Ling 566
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Binding Theory, Imperatives

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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

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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.*

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Some Terminology

- Binding: The association between a pronoun and an antecedent.
- Anaphoric: A term to describe an element (e.g. a pronoun) that derives its interpretation from some other expression in the discourse.
- Antecedent: The expression an anaphoric expression derives its interpretation from.
- Anaphora: The relationship between an anaphoric expression and its antecedent.

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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.

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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.

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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").

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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.

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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

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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.

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Two Bits of Technical Machinery

- Definition: 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.

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The Binding Principles

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

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

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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.

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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.

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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.

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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.

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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.

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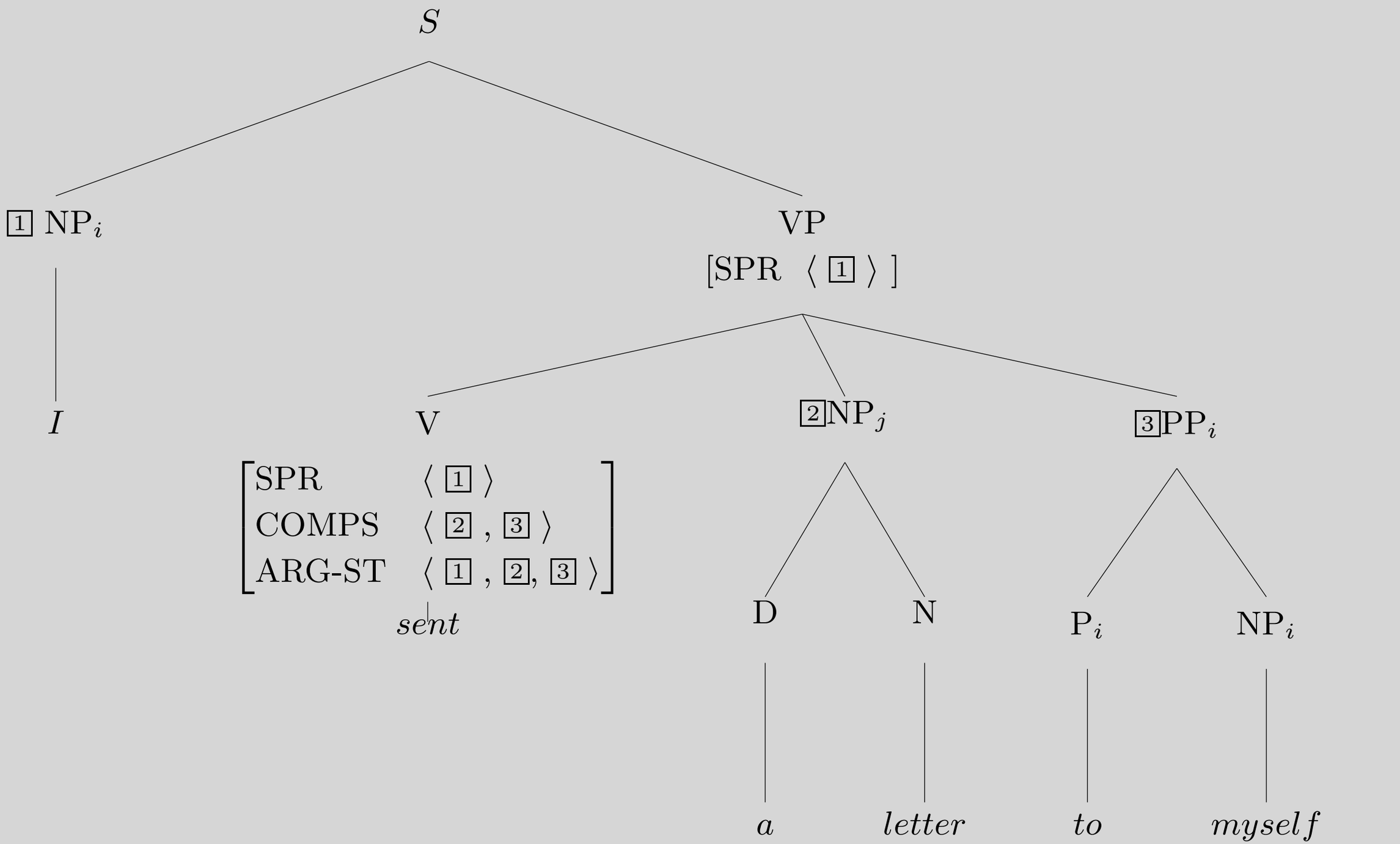
An Example



