Introduction to Linguistic Theories

Semester 6: Linguistics and Cultural Studies Stream

Morphosyntax

Syntax:

The Sentence Patterns of Language

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Learning Goals

- Hierarchical sentence structure
- Word categories
- X–bar
- Ambiguity
- Recursion
- Transformations

Syntax

- Any speaker of any human language can produce and understand an infinite number of possible words/sentences;

- Thus, we can't possibly have a mental dictionary of **all** the possible words/sentences;

- Rather, we have the rules for forming words/ sentences stored in our brains

  - **Syntax** is the part of grammar that pertains to a speaker's knowledge of sentences and their structures

What the Syntax Rules Do

- The rules of syntax combine words into phrases and phrases into sentences

- They specify the correct word order for a language, with 6 dominant word orders (Greenberg,1966):

  1. SVO 2. VSO 3. SOV
  4. VOS 5. OSV 6. OVS

  - For example, English is a Subject-Verb-Object (SVO) language
    - The President nominated a new Supreme Court justice
    - *President the new Supreme justice Court a nominated

- They also describe the relationship between the meaning of a group of words and the arrangement of the words

  - I mean what I say Vs. I say what I mean

What the Syntax Rules Do

- The rules of syntax also specify the grammatical relations of a sentence, such as the subject and the direct object

  – Your dog chased my cat Vvs. My cat chased your dog

- Syntactic rules specify constraints on sentences based on the verb of the sentence

  *The boy found

  *The boy found in the house

  The boy found the ball soundly

  *Disa slept the baby

  Disa slept

  Disa slept

  Zack believes Robert to be a gentleman

  *Zack believes to be a gentleman

  Zack tries to be a gentleman

  *Zack tries Robert to be a gentleman

What the Syntax Rules Do

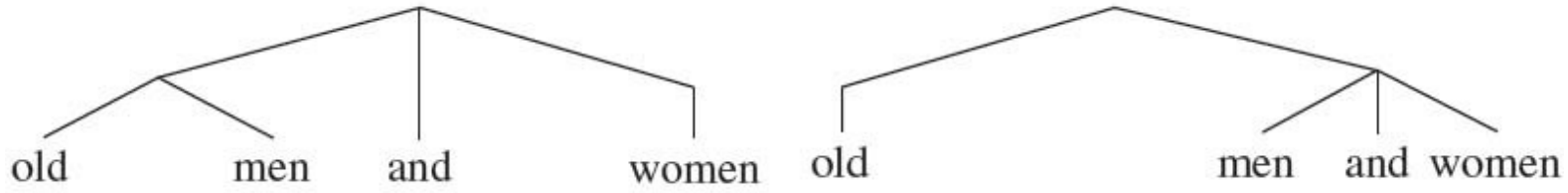
- Syntax rules also tell us how words form groups and are hierarchically ordered in a sentence

"The captain ordered the old men and women off the ship"

- This sentence has two possible meanings:
  - 1. The captain ordered the old men and the old women off the ship
  - 2. The captain ordered the old men and the women of any age off the ship
- The meanings depend on how the words in the sentence are grouped (specifically, to which words is the adjective 'old' applied?)
  - 1. The captain ordered the [old [men and women]] off the ship
  - 2. The captain ordered the [old men] and [women] off the ship

What the Syntax Rules Do

- These groupings can be shown hierarchically in a tree



- These trees reveal the structural ambiguity in the phrase "old men and women"
  - Each structure corresponds to a different meaning
- Structurally ambiguous sentences can often be humorous:
  - Catcher: "Watch out for this guy, he's a great fastball hitter."
  - Pitcher: "No problem. There's no way I've got a great fastball."

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What Grammaticality Is Not Based On

- Grammaticality is not based on prior exposure to a sentence
- Grammaticality is not based on meaningfulness
- Grammaticality is not based on truthfulness

Sentence Structure

- We could say that the sentence "The child found the puppy" is based on the template:

