Linguistics A

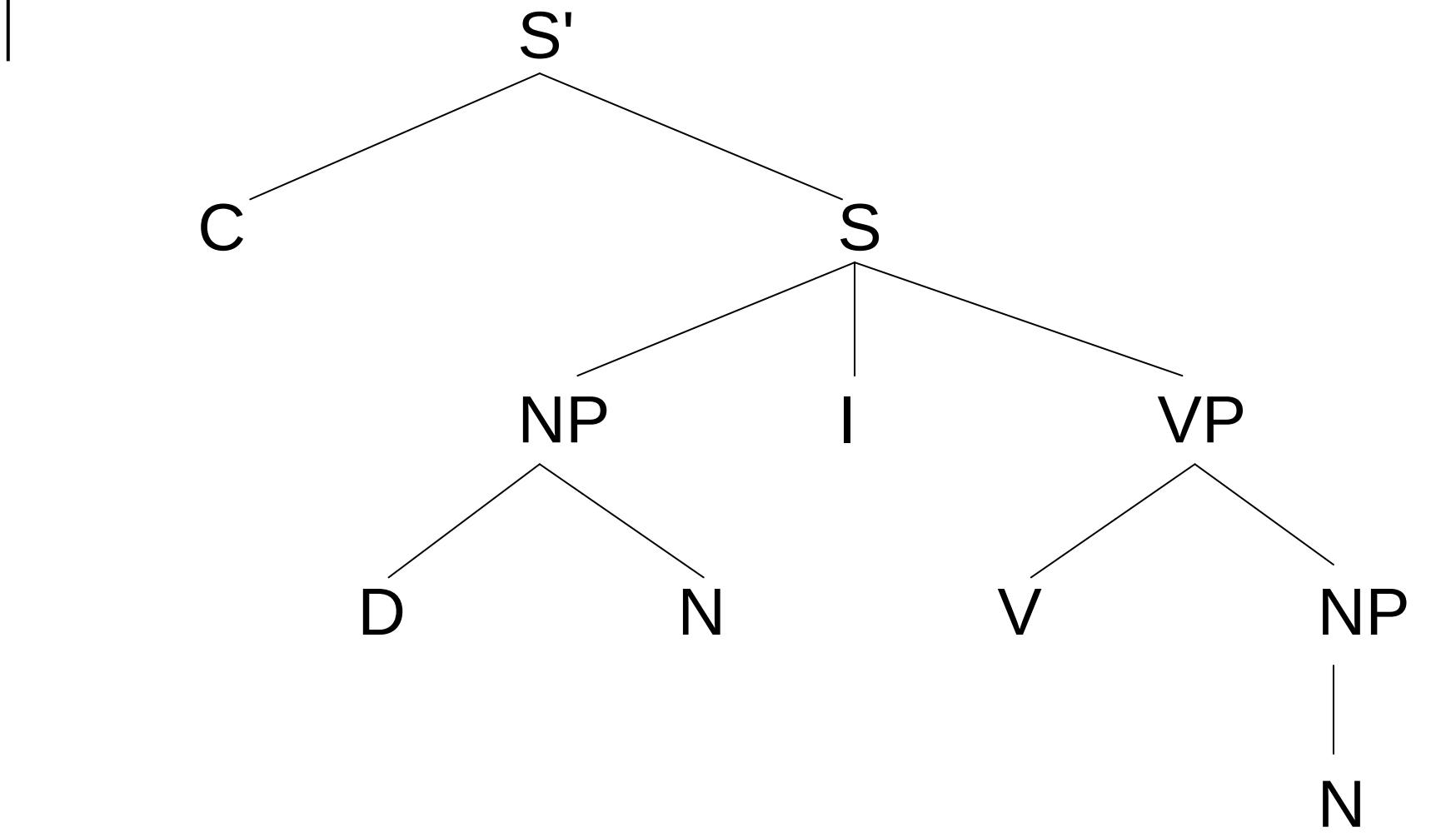
Syntax (Part 2) :

Recursive Rules, Structural Ambiguity, and Theta Roles

Simple Transitive Sentences

- The man [$_{VP}$ said [$_{NP}$ it]]

