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Binding Theory, Imperatives

Overview

- Review of Ch 1 informal binding theory

- What we already have that's useful

- What we add in Ch 7 (ARG-ST, ARP)

- Formalized Binding Theory

- Binding and PPs

- Examples

- Imperatives

- Reading questions

Some Examples from Chapter 1

- *She likes herself*
- **She$_i$ likes her$_i$.*
- *We gave presents to ourselves.*
- **We gave presents to us.*
- *We gave ourselves presents*
- **We gave us presents.*

- **Leslie told us about us.*
- *Leslie told us about ourselves.*
- **Leslie told ourselves about us.*
- **Leslie told ourselves about ourselves.*

The Chapter 1 Binding Theory Reformulated

- ## Old Formulation:
  - A reflexive pronoun must be an argument of a verb that has another preceding argument with the same reference.
  - A nonreflexive pronoun cannot appear as an argument of a verb that has a preceding coreferential argument.

- ## New Formulation:
  - Principle A (version I): A reflexive pronoun must be bound by a preceding argument of the same verb.
  - Principle B (version I): A nonreflexive pronoun may not be bound by a preceding argument of the same verb.

Some Challenges

- Replace notions of "bound" and "preceding argument of the same verb" by notions definable in our theory.

- Generalize the Binding Principles to get better coverage.

A Question

- What would be a natural way to formalize the notion of "bound" in our theory?

- Answer: Two expressions are bound if they have the same INDEX value ("are coindexed").

Two More Questions

- Where in our theory do we have information about a verb's arguments?

- Answer: In the verb's VALENCE features.

- What determines the linear ordering of a verb's arguments in a sentence?

- Answer: The interaction of the grammar rules and the ordering of elements in the COMPS list.

The Argument Realization Principle

- For Binding Theory, we need a single list with both subject and complements.

- We introduce a feature ARG-ST, with the following property (to be revised later):

$$
\begin{bmatrix}
\text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{SPR} & \boxed{A} \\ \text{COMPS} & \boxed{B} \end{bmatrix} \end{bmatrix} \\
\text{ARG-ST} & \boxed{A} \oplus \boxed{B}
\end{bmatrix}
$$

- This is a constraint on the type word

Notes on ARG-ST

- It's neither in SYN nor SEM.

- It only appears on lexical heads (not appropriate for type *phrase*)

- No principle stipulates identity between ARG-STs.

Two Bits of Technical Machinery

- <u>Definition</u>: If *A* precedes *B* on some ARG-ST list, then *A* **outranks** *B*.

- Elements that must be anaphoric -- that is, that require an antecedent -- are lexically marked **[MODE ana]**. These include reflexive pronouns and reciprocals.

The Binding Principles

- <u>Principle A</u>: A [MODE ana] element must be outranked by a coindexed element.

- <u>Principle B</u>: A [MODE ref] element must not be outranked by a coindexed element.

Pronoun-Antecedent Agreement

- The Binding Principles by themselves don't block:

    * *I amused yourself.*

    * *He amused themselves.*

    * *She amused himself.*

- Coindexed NPs refer to the same entity, and AGR features generally correlate with properties of the referent.

- The Anaphoric Agreement Principle (AAP): Coindexed NPs agree.

Binding in PPs

- What do the Binding Principles predict about the following?

I brought a book with me.

*I brought a book with myself.

*I mailed a book to me.

I mailed a book to myself.

Two Types of Prepositions: the Intuition

- "Argument-marking": Function like case-markers in other languages, indicating the roles of NP referents in the situation denoted by the verb.

- "Predicative": Introduce their own predication.

Two Types of Prepositions: a Formalization

- Argument-marking prepositions share their objects' MODE and INDEX values.
  - This is done with tagging in the lexical entries of such prepositions.
  - These features are also shared with the PP node, by the Semantic Inheritance Principle.
- Predicative prepositions introduce their own MODE and INDEX values.

Redefining Rank

- If there is an ARG-ST list on which *A* precedes *B*, then *A* outranks *B*.

