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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*
- *Shei likes heri.*
- *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.*

Some Terminology

- <u>Binding</u>: The association between a pronoun and an antecedent.

- <u>Anaphoric</u>: A term to describe an element (e.g. a pronoun) that derives its interpretation from some other expression in the discourse.

- <u>Antecedent</u>: The expression an anaphoric expression derives its interpretation from.

- <u>Anaphora</u>: The relationship between an anaphoric expression and its antecedent.

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.

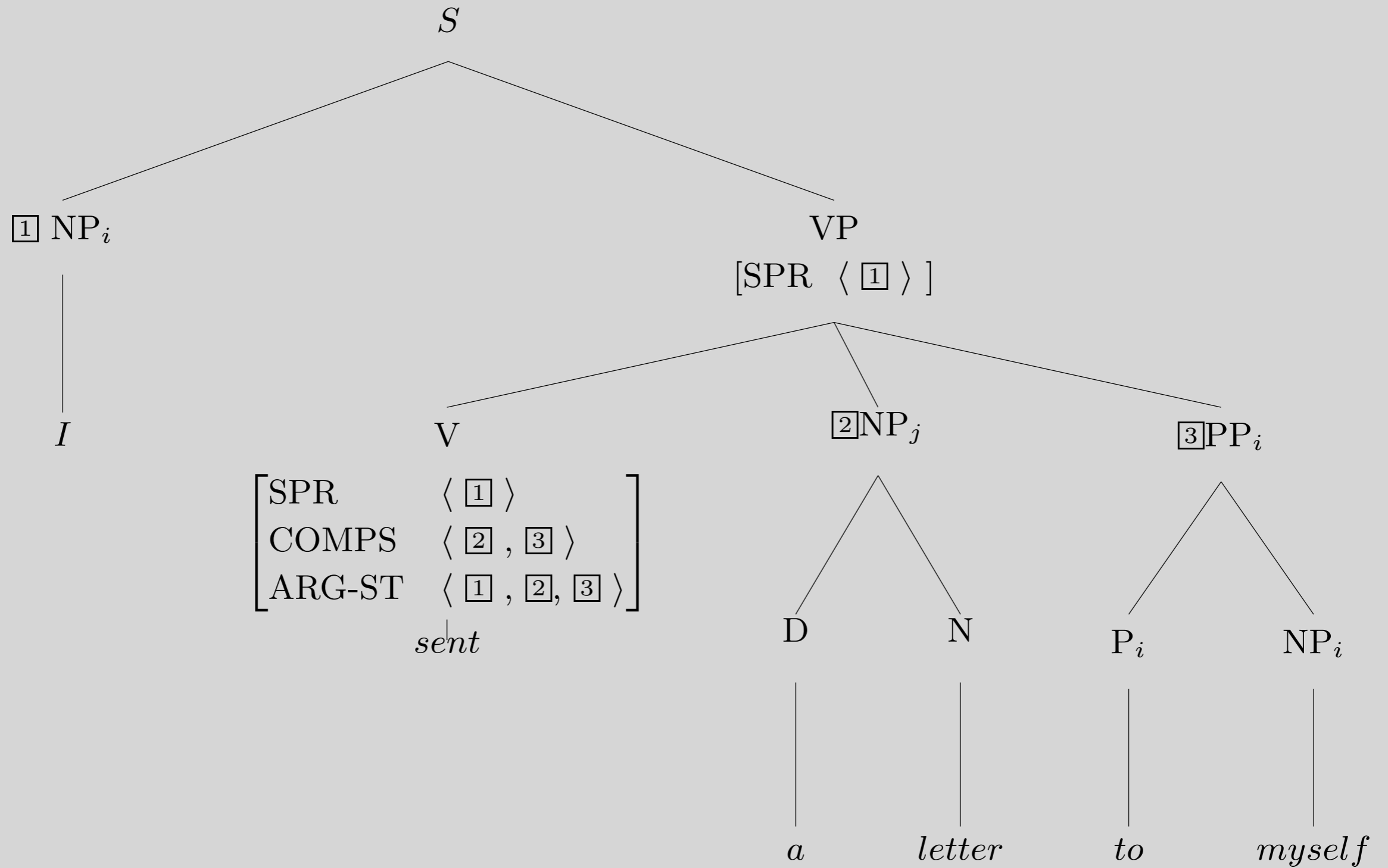- "Predicative": Introduce their own predication.