1. S' → C S
2. S → NP I VP
3. NP → (D) N
4. VP → V NP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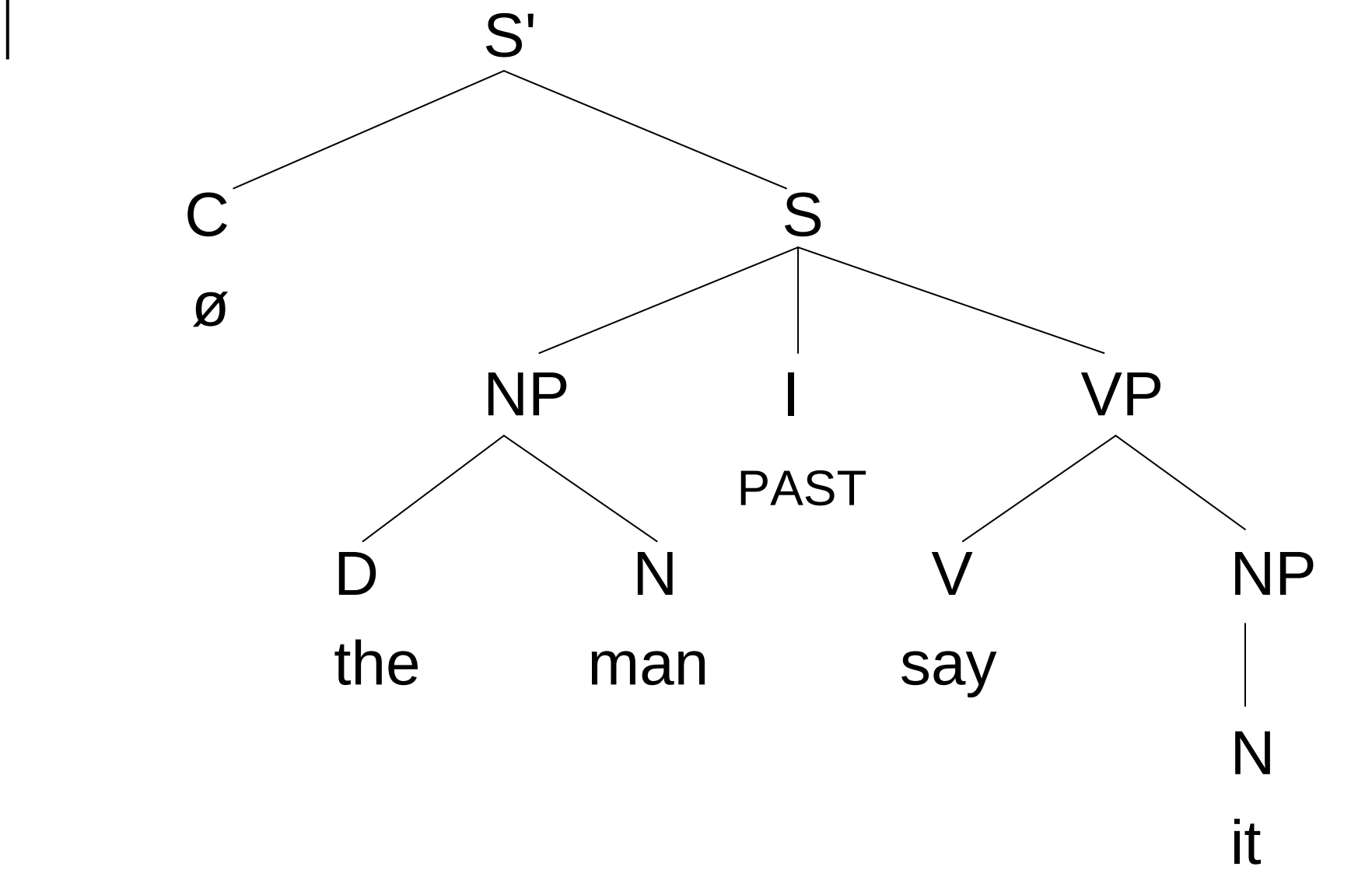
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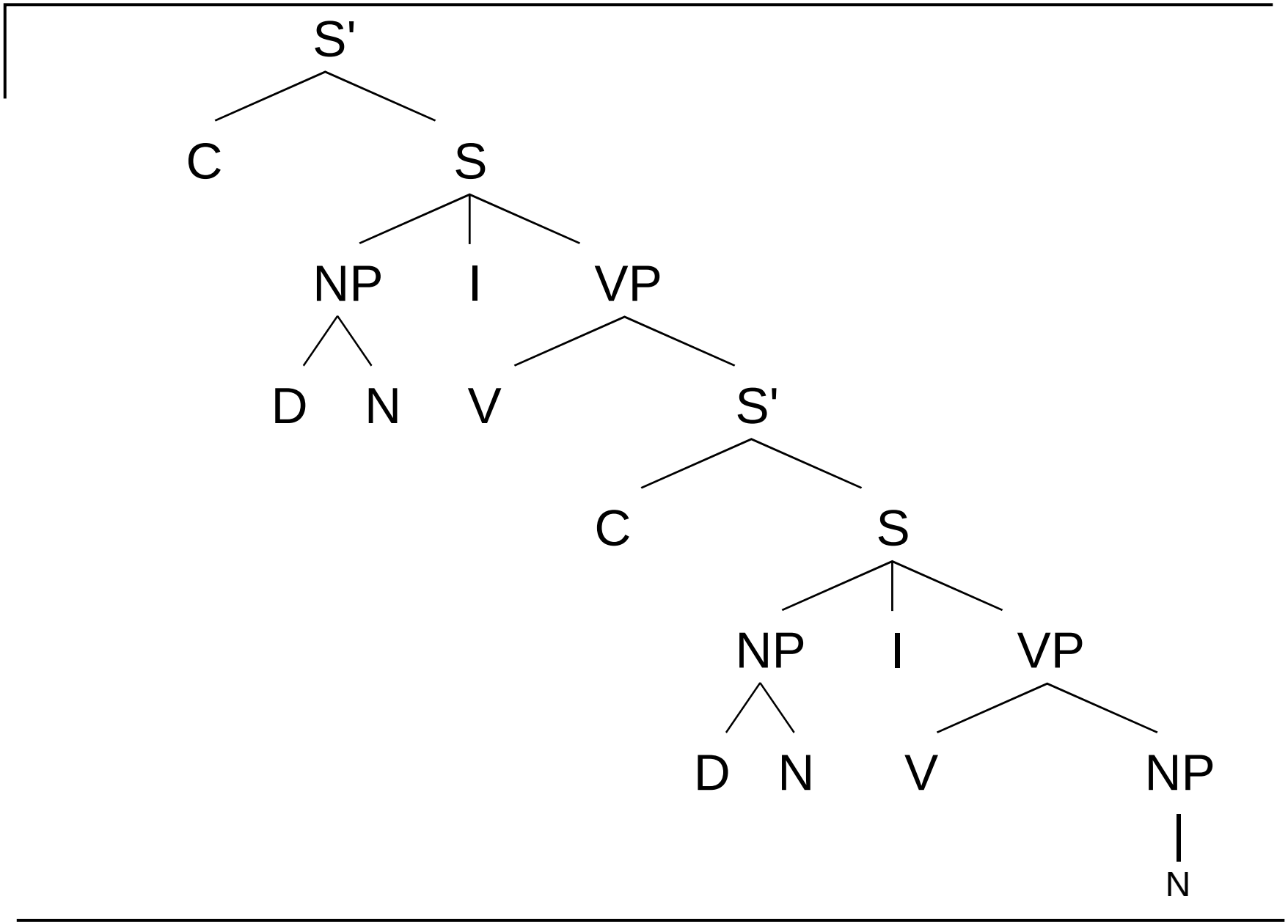
Embedded Clauses