- If a node is coindexed with its daughter, they are of equal rank -- that is, they outrank the same nodes and are outranked by the same nodes.

An Example

S

$\boxed{1}\,\text{NP}_i$

VP
$[\text{SPR}\ \langle\ \boxed{1}\ \rangle\ ]$

I

V
$$\begin{bmatrix} \text{SPR} & \langle\ \boxed{1}\ \rangle \\ \text{COMPS} & \langle\ \boxed{2}\ ,\ \boxed{3}\ \rangle \\ \text{ARG-ST} & \langle\ \boxed{1}\ ,\ \boxed{2},\ \boxed{3}\ \rangle \end{bmatrix}$$
sent

$\boxed{2}\text{NP}_j$

$\boxed{3}\text{PP}_i$

D

N

P_i

NP_i

a

letter

to

myself

The ARG-ST

$$\left[\text{ARG-ST} \left\langle \begin{bmatrix} \text{NP}_i \\ \text{MODE ref} \end{bmatrix}, \begin{bmatrix} \text{NP}_j \\ \text{MODE ref} \end{bmatrix}, \begin{bmatrix} \text{PP}_i \\ \text{MODE ana} \end{bmatrix} \right\rangle \right]$$
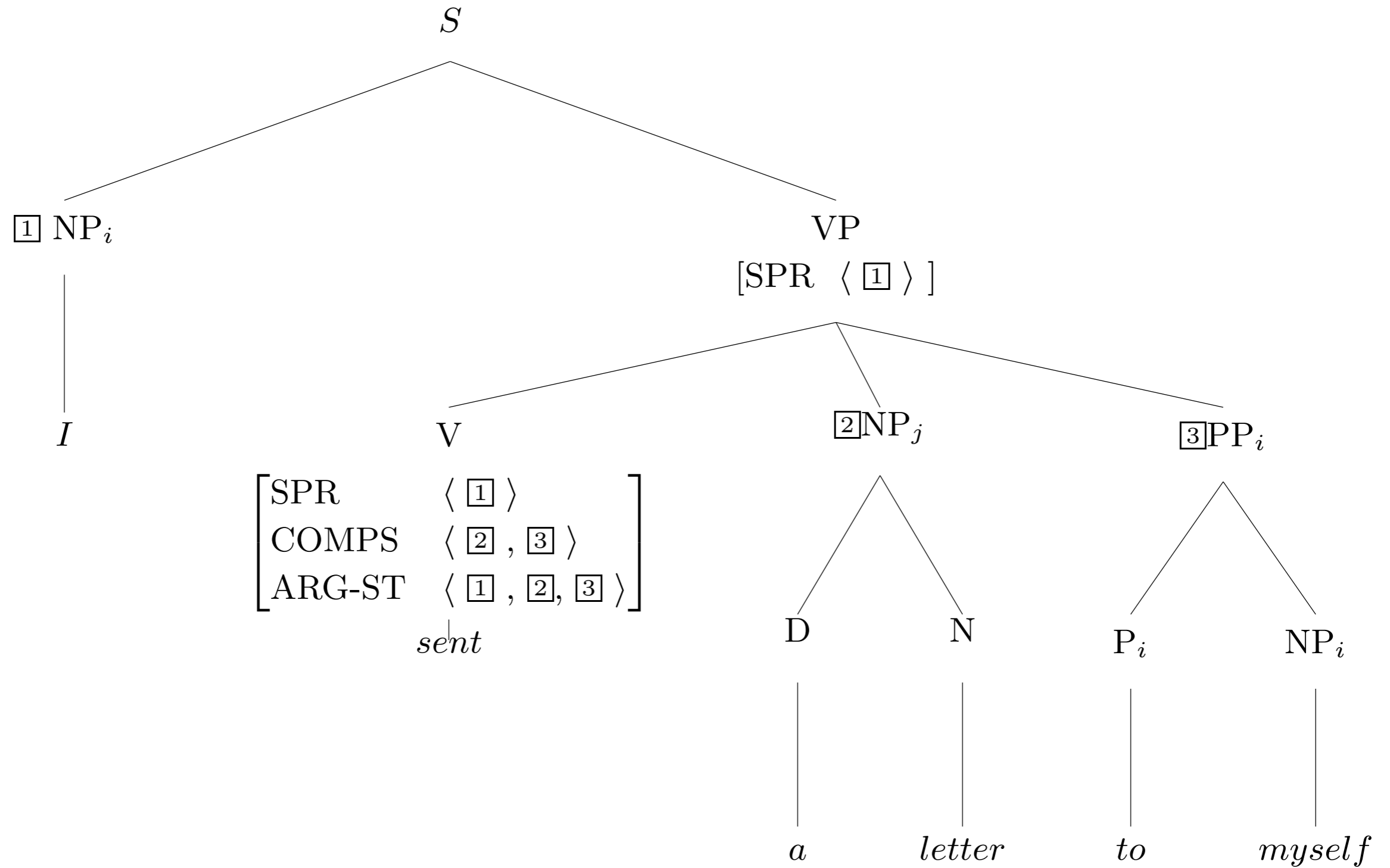
- The PP is outranked by the first NP. (Why?)
- *myself* has the same rank as the PP. (Why?)
- So, *myself* is outranked by the first NP. (Why?)
- Therefore, Principle A is satisfied.