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
[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

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

- 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*
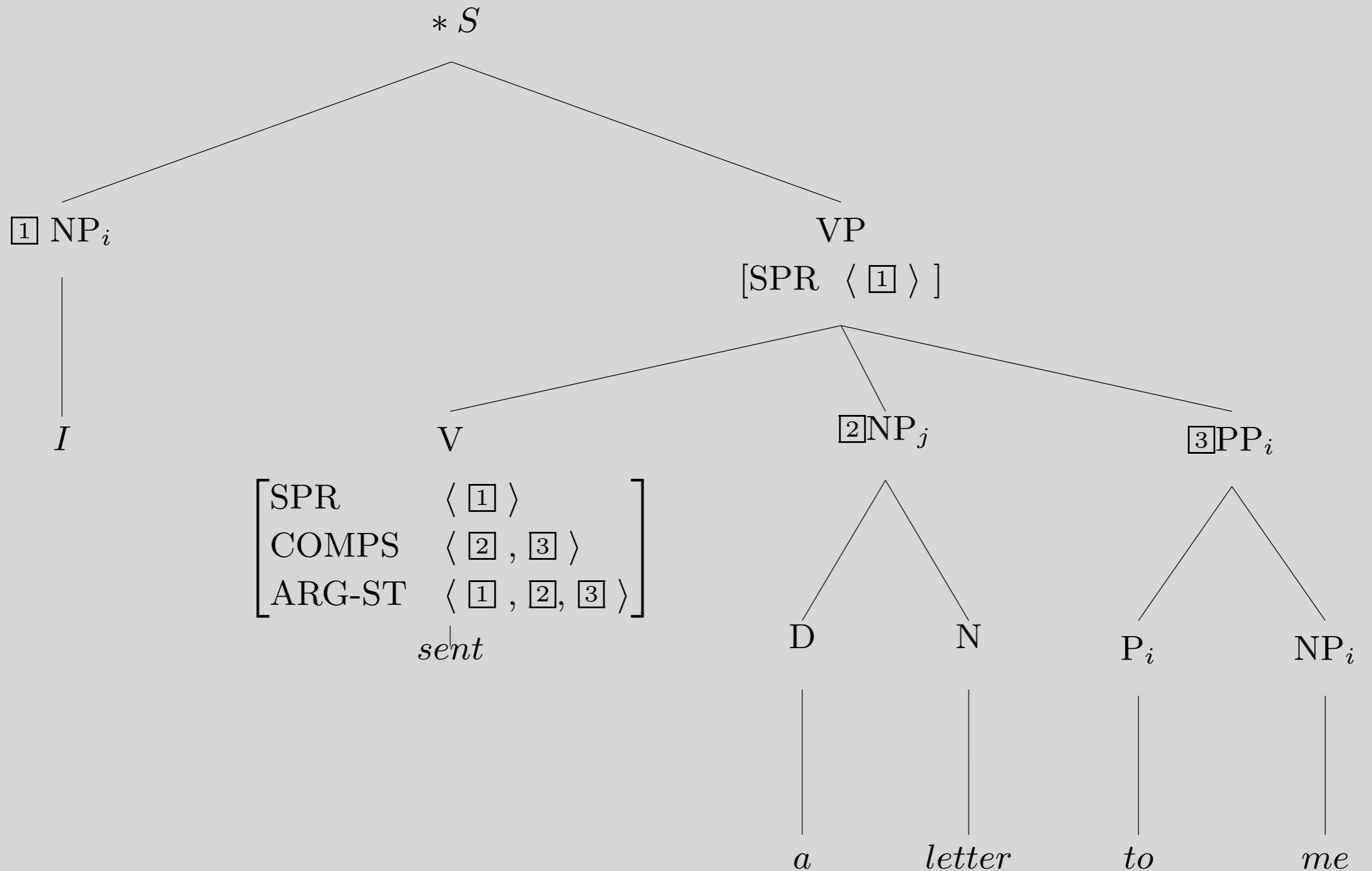
$* S$

