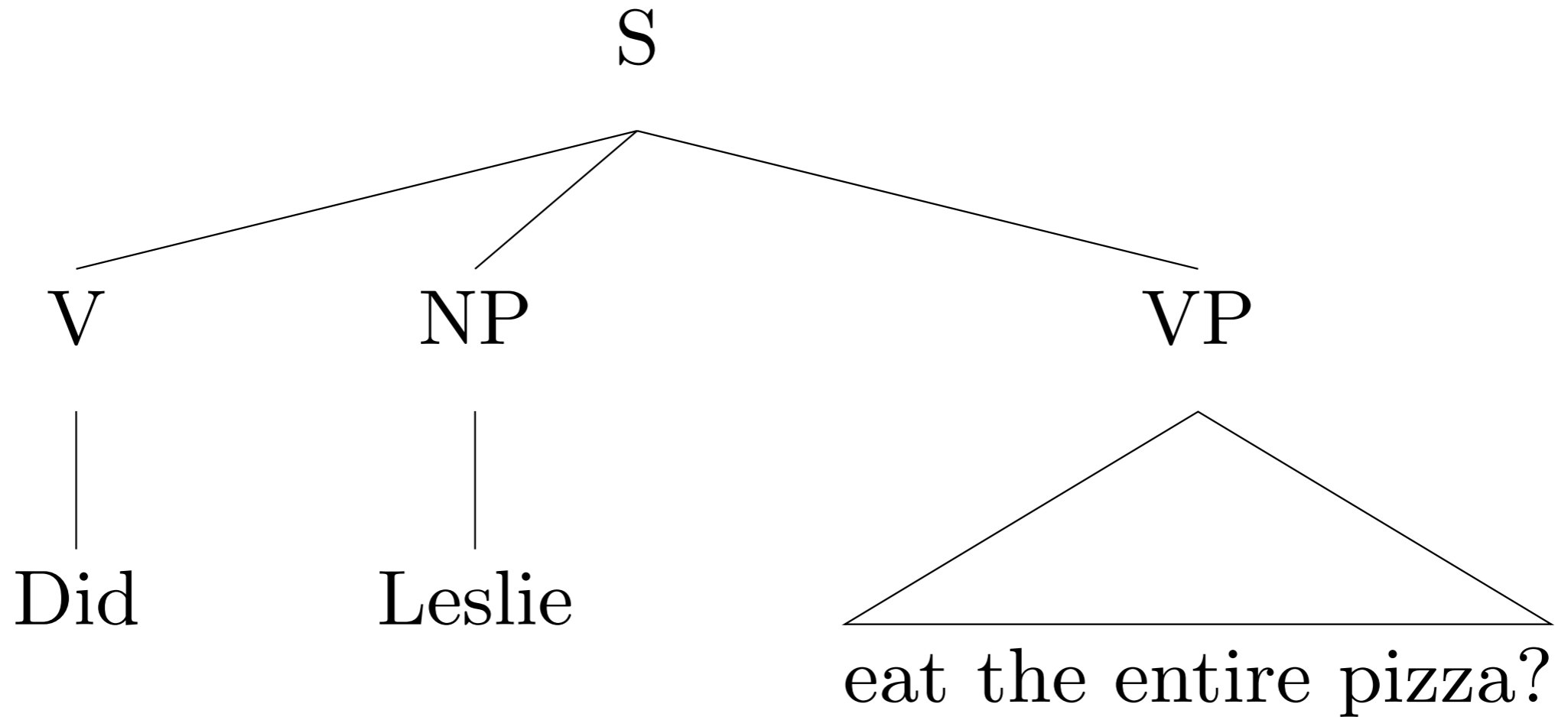
# The $ADV_{pol}$ -Addition Lexical Rule

$$\left[ \begin{array}{l} \textit{pi-rule} \\ \text{INPUT} \end{array} \left\langle X, \left[ \begin{array}{l} \text{SYN} \left[ \begin{array}{l} \text{HEAD} \left[ \begin{array}{l} \textit{verb} \\ \text{FORM} \quad \textit{fin} \\ \text{POL} \quad - \\ \text{AUX} \quad + \end{array} \right] \right] \\ \text{ARG-ST} \quad \langle \boxed{1} \rangle \oplus \boxed{A} \\ \text{SEM} \quad \left[ \text{INDEX} \quad s_1 \right] \end{array} \right] \right\rangle \right. \\ \\ \left. \begin{array}{l} \text{OUTPUT} \left\langle Y, \left[ \begin{array}{l} \text{SYN} \left[ \begin{array}{l} \text{HEAD} \left[ \text{POL} \quad + \right] \\ \text{VAL} \quad \left[ \text{SPR} \quad \langle Z \rangle \right] \end{array} \right] \\ \text{ARG-ST} \quad \langle \boxed{1} \rangle \oplus \left\langle \begin{array}{l} \text{ADV}_{pol} \\ \left[ \text{INDEX} \quad s_2 \right] \\ \text{RESTR} \quad \left\langle \left[ \text{ARG} \quad s_1 \right] \right\rangle \right\rangle \oplus \boxed{A} \\ \text{SEM} \quad \left[ \text{INDEX} \quad s_2 \right] \end{array} \right] \right\rangle \right. \end{array} \right]$$

# Reading Questions

- In (57) on p. 410, what happened to the VP node that formerly dominated the VP tap-dance and of which "can" was formerly the head daughter? Similarly, when "be" is the head verb of a sentence, what happens to its original mother VP (and its complements) when it undergoes the Inversion Lexical Rule?

# Inversion: A Sample Tree



# Reading Questions

- If *better* is an auxiliary verb, then doesn't that violate (5e) on iteration?
- The twins had better have gone to bed.
- Or is that a different *have* or a different *better*?

# Reading Questions

- Footnote 11 describes what I was thinking when I sent the reading question forwarded below, when I figured there was a difference between a VP with an NP COMPS and a VP with and adverb. Turns out they're COMPS either way. :) "He loves easily and often."
- Examples from fn 11:
  - This book reads (easily).
  - They treated Sandy (contemptuously).

# Reading Questions

- Let me see if I'm following: it looks like we could apply the Ellipsis Lexical Rule and then later the Inversion Lexical Rule to end up with something like this, right?
- A: I've been reading the papers.
- B: Have you?