Replacing *myself* with *me*
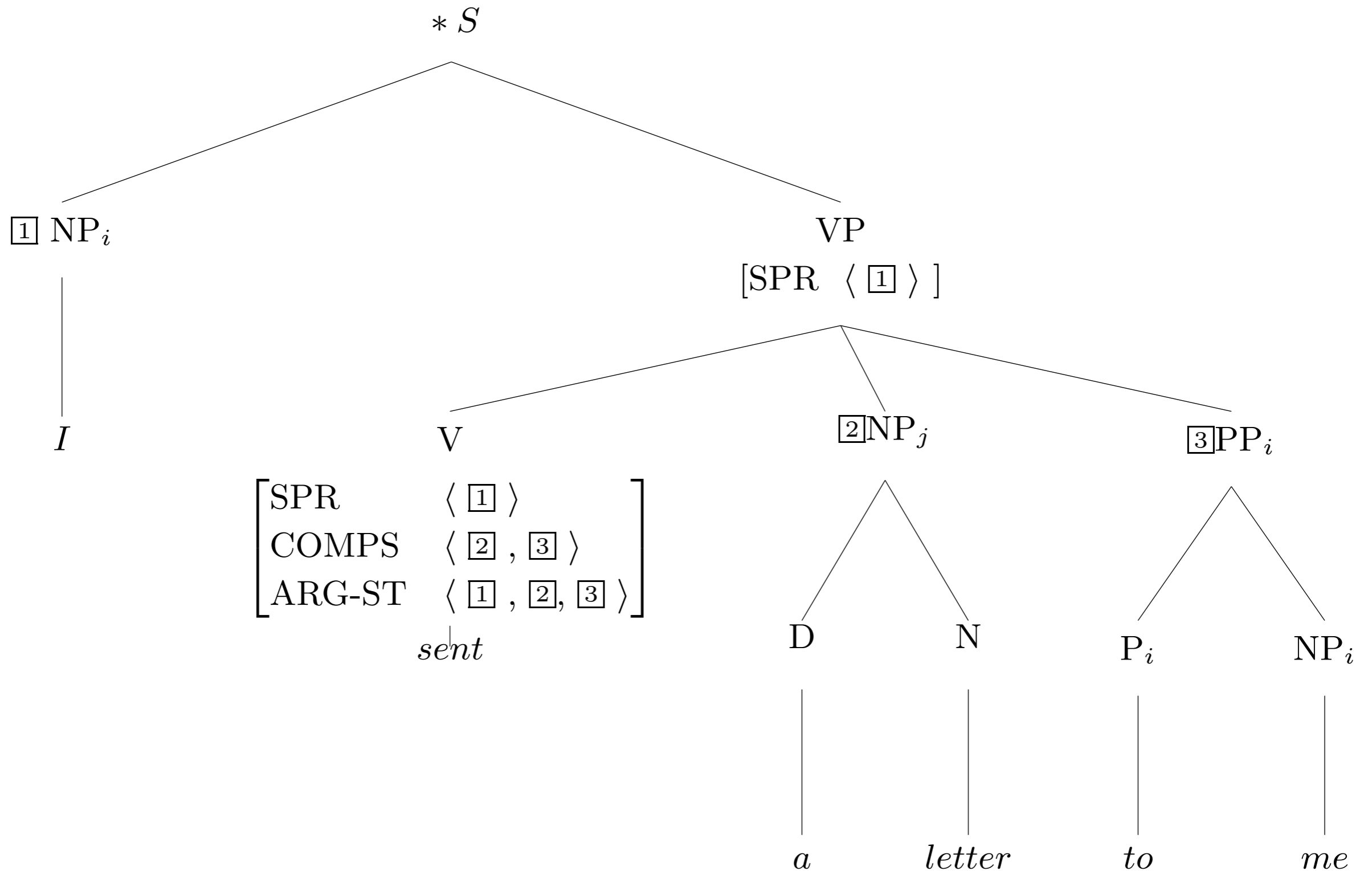
$$*\,S$$

$$\text{\framebox{1}}\ \mathrm{NP}_i$$

$$\mathrm{VP}$$
$$[\mathrm{SPR}\ \ \langle\ \text{\framebox{1}}\ \rangle\ ]$$

$$I$$

$$\mathrm{V}$$

$$\begin{bmatrix} \mathrm{SPR} & \langle\ \text{\framebox{1}}\ \rangle \\ \mathrm{COMPS} & \langle\ \text{\framebox{2}}\ ,\ \text{\framebox{3}}\ \rangle \\ \mathrm{ARG\text{-}ST} & \langle\ \text{\framebox{1}}\ ,\ \text{\framebox{2}},\ \text{\framebox{3}}\ \rangle \end{bmatrix}$$

sent

$$\text{\framebox{2}}\mathrm{NP}_j$$

$$\mathrm{D}$$

$$\mathrm{N}$$

$$\text{\framebox{3}}\mathrm{PP}_i$$

$$\mathrm{P}_i$$

$$\mathrm{NP}_i$$

a *letter* *to* *me*

The ARG-ST

$$\left[\text{ARG-ST} \left\langle \begin{bmatrix} \text{NP}_i \\ \text{MODE ref} \end{bmatrix}, \begin{bmatrix} \text{NP}_j \\ \text{MODE ref} \end{bmatrix}, \begin{bmatrix} \text{PP}_i \\ \text{MODE ref} \end{bmatrix} \right\rangle \right]$$

- The PP is outranked by the first NP.
- *me* has the same rank as the PP.