- The woman [$_{VP}$ said [$_{S'}$ the man said it]]
  - VP → V S'
  - VP → V NP
  - VP → V
  - VP → V (α)
    - α = NP or S'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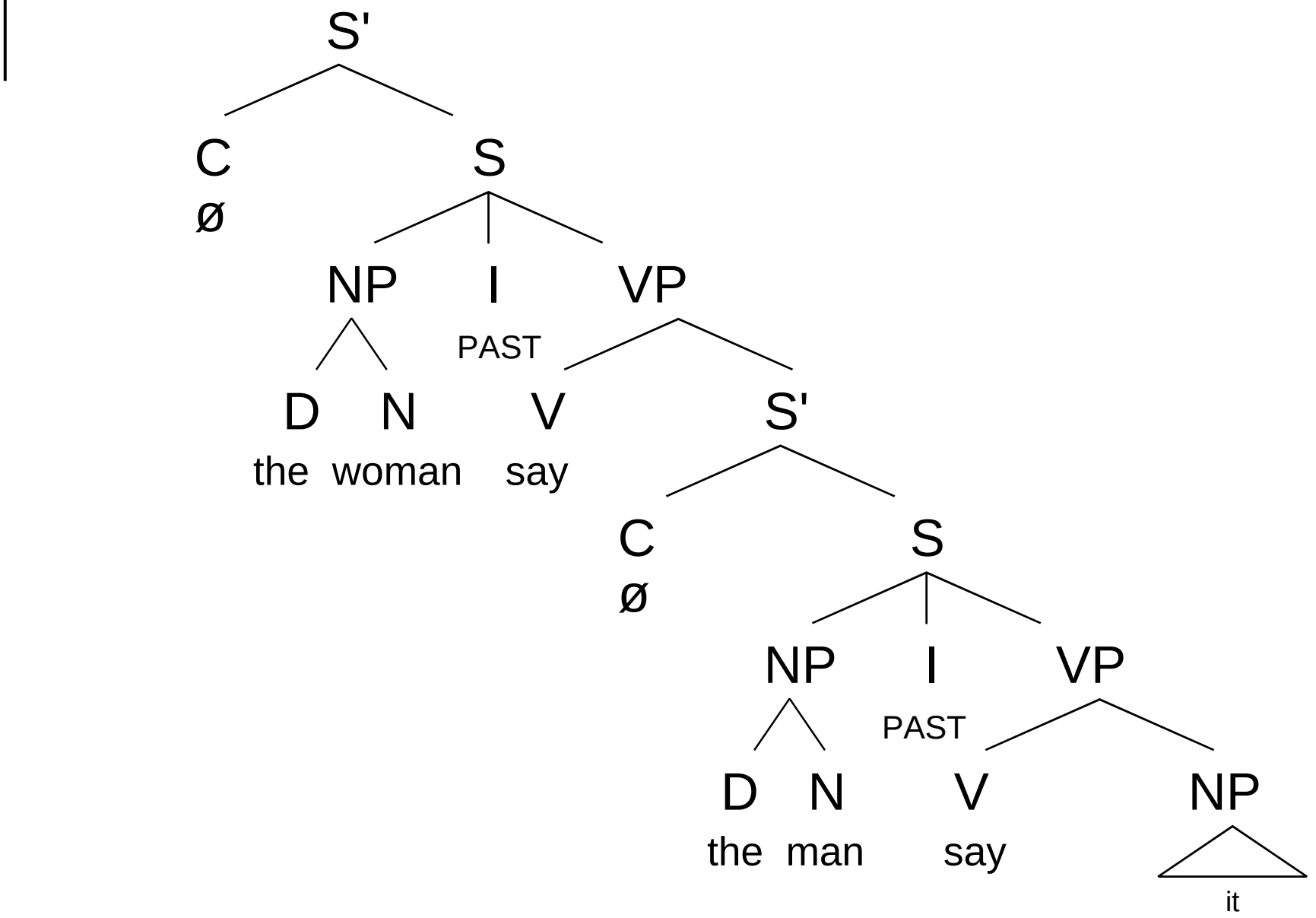
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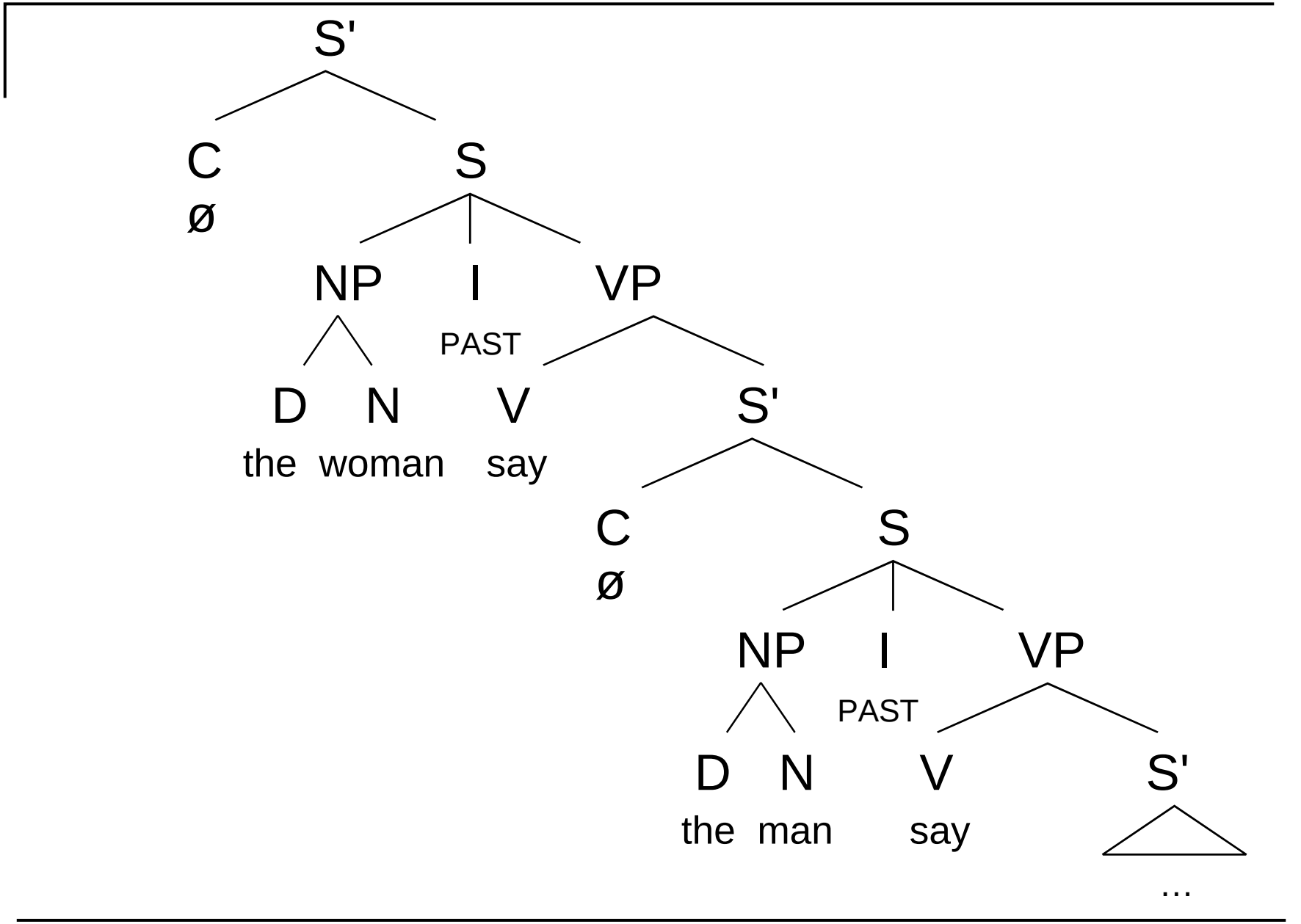
Infinite Syntax: Recursive Embedding