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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.

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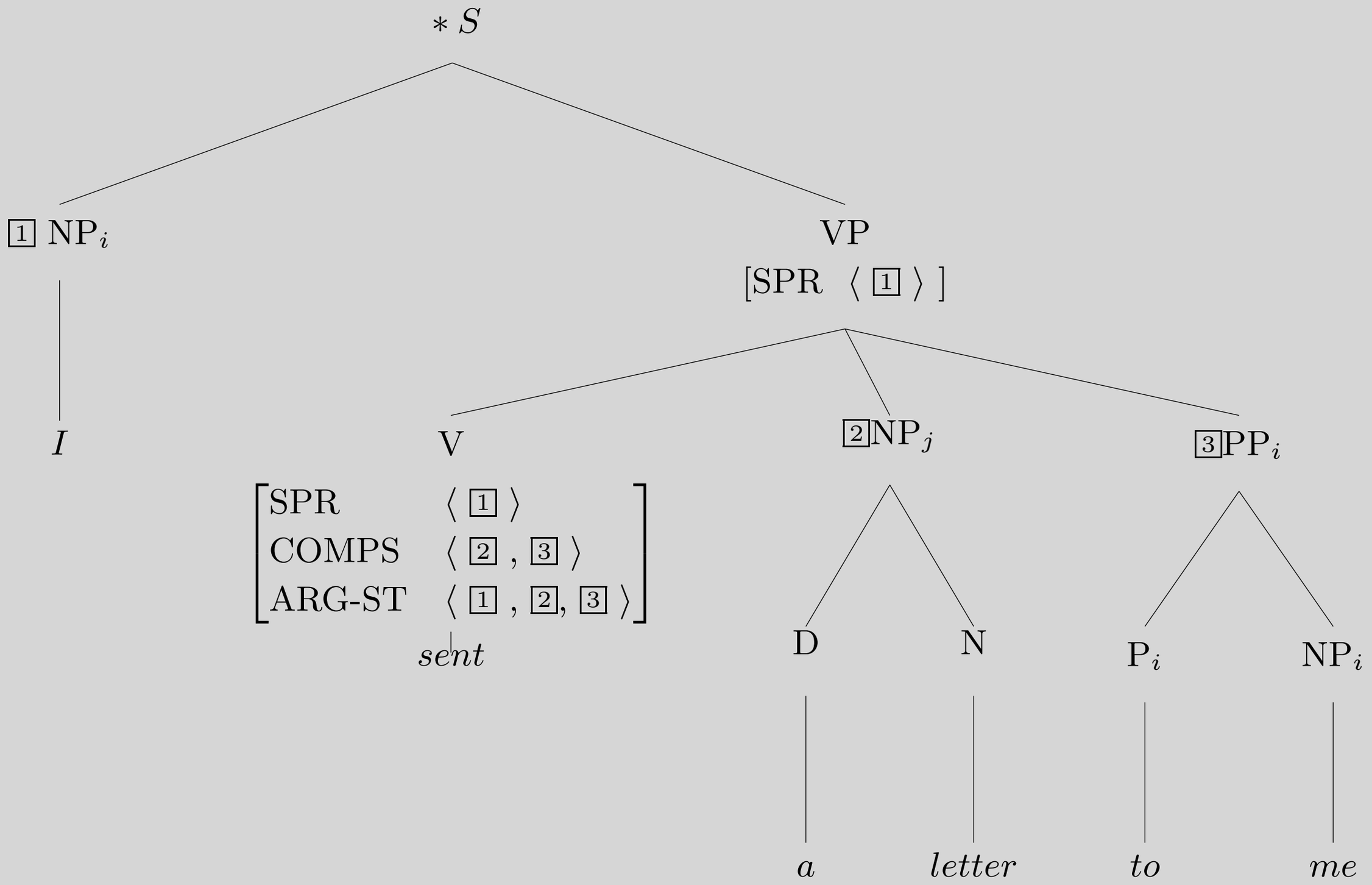
Replacing *myself* with *me*