- So, *me* is outranked by the first NP.
- Therefore, Principle B is violated.

Another Example

$$S$$

$\boxed{1}\ NP_i$

I

VP
$[\text{SPR} \ \langle \ \boxed{1} \ \rangle]$

V

$$\begin{bmatrix} \text{SPR} & \langle \ \boxed{1} \ \rangle \\ \text{COMPS} & \langle \ \boxed{2} \ , \ \boxed{3} \ \rangle \\ \text{ARG-ST} & \langle \ \boxed{1} \ , \ \boxed{2}, \ \boxed{3} \ \rangle \end{bmatrix}$$

brought

$\boxed{2}NP_j$

D

a

N

pencil

$\boxed{3}PP_k$

P_k

with

NP_i

me

- Here *I* does not outrank *me*, so Principle B is satisfied.

Replacing *me* with *myself*

$* S$

$\boxed{1}\ \text{NP}_i$

VP
$[\text{SPR}\ \langle\ \boxed{1}\ \rangle\ ]$

I

V
$$\begin{bmatrix} \text{SPR} & \langle\ \boxed{1}\ \rangle \\ \text{COMPS} & \langle\ \boxed{2}\ ,\ \boxed{3}\ \rangle \\ \text{ARG-ST} & \langle\ \boxed{1}\ ,\ \boxed{2},\ \boxed{3}\ \rangle \end{bmatrix}$$
brought

$\boxed{2}\text{NP}_j$

D

N

$\boxed{3}\text{PP}_k$

P_k

NP_i

a

pencil

with

myself

- Here *I* does not outrank *myself*, so Principle A is violated.