1. She knows the woman said the man said it.
2. He believes she knows the woman said the man said it.
3. She wonders whether he believes she knows the woman said the man said it.
4. He thinks that she wonders whether he believes that she knows the woman said the man said it.
5. ...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Recursive Rules

- Single Recursive Rule
  1. X → … X …

- Recursive Set of Rules
  1. X → … Y …
  2. Y → … Z …
  3. Z → … X …

PP Modifiers and Structural Ambiguity

- A modifier is a phrase that describes or modifies the meaning of another word (lexical category); for example, the adjective phrase *very handsome* modifies the noun *man* in the noun phrase *the very handsome man*; the adverb phrase *very quickly* modifies the verb *run* in the verb phrase *to run very quickly*. However, a modifier phrase cannot modify just any word in the sentence; the two must be structurally very “close” to one another. We will state this structural relation as follows:

- *Principle of Modification*

  A modifier and the lexical category it modifies must be “sisters” (= immediately contained by the same phrasal category).

PP can modify N

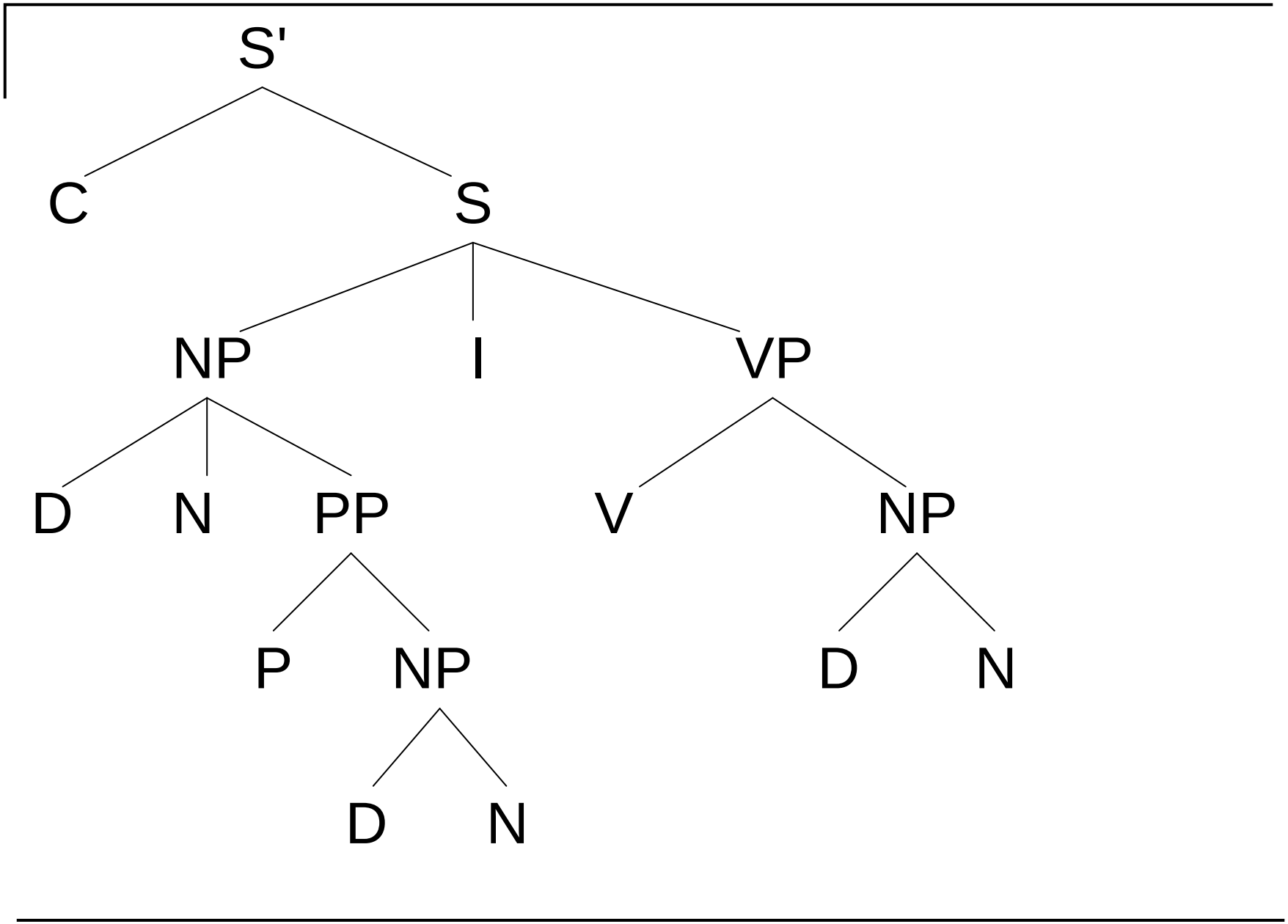
A girl with an umbrella hit a boy.