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

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

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

D

N

a

letter

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

P_i

NP_i

to

me

The ARG-ST

$$\left[\text{ARG-ST} \left\langle \begin{bmatrix} \text{NP}_i \\ \text{MODE ref} \end{bmatrix}, \begin{bmatrix} \text{NP}_j \\ \text{MODE ref} \end{bmatrix}, \begin{bmatrix} \text{PP}_i \\ \text{MODE ref} \end{bmatrix} \right\rangle \right]$$
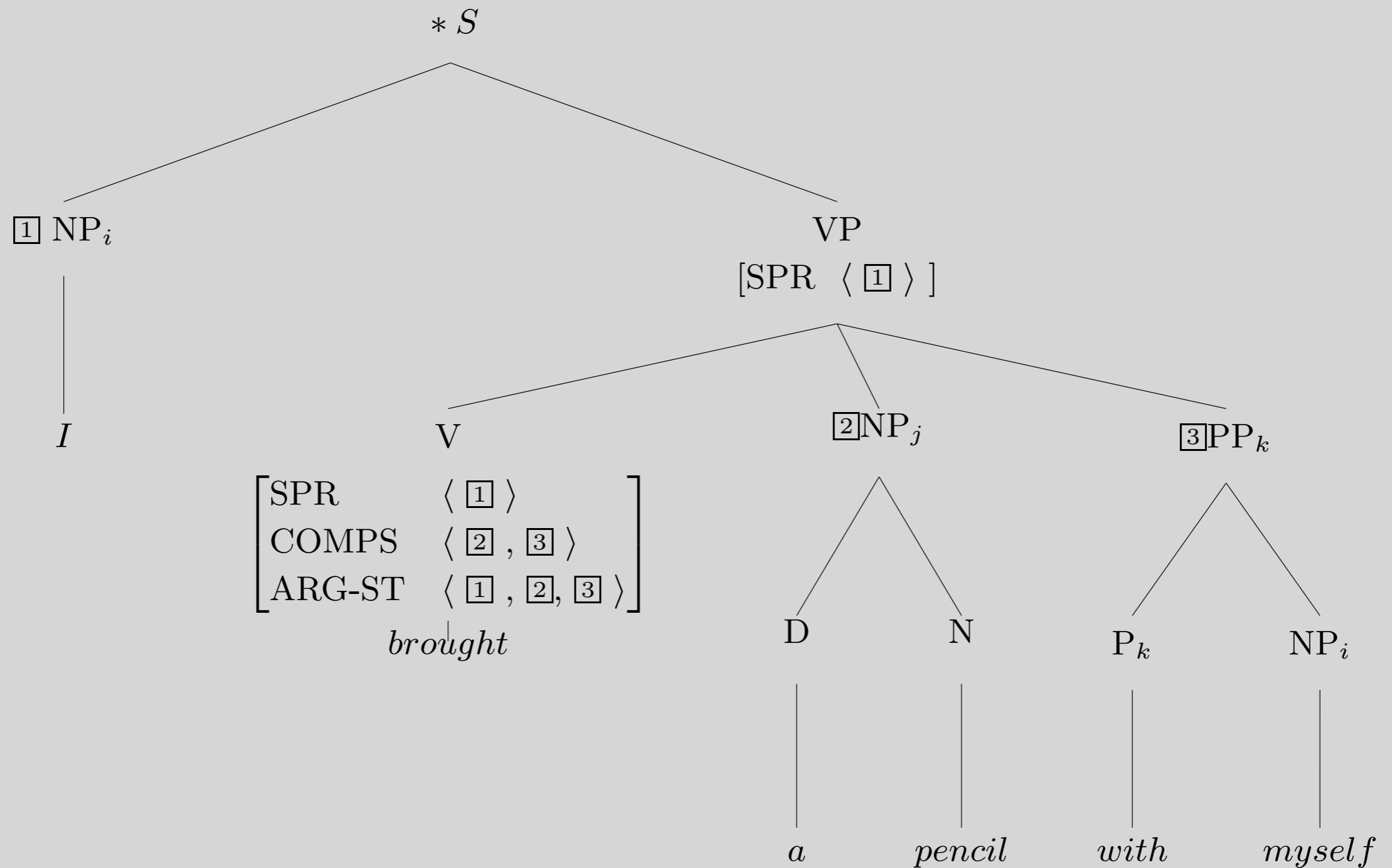
- The PP is outranked by the first NP.
- *me* has the same rank as the PP.
- So, *me* is outranked by the first NP.
- Therefore, Principle B is violated.

Another Example

$$S$$

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

I $\quad\quad\quad\quad\quad\quad$ V $\quad\quad\quad\quad\quad$ $\boxed{2}NP_j$ $\quad\quad\quad\quad$ $\boxed{3}PP_k$