  Det—N—V—Det—N

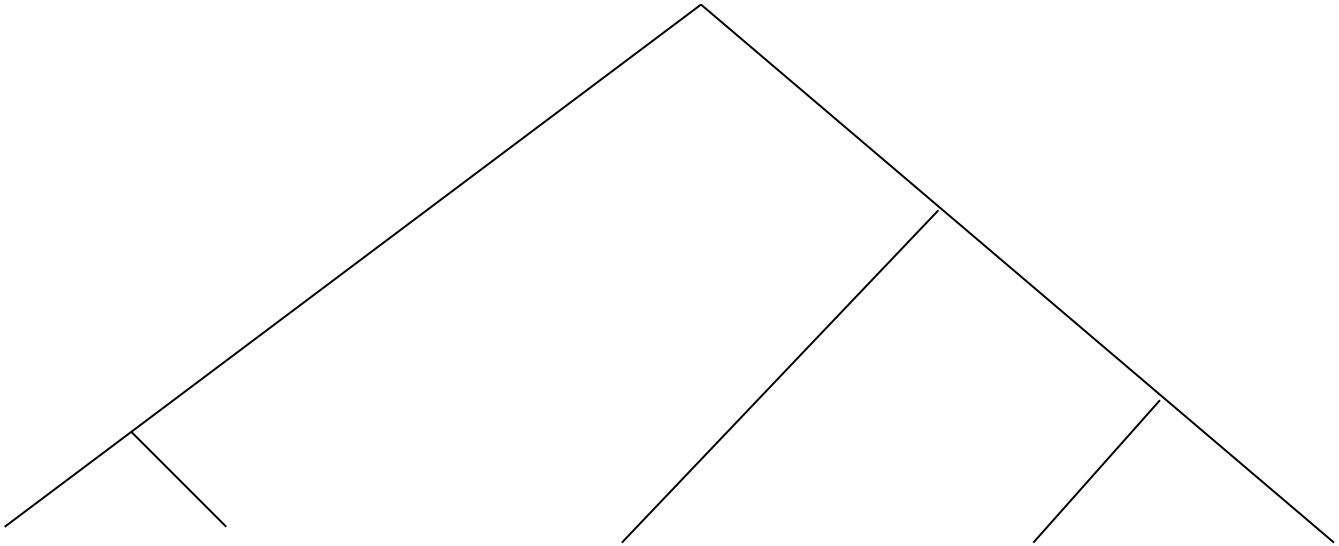
  - But this would imply that sentences are just strings of words without internal structure

  - This sentence can actually be separated into several groups:

    - [the child] [found a puppy]
    - [the child] [found [a puppy]]
    - [[the] [child]] [[found] [[a] [puppy]]

Sentence Structure

- A **tree diagram** can be used to show the hierarchy of the sentence:



The child found a puppy

Constituents and Constituency Tests

- **Constituents** are the natural groupings in a Sentence that cannot be changed, separated or moved (they must move together)
- Tests for constituency include:
  - 1. "stand alone test": if a group of words can stand alone, they form a constituent
    - A: "What did you find?"
    - B: "A puppy."
  - 2. "replacement by a pronoun": pronouns can replace constituents
    - A: "Where did you find a puppy?"
    - B: "I found him in the park."

Constituents and Constituency Tests

- 3. "move as a unit" test: If a group of words can be moved together, they are a constituent
  - A: "The child found a puppy."
  - ✎ " A puppy was found by the child."

Constituents and Constituency Tests

- Experimental evidence shows that people perceive sentences in groupings corresponding to constituents

- Every sentence has at least one constituent structure

  – If a sentence has more than one constituent structure, then it is ambiguous and each constituent structure corresponds to a different meaning

Syntactic Categories

- A **syntactic category** is a family of expressions that can substitute for one another without loss of grammaticality

The child found a puppy.	The child **found a puppy**.
A police officer found a puppy.	The child **ate the cake**.
Your neighbor found a puppy.	The child **slept.**

- All the underlined groups constitute a syntactic category known as a **noun phrase (NP)**
  - NPs may be a subject or an object of a sentence, may contain a determiner, proper name, pronoun, or may be a noun alone
- All the bolded groups constitute a syntactic category known as a **verb phrase (VP)**
  - VPs must always contain a verb but may also contain other constituents such as a noun phrase or a **prepositional phrase (PP)**

Syntactic Categories

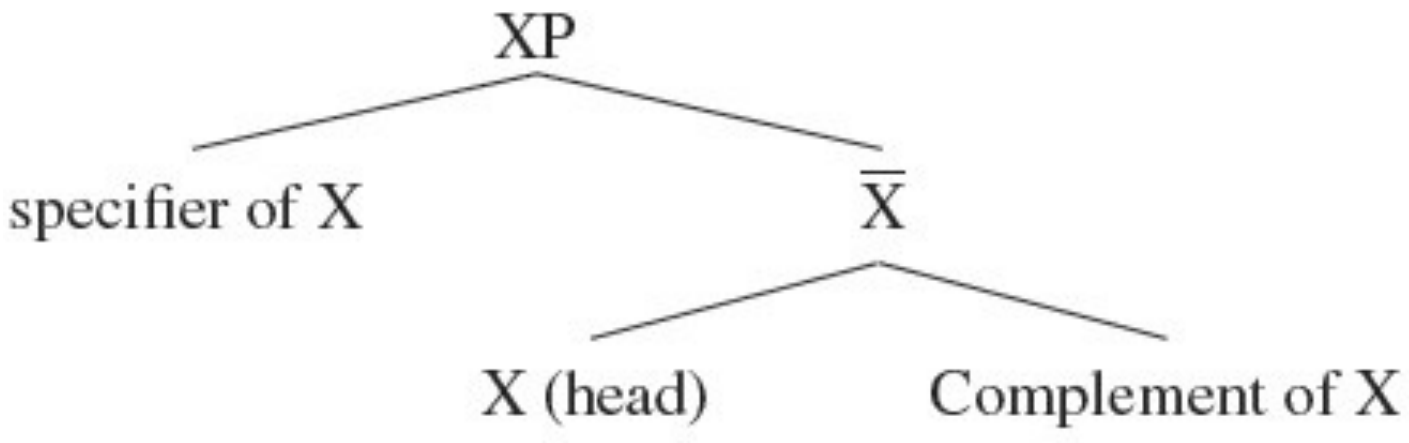
- Phrasal categories: NP, VP, PP, AdjP, AdvP
- Lexical categories:
  - Noun: puppy, girl, soup, happiness, pillow
  - Verb: find, run, sleep, realize, see, want
  - Preposition: up, down, across, into, from, with
  - Adjective: red, big, candid, lucky, large
  - Adverb: again, carefully, luckily, very, fairly
- Functional categories:
  - Auxiliary: verbs such as have, and be, and modals such as may, can, will, shall, must
  - Determiners: the, a, this, that, those, each, every