[$_{NP}$ a girl with an umbrella] hit a boy

[$_{NP}$ she] hit a boy

NP → (D) N (PP)

PP → P NP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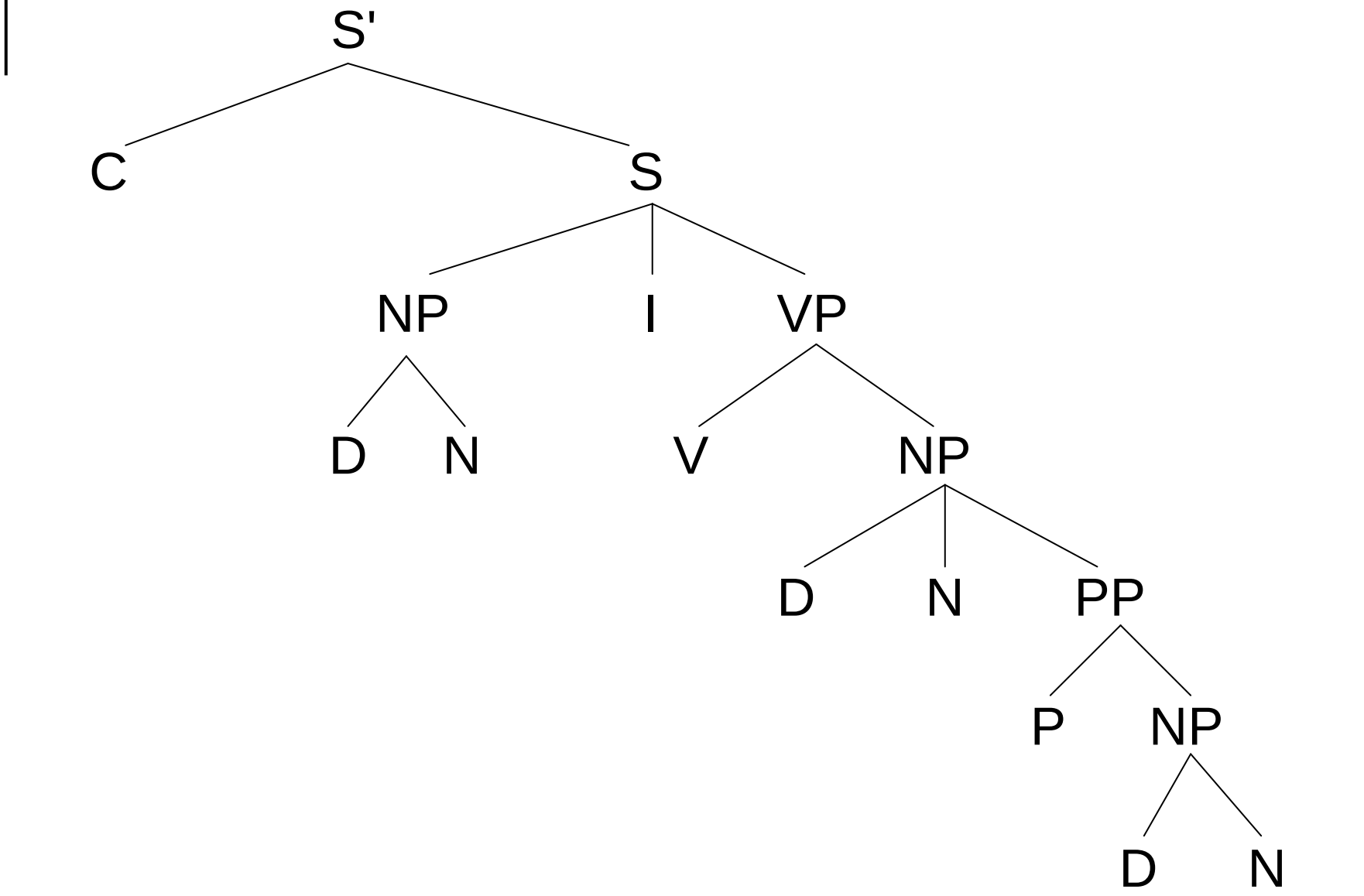
- *A boy hit a girl with an umbrella.*

a boy hit $[_{NP}$ a girl with an umbrella]

a boy hit $[_{NP}$ her]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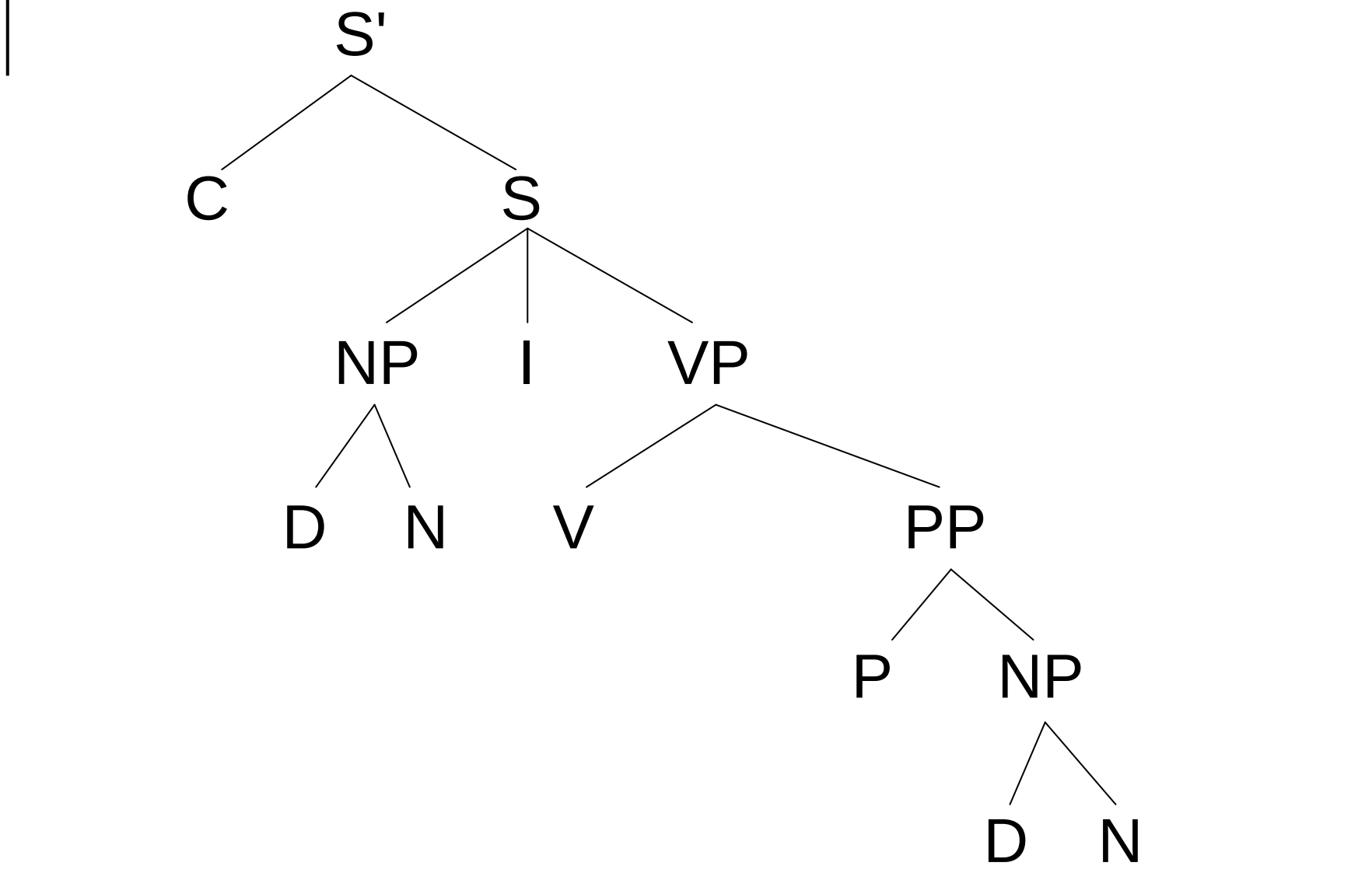
PP can modify V