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

brought

D $\quad\quad$ N $\quad\quad\quad$ P_k $\quad\quad$ NP_i

a $\quad\quad$ *pencil* $\quad\quad$ *with* $\quad\quad$ *me*
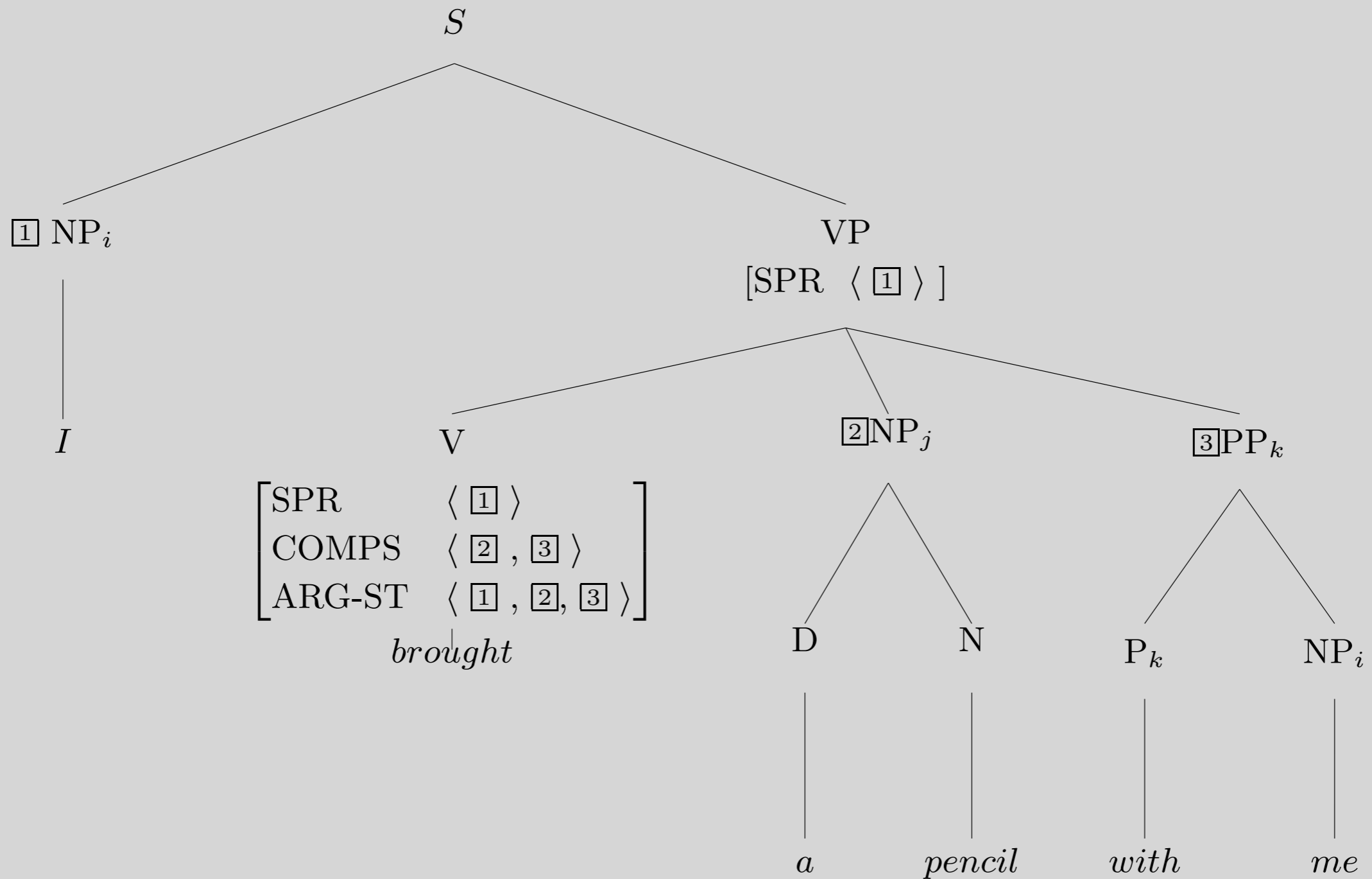
- Here *I* does not outrank *me*, so Principle B is satisfied.