Imperatives

- Have the internal structure of a VP
  Leave!
  Read a book!
  Give the dog a treat!
  Put the ice cream in the freezer!

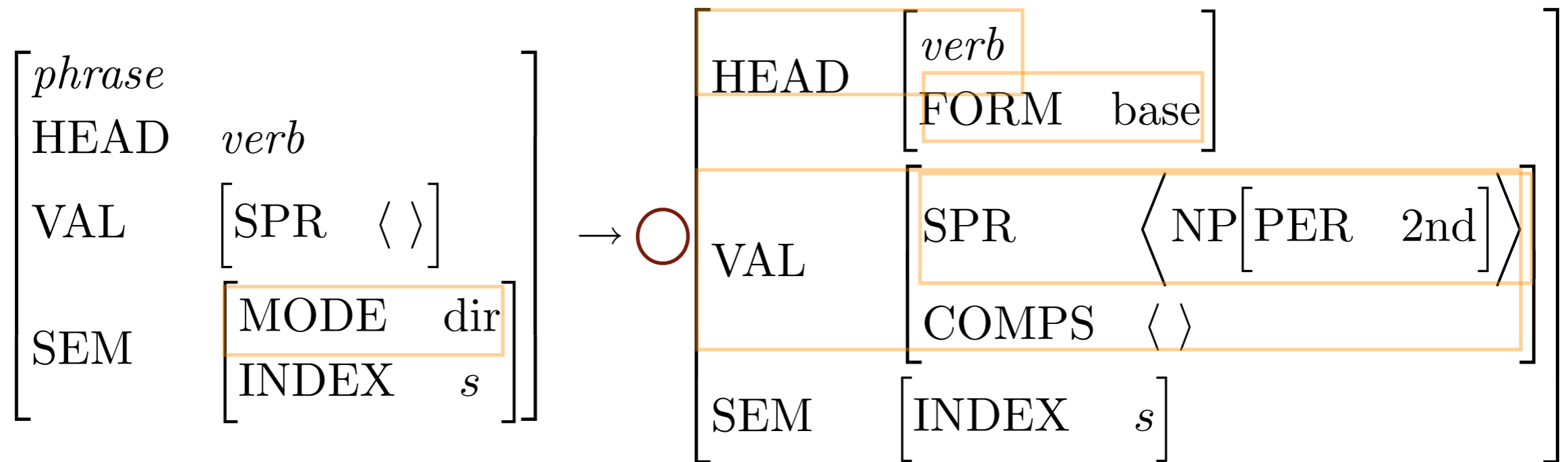- Function as **directives**

- Have the verb in base form

  Be careful!   not   **Are careful!*

- Allow 2nd person reflexives, and no others

  Defend yourself! vs. **Defend myself/himself!*

The Imperative Rule

$$
\begin{bmatrix} phrase \\ \text{HEAD} \quad verb \\ \text{VAL} \quad \begin{bmatrix} \text{SPR} \quad \langle \, \rangle \end{bmatrix} \\ \text{SEM} \quad \begin{bmatrix} \text{MODE} \quad dir \\ \text{INDEX} \quad s \end{bmatrix} \end{bmatrix} \rightarrow \bigcirc \begin{bmatrix} \text{HEAD} \quad \begin{bmatrix} verb \\ \text{FORM} \quad base \end{bmatrix} \\ \text{VAL} \quad \begin{bmatrix} \text{SPR} \quad \langle \text{NP}\begin{bmatrix} \text{PER} \quad 2nd \end{bmatrix} \rangle \\ \text{COMPS} \quad \langle \, \rangle \end{bmatrix} \\ \text{SEM} \quad \begin{bmatrix} \text{INDEX} \quad s \end{bmatrix} \end{bmatrix}
$$

- Internal structure of a VP
- Directive function
- Base form
- Only 2nd person reflexives

- Note that this is not a headed rule. Why?
- Answer: It would violate the HFP and the SIP.