1. The man [$_{VP}$ walked with a cane] (and the woman did too).
2. The old man walked into the room with a cane (and the old woman did too).
3. An American ate his sushi with a fork (and an Englishman did too).

- VP → V (NP) PP PP modifies V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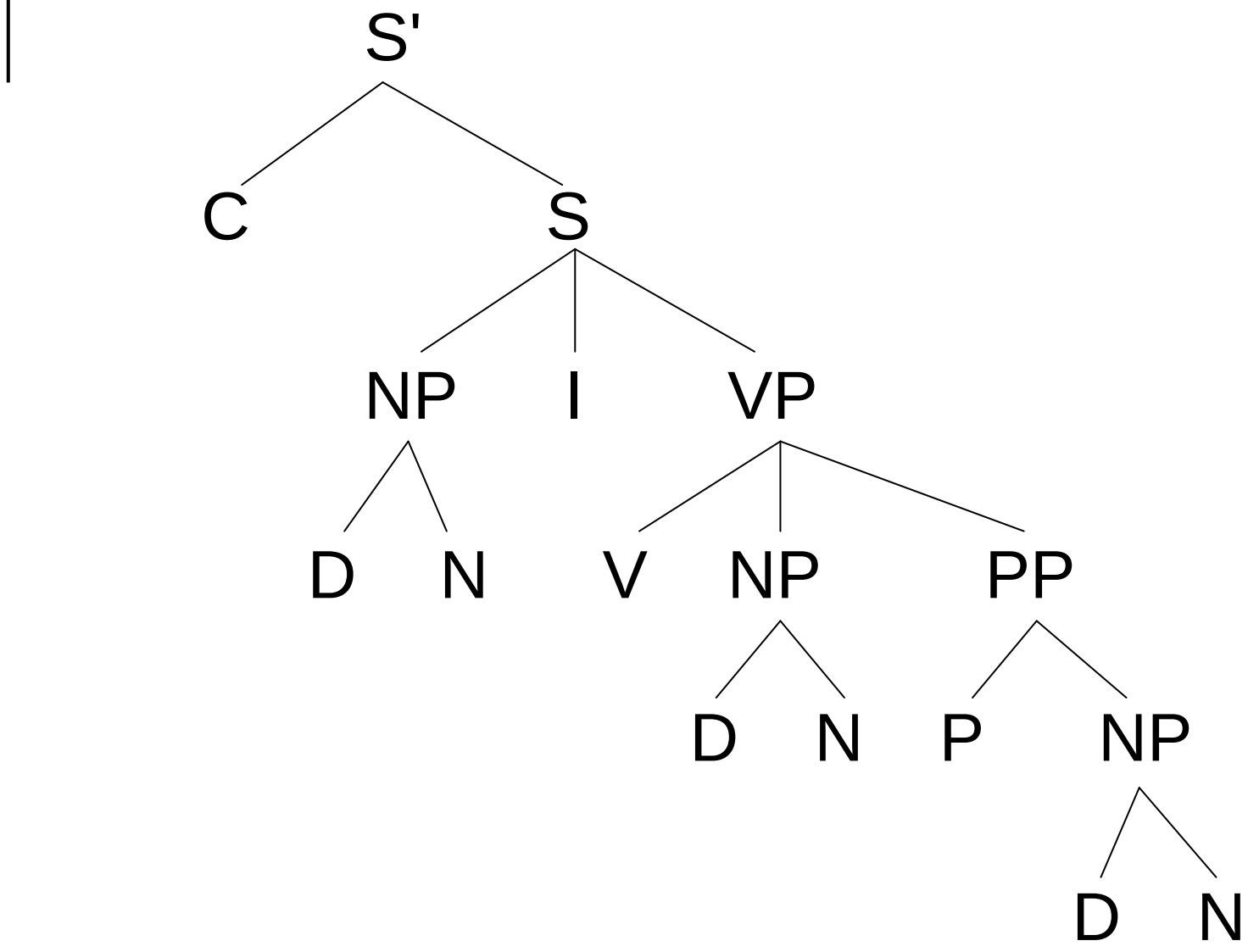
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Structural Ambuguity

A+boy+PAST+hit+a+girl+with+an+umbrella

- Structural Possibility #1: PP modifies N

A boy [$_{VP}$ hit **[$_{NP}$ a girl [$_{PP}$ with an umbrella]]**]

- Structural Possibility #2: PP modifies V

A boy [$_{VP}$ hit **[$_{NP}$ a girl]** [$_{PP}$ with an umbrella]]

Corresponding Ambiguity in the Meaning

- Meaning #1 of the sentence *A boy hit a girl with an umbrella*:

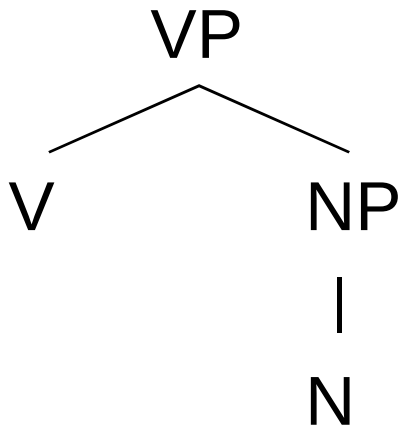
  Paraphrase = "A boy hit (in some way) a girl who has or had an umbrella; i.e., *with an umbrella* modifies the noun girl."