Replacing *me* with *myself*

$* S$

$\boxed{1}\ NP_i$

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

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!
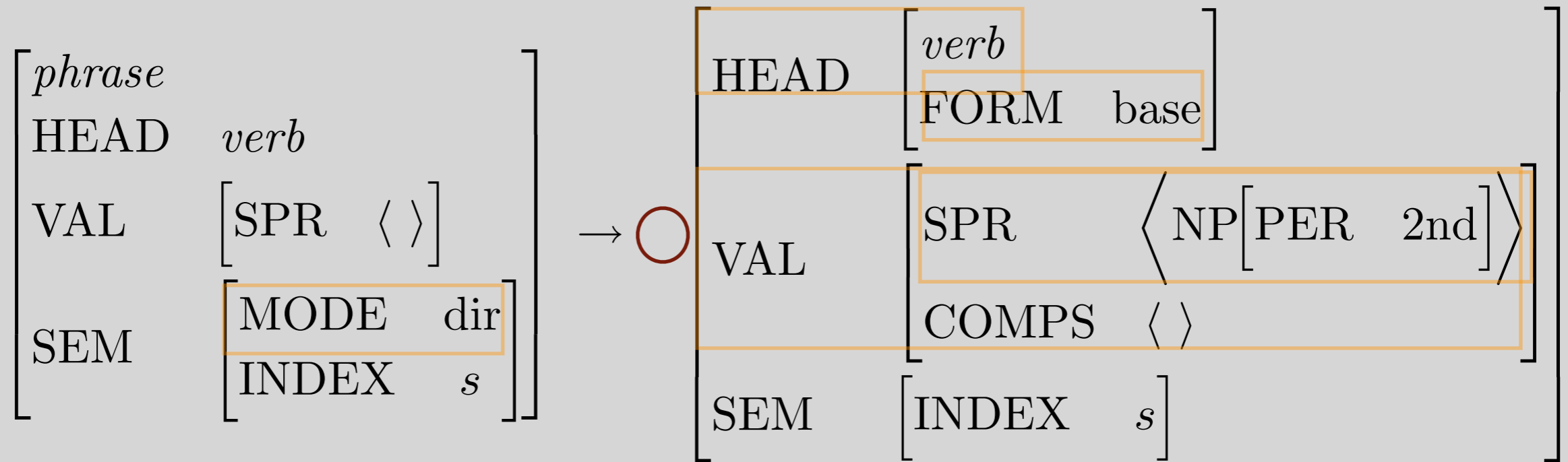
- Function as **directives**

- 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

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

- 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.

Reading Questions

- I got a little confused by the analysis of imperatives, in particular, the use of the SPR on the imperative verb. I don't get how this "ghost" SPR works in our grammar. If something shows up on the SPR list of a word that's in a well-formed tree, doesn't that thing need to actually be in the tree? I also noticed that the end of this section says this was a "preview... of verb forms that will be developed in the next chapter." Does that mean I should not worry about it for now?

Imperative example
(Combining constraints again)

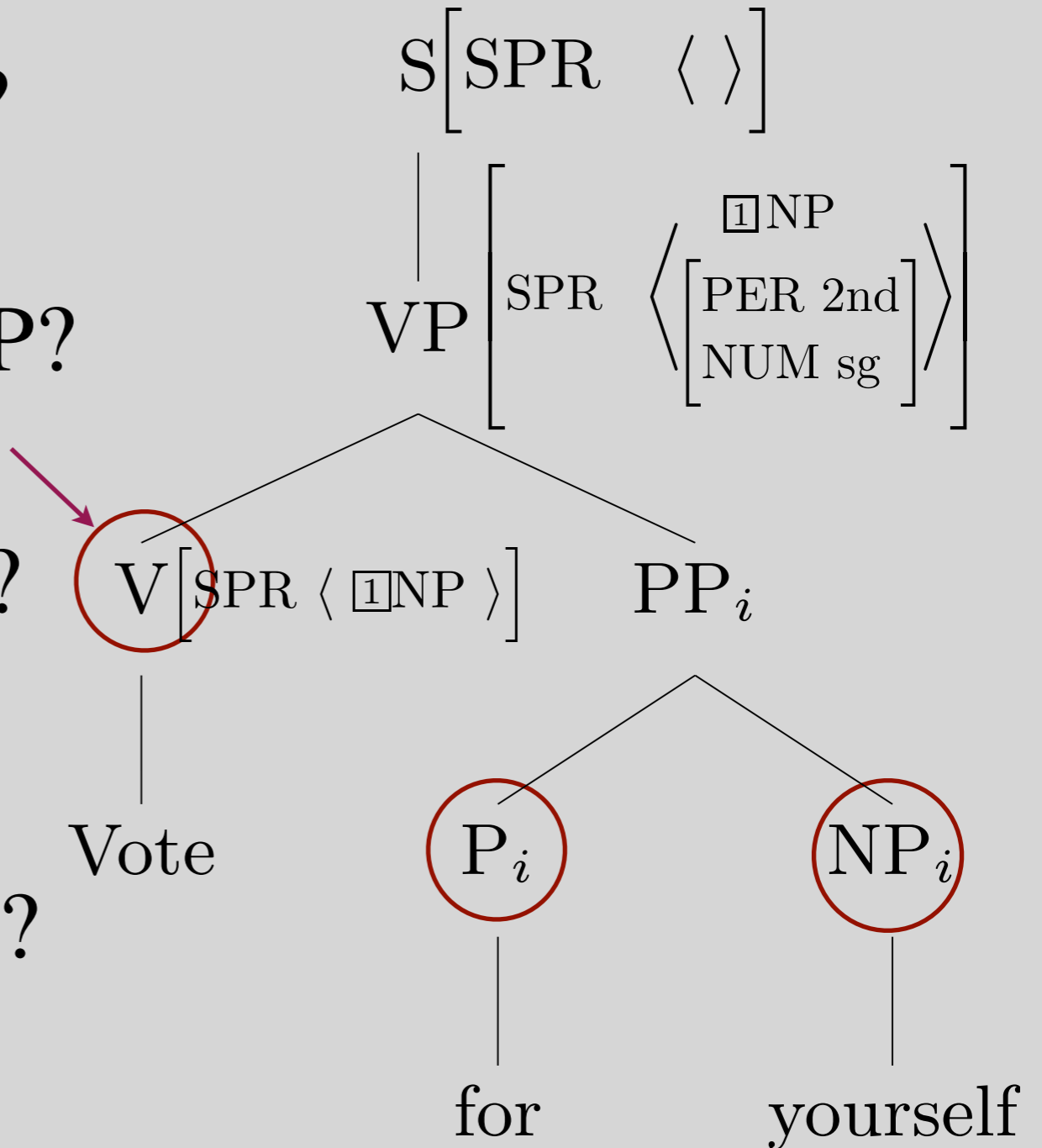What's the SPR value on S?