Imperative example
(Combining constraints again)

What's the SPR value on S?
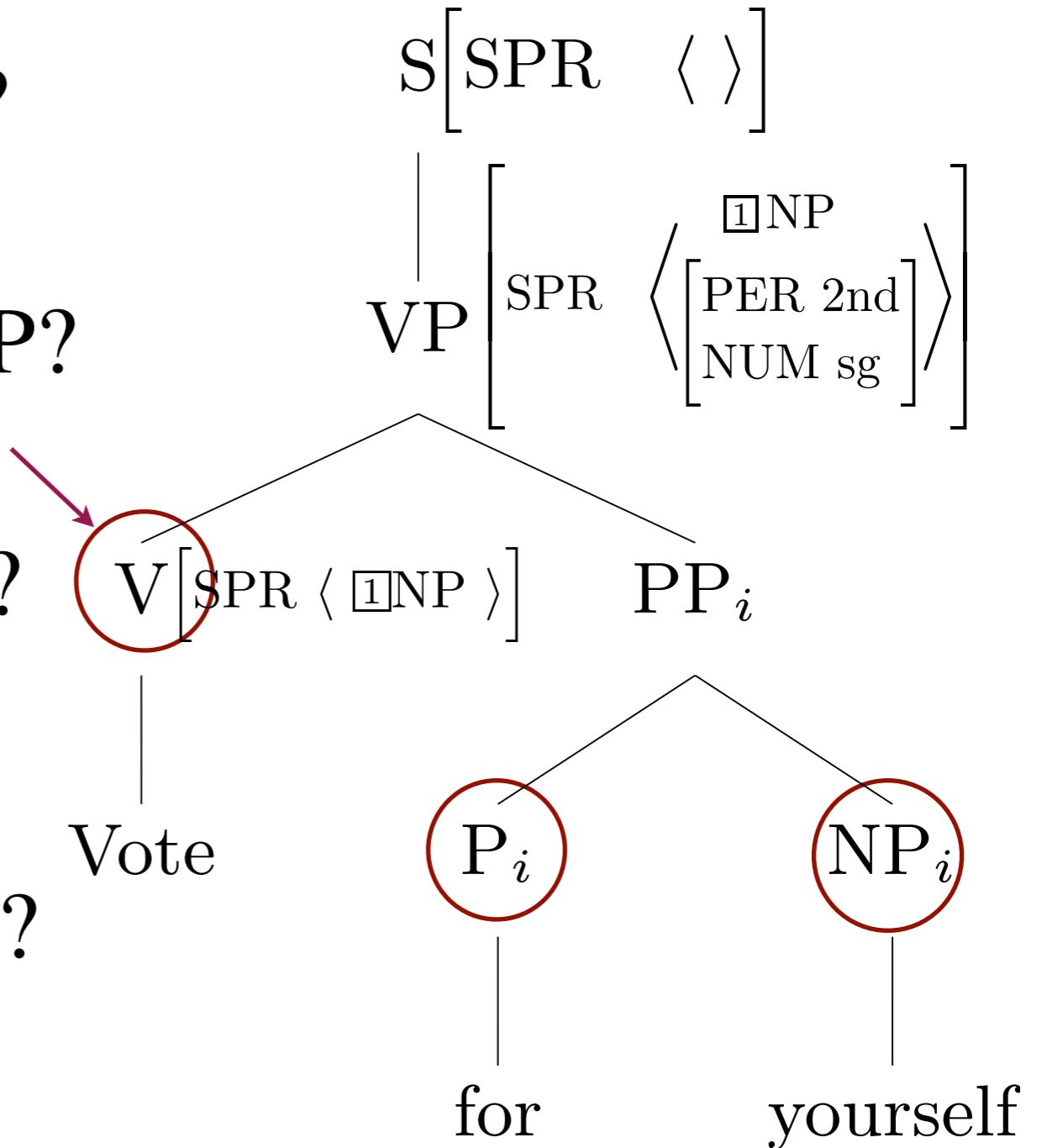
Why?