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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.

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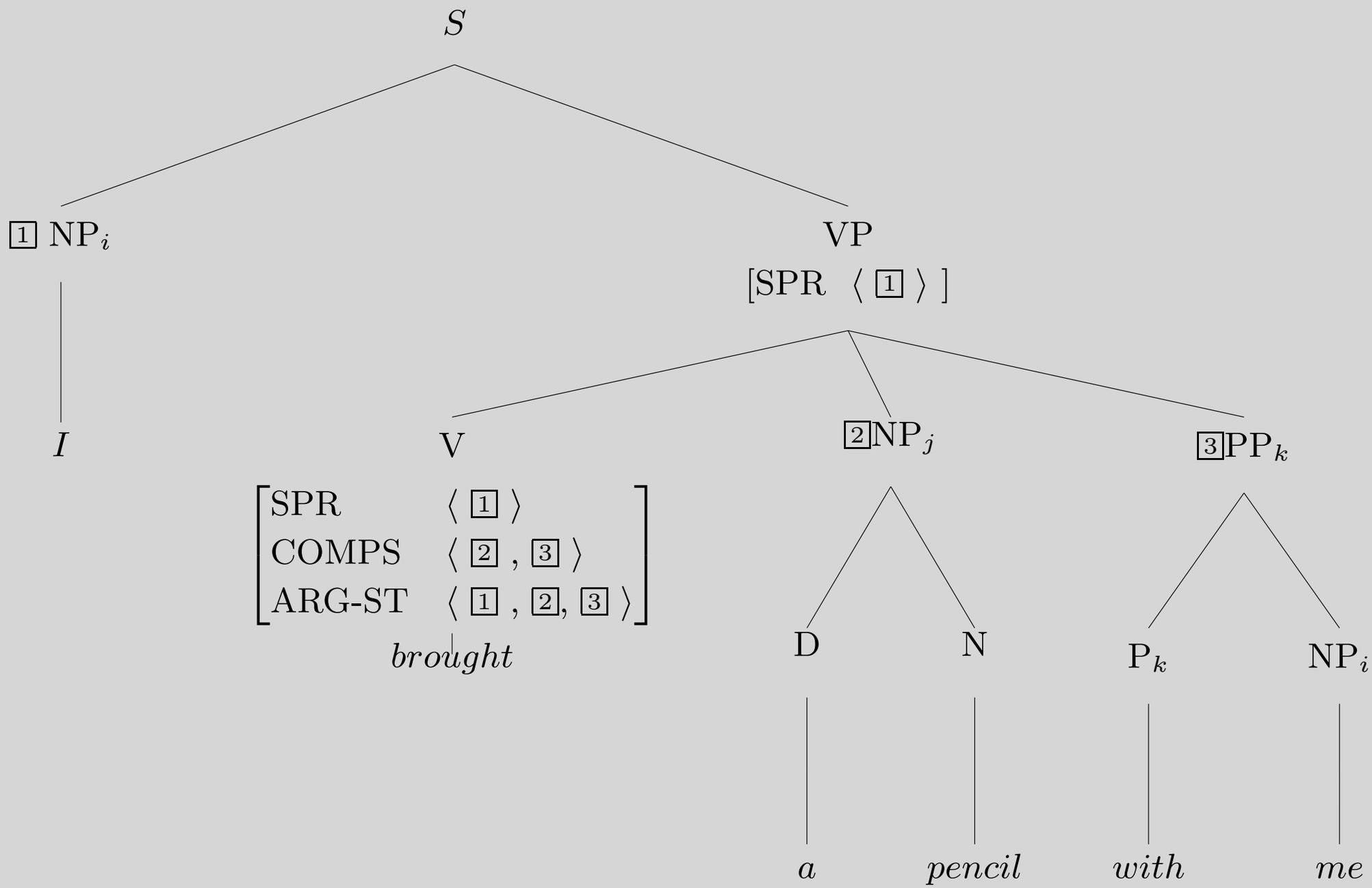
Another Example