Why?

What's the SPR value on VP?
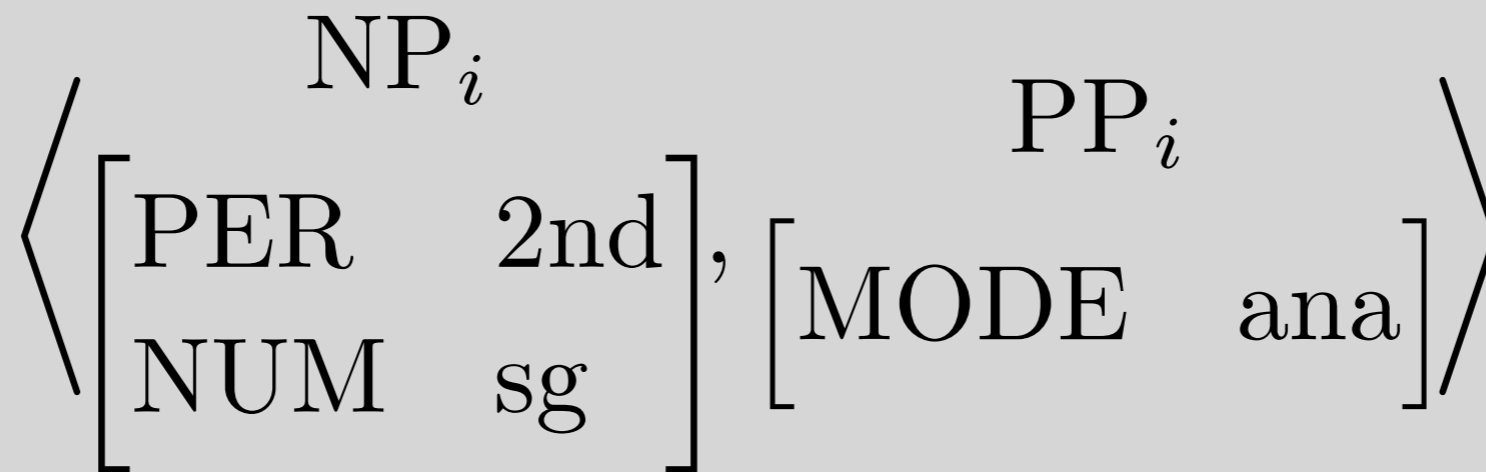
Why?

What's the SPR value on V?

Why?

Which nodes have ARG-ST?

Which ARG-ST matters for
the licensing of yourself?

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

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

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

Vote

P_i

NP_i

for

yourself

ARG-ST on *vote*

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

- 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.