- Meaning #2 of the sentence *A boy hit a girl with an umbrella*:

  Paraphrase = "It was using an umbrella that a boy hit a girl; i.e., *with an umbrella* modifies the verb hit"

A Problem for PS Rules

- VP → V NP



He saw/kicked/loved it.

*He saw/kicked/loved.

- VP → V

He slept/arrived/died.

*He slept/arrived/died it.

One Possible Solution: Subcategories

V:

$V_{Transitive}$ = *see*, *love*, *hit*, *believe*, etc.

$V_{Intransitive}$ = *sleep*, *die*, *leave*, etc.

PS Rules

- VP → $V_{Transitive}$ NP
- VP → $V_{Intransitive}$

Predicates and Arguments

- Whether or not an object is required, or alternatively whether an object is prohibited, depends on the verb in question, and intuitively this seems to be related to the meaning of that verb.

- Standard logic talks about such relations in terms of *n*-place predicates, which establish a relation between a **predicate** and *n* **arguments**.
  - 1-place predicate P (*x*)
  - 2-place predicate P (*x, y*)
  - 3-place predicate P (*x, y, z*)

- Similarly, lexical items such as verbs, adjectives, nouns, can be considered to be predicates whereas certain phrases (NP, S' and perhaps some instances of PP as well) are arguments.

Thematic Relations

- John hit Mary

Agent Patient

- John saw Mary

Experiencer Theme

Types of Thematic Relations

- **Agent:** volitionally instigates/initiates/performs the 'event'.
  - John opened the door (on purpose).
- **Natural Cause:** non-volitionally causes the 'event'.
  - The wind opened the door (*on purpose).
- **Instrument:** serves as an instrument for the 'event'.
  - The key opened the door.
- **Experiencer:** undergoes an experience, sensory or emotional, from the 'event'.
  - John saw the door.
  - The door surprised John.

Types of Thematic Relations

- Patient: undergoes the ‘event’ and is “affected” by it.
  - John hit Bill.
  - John broke the window.
- Theme: undergoes the ‘event’ but not “affected” by it.
  - John saw the door.
- Goal: the location toward which the ‘event’ is directed.
  - John put the book on the table.
  - John entered the room.
- Beneficiary: benefits from the ‘event’
  - John baked Mary a cake.

Theta-Roles (θ-Roles)

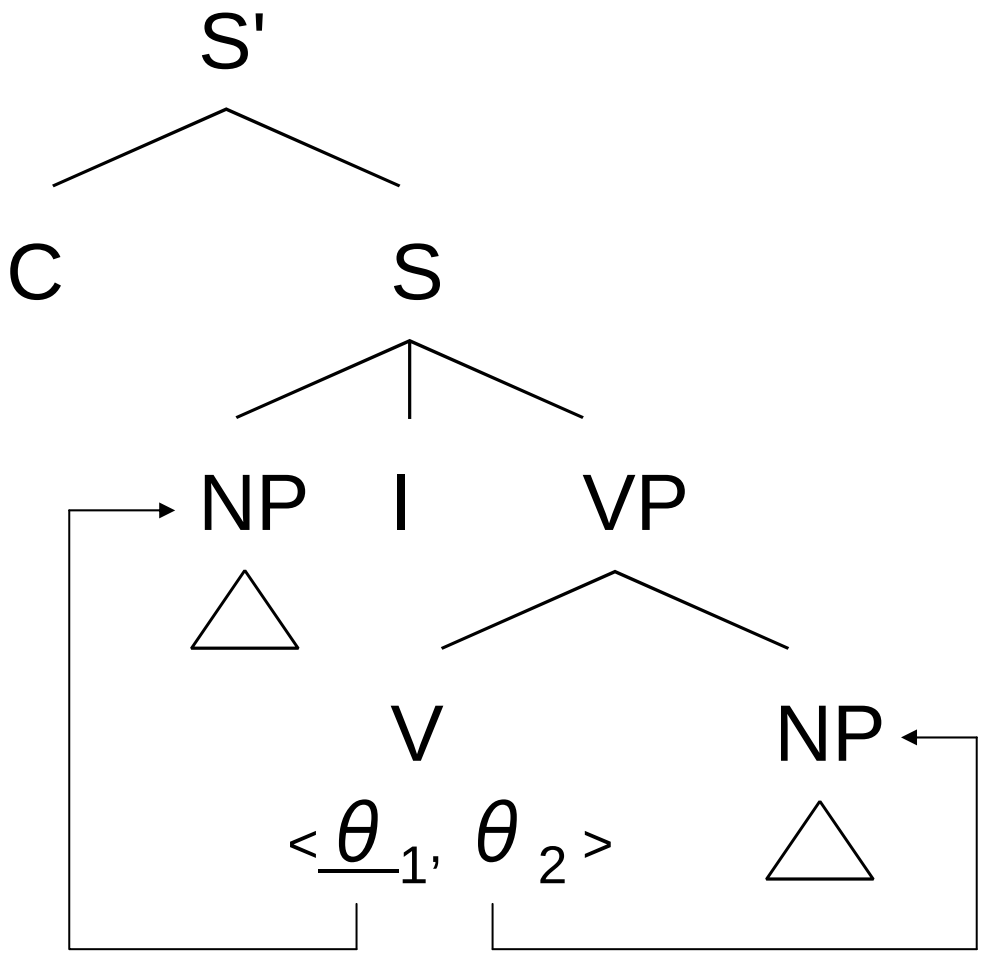
- We will assume thematic relations are grammatically "represented" as Theta-Roles (θ-Roles).
- Predicates are lexically specified, in terms of a Theta-Grid, as having certain Theta-Roles, which get assigned to arguments in a particular structural relation with the predicate.
- The first Theta-Role in a Theta-Grid is designated as the External Role, and gets assigned an argument in "subject position," whereas any other Theta-Roles in a predicate's Theta-Grid are Internal Roles and get assigned to arguments in "object positions."