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

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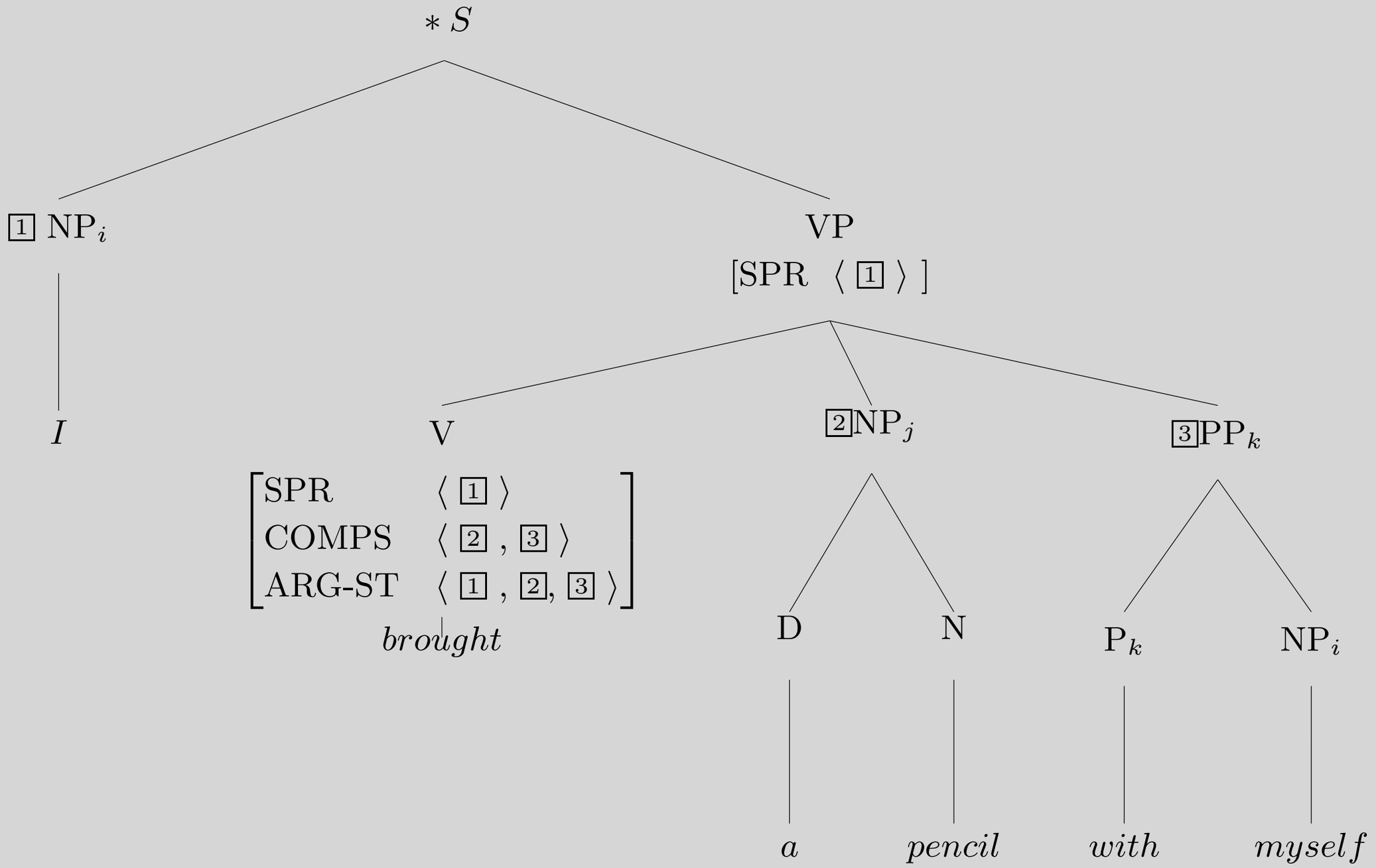
Replacing *me* with *myself*