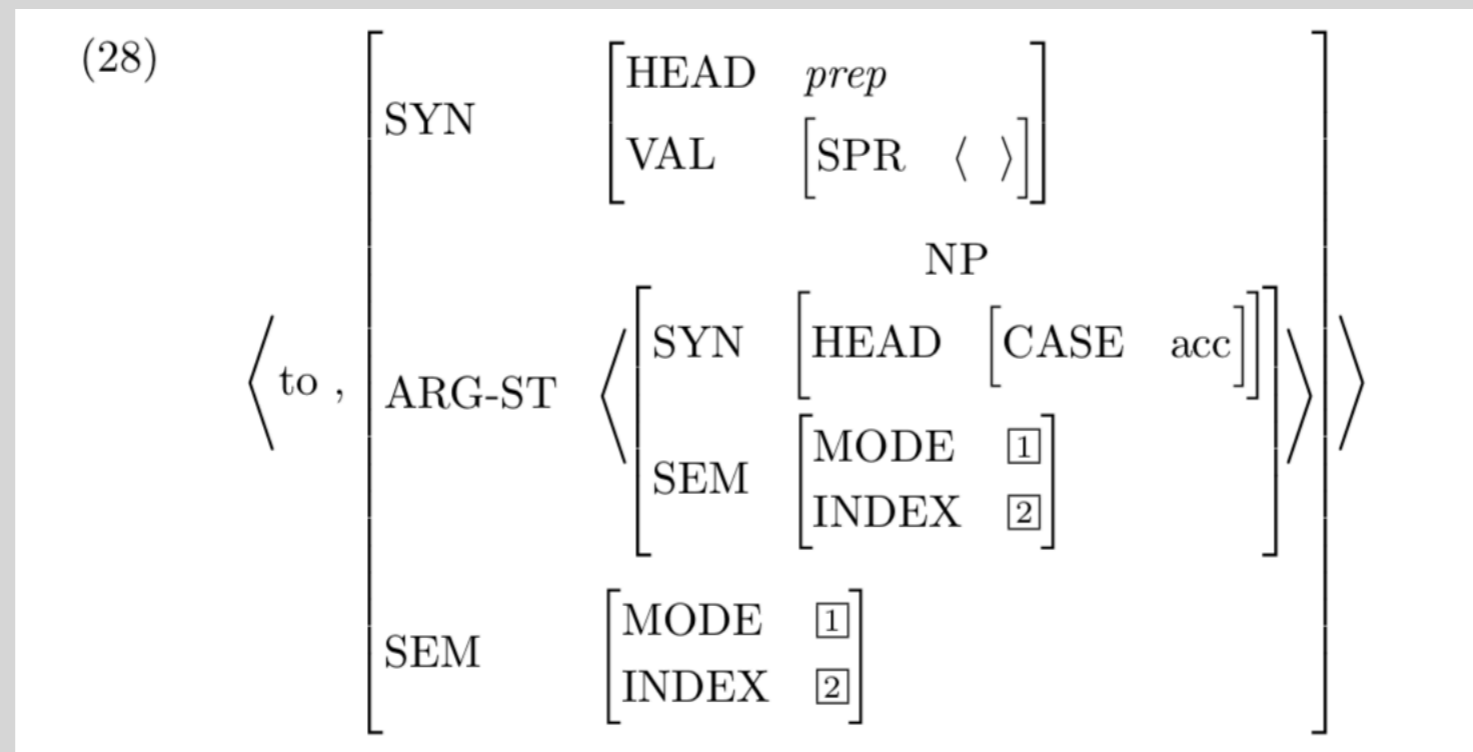- *Go f---- NP!* can only be analyzed as an imperative.

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

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Reading Questions

- Does the AGR-ST "hierarchy" refer to the fact that the elements are listed in order? I don't quite understand what is hierarchical about the formulation of AGR-ST.

- What is the functional purpose of including the ARG-ST list rather than taking that information manually from the SPR and COMPS lists? I think that it is discussed in the paragraph right before example 14, but I'm not sure where this becomes necessary or useful.

Reading Questions

- Re no COMPS feature shown on the lexical entry for to in (28). Because the SPR list is empty and we have a value in the ARG-ST list, doesn't this mean that the NP in the ARG-ST list must be coming from the COMPS list (due to the ARP)? Is COMPS just being omitted because it's not necessary for the point the example is making about argument-marking prepositions sharing the MODE and INDEX values of their objects (but for a fully-specified lexical entry it would be included)?

$$(28) \quad \left\langle to, \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & prep \\ \text{VAL} & [\text{SPR} \langle \rangle] \end{bmatrix} \\ \text{ARG-ST} & \left\langle \begin{matrix} \text{NP} \\ \begin{bmatrix} \text{SYN} & [\text{HEAD} & [\text{CASE} & acc]] \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \boxed{1} \\ \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \end{matrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \boxed{1} \\ \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle$$

Reading Questions

- "Reflexive pronouns must be coreferential with a preceding argument of the same verb; nonreflexive pronouns cannot be."