Theta-Grids of Predicates: Some Examples

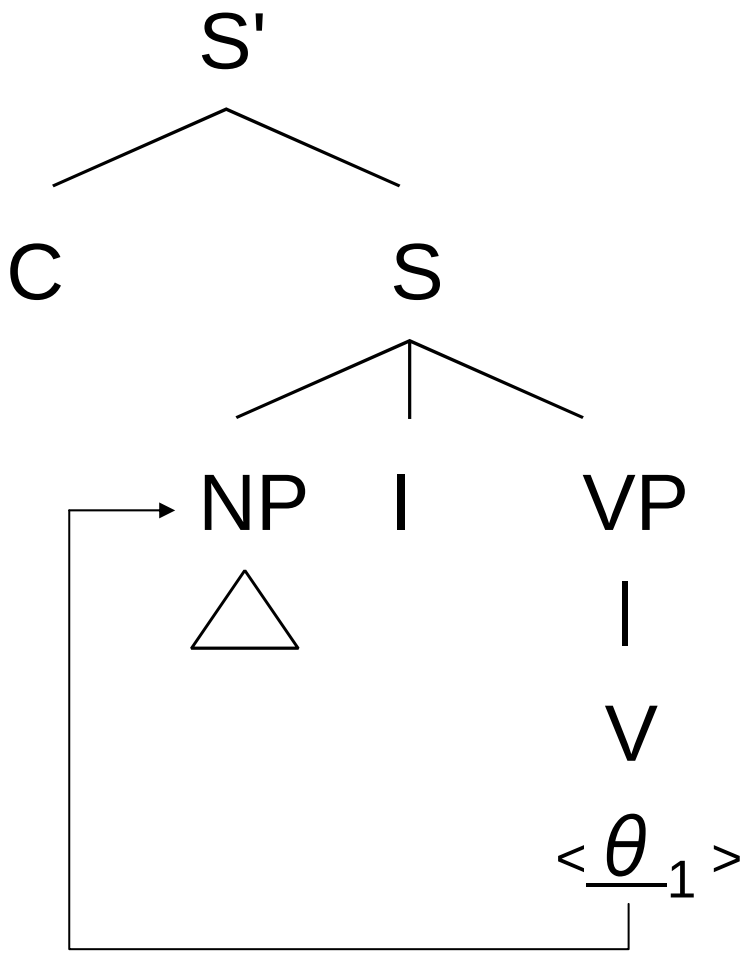
- HIT <{Agent, Cause}, Patient>
- WRITE <Agent, Theme>
- SEE <Experiencer, Theme>
- SCARE <{Agent, Cause}, Experiencer>
- RUN <Agent>
- DIE <Patient>
- SLEEP <Theme>

- External roles are underlined; {X, Y} indicates optional assignment of either role X or role Y.

Theta-Role Assignment



Theta-Role Assignment



Theta-Roles and Arguments

- “too few arguments”
  - *He sees.
  - *Sees her.
  - *Sees.
- “too many arguments”
  - *He died it.
  - *He sees him her.

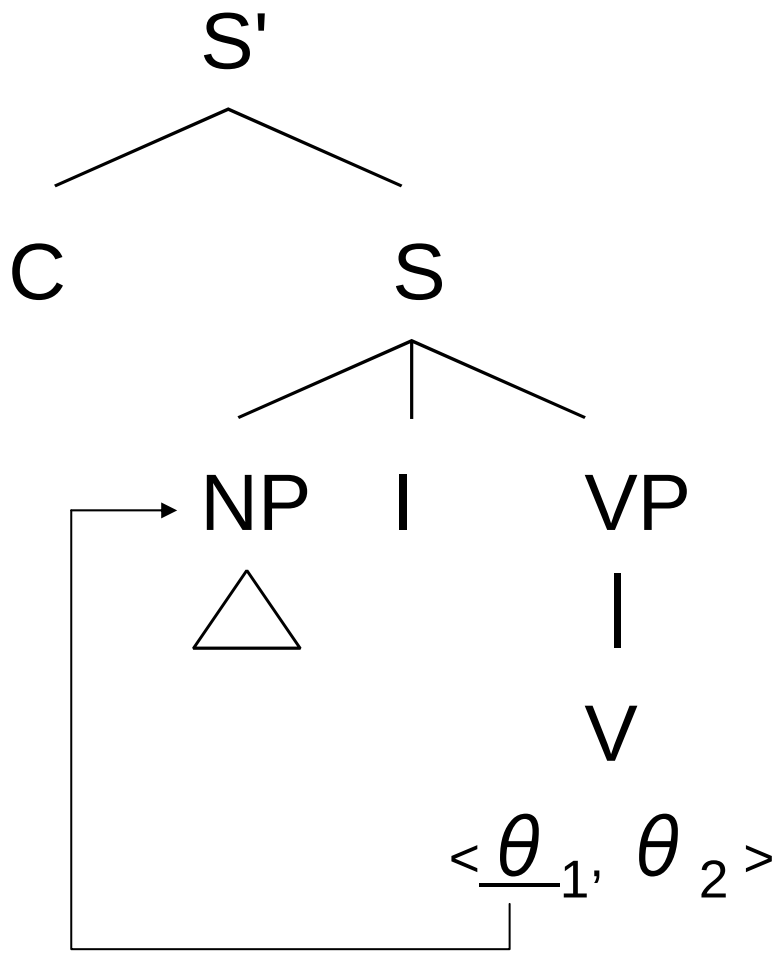
Towards a Better Solution: The Theta-Criterion

Theta-Criterion:

(I) Every Theta-Role (in a predicate's theta-grid) must be "assigned" to one and only one argument.

(II) Every argument must be "assigned" one and only one Theta-Role.

*John saw.



*John died it.