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

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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!*

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The Imperative Rule

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

- 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.

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Imperative example (Combining constraints again)

What's the SPR value on S?

Why?

What's the SPR value on VP?

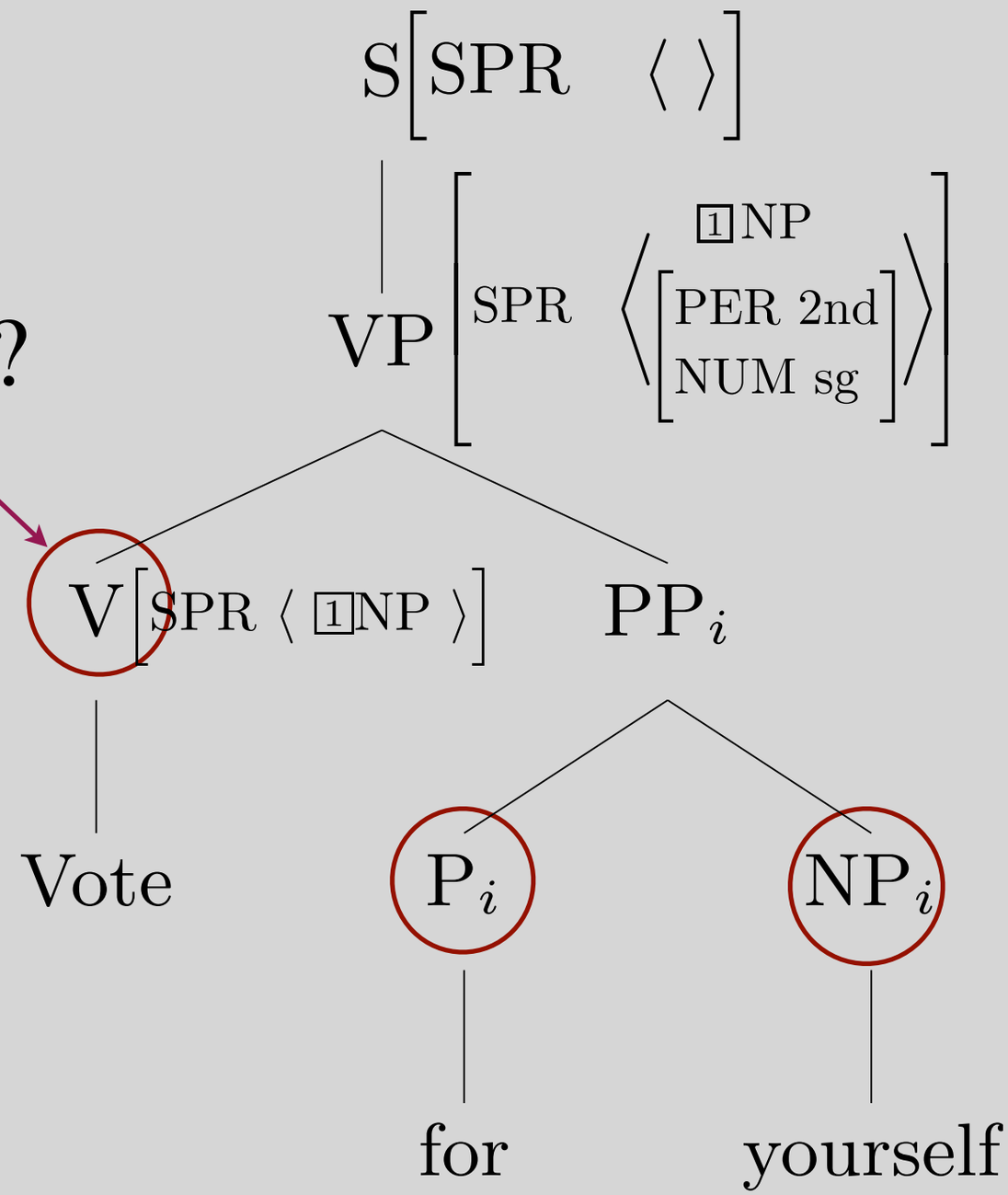
Why?