  - (8) b. Susan$_i$'s friends like her$_i$

- Isn't *her* a nonreflexive pronoun? If her is a nonreflexive pronoun, why is it coreferenced with a preceding argument of the same verb? Otherwise, is the preceding argument = *Susan's friends*?

Reading Questions

- I thought that elements in a RESTR list aren't really in order, but in ARG-ST elements have to be ordered. Is there some rule about when things are ordered and when they're not?

- Re ARG-ST: the book says that it is a feature of words not phrases and there is no need to copy the information up the levels of the tree. Why is that so?

- When drawing a tree for a sentence does only one word have a ARG-ST value?

- Why isn't ARG-ST in SYN?

Reading Questions

- In 7.4.1, "coindexing is not the same thing as coreference; any two coindexed NPs are coreferential, but not all pairs of coreferential NPs are coindexed." So what exactly is the definition of coindex?

Reading Questions

- In example (21) "The solution to this problem is rest and relaxation", "the solution to this problem" and "rest and relaxation" are coreferential because they refer to the same entity. But in (23) "My family hates cornflakes. But they love granola", according to the textbook, "my family" and "they" refer to distinct entities. After reading these paragraphs a few times, I still don't quite understand why the latter is not coreferential.

- Could you clarify what "Binding theory constrains variable identity, not the assignments of values to variables" means?

Reading Questions

- i. Who likes Grinch?

- ii. (Only) Grinch likes Grinch.

- Would (ii) be a sentence that fails principle B? Or can we argue it is a case like (21), where Grinch1 and Grinch2 are coreferenced but not coindexed?

Reading Questions

- What is the issue with marking reflexive pronouns for agreement? Why does pronominal agreement need to be specified by its own principle instead of being represented in the AGR feature?

- Is the AAP better off being its own principle, instead of perhaps combining with Principle A? I'm just curious what goes into the decision-making of creating less principles that are more detailed vs more principles that are simpler.

Reading Questions

- How does the Argument Realization Principle handle anaphora inside modifiers? The ARG-ST only contains the members of SPR and COMPS, not modifiers. Maybe I'm still not sure how our grammar differentiates complements and modifiers. Like in this sentence: *Susan went to the park yesterday by herself*, I would assume *by herself* is a PP modifier.

- *himself* doesn't seem to be in the ARG-ST of *bought* at all. How do we model such sentences?

    - 1) John$_i$ bought some books about himself$_i$.

- The transparent MODE & INDEX approach for argument-marking Ps doesn't seem to be appropriate here, since AAP says the head *books* must not be coindexed with *himself* - *books* is pl. and *himself* is sg.

Reading Questions

- Are reflexive pronouns that are used for emphasis treated more like modifiers? Modifying the "They saw themselves example" (14) how should we interpret the following examples?

  - They themselves saw.

  - They saw themselves that the world was great

  - They saw themselves, themselves in the mirror.

Reading Questions

- One famous example of anaphora is *I like it and so do they*. Can the verb *do* also be solved by AGR-ST hierarchy?

Reading Questions

- Still confusing is the fact that the PP in example (32) is indexed as i in addition to the NPi. If two elements are coindexed, shouldn't that mean they have EXACTLY the same referent? Not the same referent plus a preposition?

- Also, how are the types of PP differentiated in our trees?

- The hardest part was understanding the mechanism for resolving reflexive pronouns in both PP and NPs. Was the gist that changing the definition of outranking allowed us to apply a heuristic that corrects for an imbalance in the original formulation?

Reading Questions

- When talking about nodes of equal rank, it says that 'if a node is coindexed with its daughter, their feature structures are of equal rank.' Does this mean that we only talk about equal rank between mother and daughter?

- Intuitively, is this distinction between predicational PPs and argument marker PPs the same as the distinction between modifier PPs and complement PPs? That is to say, do predicational PPs = modifier PPs and argument marker PPs = complement PPs?

Reading Questions

- How do we tell which PPs are argument marking and which are predicational?

- Is this distinction between different prepositions or prepositions observed in different contexts?

Reading Questions

- How does this framework handle a language which uses a reflexive inflection on the verb rather than a stand alone reflexive pronoun? Is this sort of reflexive realization more in the semantic territory of the verb and could be indexed from the RESTR list with it's SPR value; is there a need to treat such a form differently from a non reflexive verb in the language?