What's the SPR value on VP?
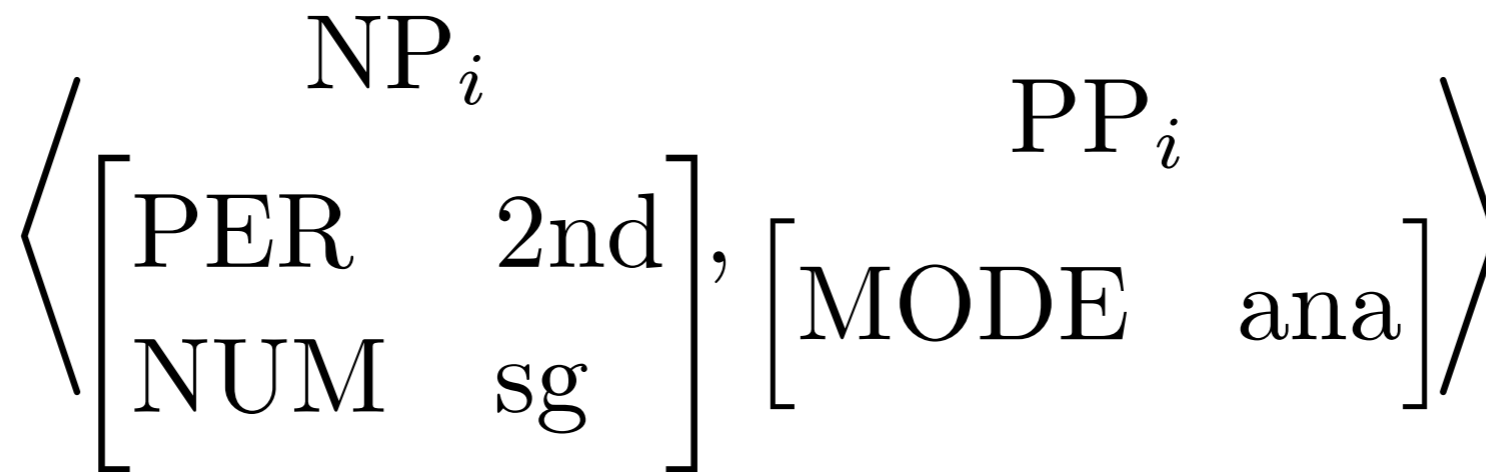
Why?

What's the SPR value on V?

Why?

Which nodes have ARG-ST?

Which ARG-ST matters for
 the licensing of yourself?

$$S\left[\text{SPR} \quad \langle \ \rangle\right]$$

$$VP\left[\text{SPR} \quad \left\langle \begin{bmatrix} \boxed{1}\text{NP} \\ \begin{bmatrix} \text{PER 2nd} \\ \text{NUM sg} \end{bmatrix} \end{bmatrix} \right\rangle\right]$$

$V\left[\text{SPR} \ \langle \ \boxed{1}\text{NP} \ \rangle\right]$ 　 PP_i

Vote 　 P_i 　 NP_i

for 　 yourself

ARG-ST on *vote*

$$\left\langle \begin{array}{c} \mathrm{NP}_i \\ \begin{bmatrix} \mathrm{PER} & \mathrm{2nd} \\ \mathrm{NUM} & \mathrm{sg} \end{bmatrix} \end{array}, \begin{array}{c} \mathrm{PP}_i \\ \begin{bmatrix} \mathrm{MODE} & \mathrm{ana} \end{bmatrix} \end{array} \right\rangle$$

- Is Principle A satisfied?

- How?

- Is Principle B satisfied?

- How?

Day 1 Revisited

- Recall

  F---- yourself!   *F---- you!*
  Go f--- yourself!   **Go f---- you!*

- *F--- NP!* has two analyses
  - As an imperative
  - As a truly subjectless fixed expression.