What's the SPR value on V?

Why?

Which nodes have ARG-ST?

Which ARG-ST matters for the licensing of yourself?



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ARG-ST on *vote*

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

- Is Principle A satisfied?
- How?
- Is Principle B satisfied?
- How?

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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

- How does the grammar account for special cases in which an anaphoric pronoun appears without an antecedent, e.g. *As for myself a burger will do nicely*?

- I am trying to come up with the ARG-ST for the V in *the girl bought her sister a toy by herself*. It seems like this is the same situation from (34) where we can reasonably assume that *bought* does not refer to *her sister* -- are these parallel ARG-ST features?

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Reading Questions

- Chapter 7 did not cover the use of reflexive pronouns for emphasis (or multiple reflexive pronouns in one sentence) - for example, would the sentence *Susan herself told a story about herself to herself* be grammatical?
- Is it possible to make the sentence *The couple seems to enjoy themselves* grammatical in our current system by introducing new features? It is somewhat unsettling to concede to the limitations of the grammar.

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Reading Questions

- In diagram (28), why is ARG-ST populated when the SPR (and COMPS) value for *to* are empty? Isn't ARG-ST the addition of the SPR and COMPS lists?

(28)

$$\left\langle \text{to} , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{prep} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} & \left\langle \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{CASE} & \text{acc} \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \boxed{1} \\ \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \boxed{1} \\ \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle$$

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Reading Questions

- Why not have just one ARG-ST list, rather than ARG-ST as well as SPR + COMPS?
- Is it correct to say that the main purpose of ARG-ST is to identify ranks, so it is not necessary to specify which list members are SPR or COMPS?

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Reading Questions

- In (44), there is a list of the order in which different arguments tend to occur in the ARG-ST structure. This specific ordering from (44) is then used to make a claim that languages that can relativize their subject to make the cross-lingual assertion in (47). However, does this ordering hold true of all languages? To put another way, does (47) hold in the (rare) case of languages that have the object occur before the subject? Or do we see that for those languages, the subject still outranks the object(s), even though it occurs after in it the sentence?

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Reading Questions

- Again, this seems like a strange case of "look ahead" when building a tree from the bottom up. For instance, it is claimed that ARG-ST is only a feature of words, but it is only through the realization of arguments in phrases that the word could "know" that it has two coindexed arguments. I guess this is again solved by the fact that it's not an iterative procedure so much as static "well-formedness principles".

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Reading Questions

- I feel like I've assumed too much. The AAP checks for anaphoric agreement, and principle A claims that anaphors must be outranked by their co-indexed element. But do we have a mechanism that assigns the index, or does it need to be explicitly marked within its lexical entry? I feel like with some basic understanding of binding, we can index anaphors by using the ARG-ST list and our definitions of rank/hierarchy.

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Reading Questions

- For AAP, the trick seems to be figuring out when two NP are not just co-referential but co-indexed. While the examples show some reasons why some co-referential things actually have distinct indices, I'm struggling to generalize it in a way I could actually use the AAP. The members and group having distinct indices seems straightforward enough to use but I am less sure I could correctly index sentences with two coreferential entities.

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Reading Questions

- How does the AAP deal with cases where we use 'themselves' to refer to singular subjects, as when we don't know the gender of a person we are referring to or when the person prefers 'they' as their personal pronoun? As in, 'My friend's neighbor bought themselves a new fence last week." In this case the AGR values of the noun and the pronoun wouldn't agree, but they are intended to refer to the same person. Would we need create a new lexical entries for them/ themselves licensing this use? Or is this situation unresolved for this grammar?

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Reading Questions

- I want to understand the difference between Coindexed and Coreference:
- Coindexed - does this just mean two nodes with identical sem-cat INDEX values?
- Coreference - I've read p.209 several times now, still doesn't feel intuitive. From the text's glossary (p.559): coreference / coreferential Two referring expressions that refer to the same entity are called 'coreferential', and the relationship between them is called 'coreference'.
- In grammar terms, is entity a synonym for NP ? (Entity is absent from the glossary and the text's index.)

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Reading Questions

- I'm struggling to understand, "indices are like variables; thus Binding Theory constrains variable identity, not the assignments of values to variables" but can't come up with a specific question about it.

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Reading Questions

- Can we use Binding Theory and/or Anaphoric Agreement Principle(AAP) for anaphora resolution? If yes, then Section 7.4.1 lists a few examples that violate the Anaphoric Agreement Principle. So don't these examples make AAP less effective in resolving anaphoras?

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Reading Questions

- I'm not sure I completely follow the motivation for creating the Anaphoric Agreement Principle as a separate principle from Principle A. I understand that agreement only applies to coindexation, not coreference, but Principle A is also only applicable to coindexation so I don't see any issues with simply adding that constraint. Is there ever a case where two coindexed elements would need to agree but wouldn't be anaphoric?

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Reading Questions

- I think I understand the basic difference between coindexing and coreference. My question is really to clarify why two things might be indexed differently despite being coreferential. In explaining the difference between these two concepts, the book lists example (21), The solution to this problem is rest and relaxation. This may be a silly question, but if the solution and rest and relaxation are referring to the same thing, are they indexed differently just because they vary in the way they are made up lexically? i.e., different words = different NP = different index? This starts to make sense as I think about how I would systematically differentiate these two NPs (i.e NP1 and NP2., etc.), and especially when the book makes reference to indices being variables, but I just want to clarify before I solidify that understanding incorrectly.

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Reading Questions

- 1) I want to understand the linguistic intuition behind this maneuver. How is it that we can so easily say that imperative sentences are not headed? They possess a VP, which is the head of our prop-type sentences. Why the discrepancy?
- 2) Are there ever going to be verbs which are not coded for MODE=prop in their lexical entries? It seems redundant to keep specifying the same MODE for every verb.
- 3) Will we similarly use unheaded phrases to justify ques-type sentences in the future?

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Reading Questions

- The imperative rule states that imperatives are not headed, but the structure on page 216 includes a head of [FORM base]. Wouldn't this technically be a head? Should it be called something else if we truly don't want imperatives to be headed? Are there other such rules for other languages in which we require phrases to have no head in order for our grammar to account for them?

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Reading Questions

- Has this framing of Binding Theory been implemented computationally? How effective is it?

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Reading Questions

- The discussion on cross-linguistic patterns that all languages adhere to (the argument structure hierarchy on pages 219-20) piqued my interest. It got me thinking more generally about work done modeling different languages with HPSG. Have there been any typological discoveries in work on languages for the grammar matrix that required a complete overhaul of a feature or rule? Or languages other than English that significantly informed the model (in a way that English alone could not have)?

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