- *Go f---- NP!* can only be analyzed as an imperative.

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Reading Questions

- Why do we need it? Couldn't we just define rank to talk about SPR & COMPS?

- Is ARG-ST denoted separately from SYN and SEM because it contains elements of both? What would be the disadvantages to including ARG-ST within an entry's SYN value?

- Why is ARG-ST only a feature of words, not phrases?

- Is there ever the case when the ARG-ST is empty and the SPR, COMPS are not?

Reading Questions

- On page 211, there's a mention of "prepositions like around being unintuitively treated as not directly contributing to the semantics of the sentence. A full analysis of these facts is beyond the scope of this book." What does this mean, and what's unintuitive about it?

- It was mentioned that the formal machinery developed in this chapter involves positing two kinds of lexical entries for each preposition. In such case, how would an automatic parser know which lexical entry to use while deciding to accept a sentence or not?

Reading Questions

- Doesn't the definition of the Imperative Rule violate the SIP?

- What does it mean that "the Imperative Rule is not a headed rule"? The rule contains "HEAD verb" which, if that doesn't make it headed, I'm very confused about. I guess I'm wondering how I could look at this rule and know that it is not headed.

Reading Questions

- It struck me as funny that the SPR < NP[PER 2nd] > reference something that is 'understood', but not represented as a structure in the tree. Since the semantics of (41) are incomplete (we don't represent the 'understood' subject), I'm wondering why the approach was to not put in a structure for the understood NP *you* and give it some visibility feature. Is the because we are attempting to match the surface form of the phrase?

- I was wondering if the imperative rule, as currently stated, would prevent us from including the NP[2nd] present in the VP's ARG-ST.

Reading Questions

- How do we account for imperative sentences like the following:

    Everyone consider yourself lucky

- Here, the subject of our sentence *everyone*, is a 3rd pl noun, yet the reflexive pronoun *yourself*, which I assume would be coindexed with the subject is 2nd sing. How should we analyze this?

Reading Questions

- Isn't the construction like *Let us*... considered imperative sentences with a 1st person plural as a subject? As *us* is certainly referencing the same (not visible) subject NP of *we*, shouldn't it be a reflexive pronoun?

Reading Questions

- Why do we distinguish between coindexing and coreferencing?

- Could we state that coindexing implies coreference, but coreference does not imply coindexing, therefore conindexing and coreference will not always match? The text mentions that binding theory deals with constraints to variable (index) identity, but not assignment of the actual (reference) values. Is there any other mechanism outside of binding theory that we could use in our grammar theory to address situations where we have coreference but not coindexing?

Reading Questions

- If I understand correctly, coindexing has more to do with marking features which must have the same AGR value, while coreference indicates that the two referents refer to the same instance of an object (which will naturally have the same AGR values because they refer to the same object instance). Is this an accurate understanding of the difference between coindexing and coreferencing?

Reading Questions

- I wasn't sure I agreed with or could really understand the example on page 209 of an NP that is not coreferential with an apparent antecedent. The example:

  My family hates cornflakes. But they love granola.

- How can family and they possibly be considered two distinct entities here? I understand the example of he and she. I could see how they would be indexed to individuals in the RESTR value of couple based on our semantic model--but if they doesn't index the family entity directly, what would it index?

Reading Questions

- At one point we were shown an example and told, reasonably, that "there are independent factors of plausibility that interact to diminish the acceptability of many grammatical examples." Why aren't those factors simply incorporated into the formal grammar or lexical entries in much the same way that semantics are?

Reading Questions

- Chapter 7 references the "intuition" of well-formedness many times when talking about reflexives. But there's definitely variation among speakers about what "sounds right" in terms of reflexives, like in the example (27c). I thought the second sentence sounded "more right" to me:

    Susan wrapped the blanket around her.

    Susan wrapped the blanket around herself.

- How do we account for these shades of well-formedness? Should the grammar accept both "around her" and "around herself"? It seems unproductive to have a parser reject one intuition in favor of another, since both types of reflexives will occur in real text.