Phrase Structure Trees

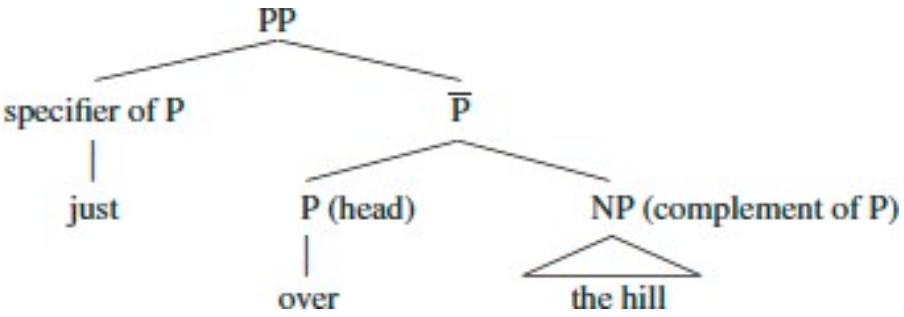
- The core of every phrase is its head
  - In the VP walk the pugs, the verb walk is the head
- The phrasal category that may occur next to a head and elaborates on the meaning of the head is a complement
  - In the PP over the river, the NP the river is the complement
- Elements preceding the head are specifiers
  - In the NP the fish, the determiner the is the specifier

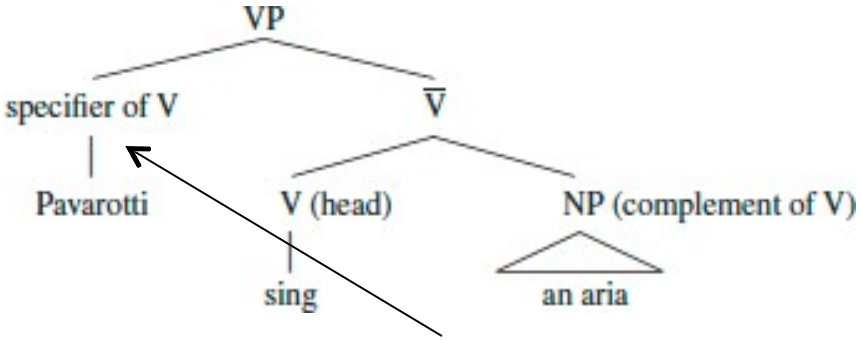
Phrase Structure Trees

- The internal structure of phrasal categories can be captured using the X-bar schema:

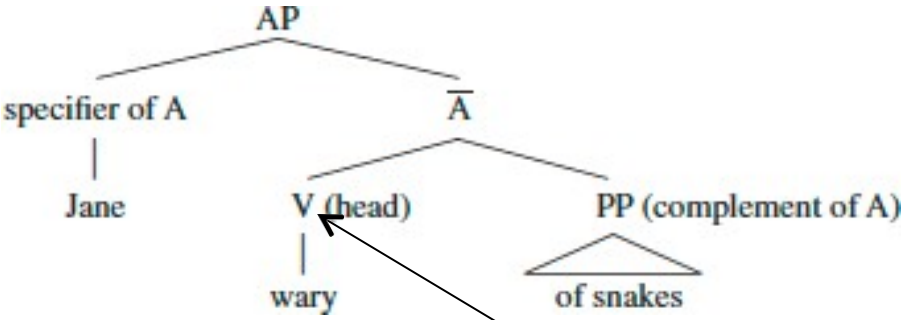


examples

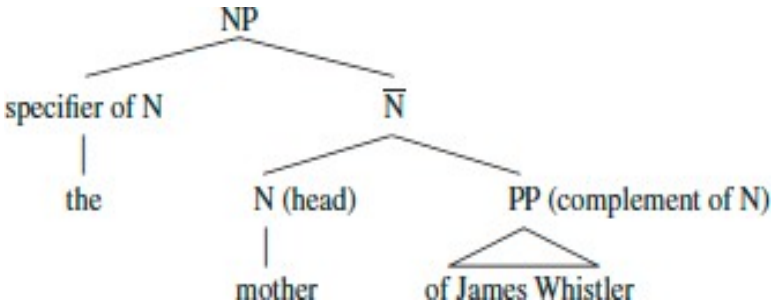




The subject will later in Spec-T

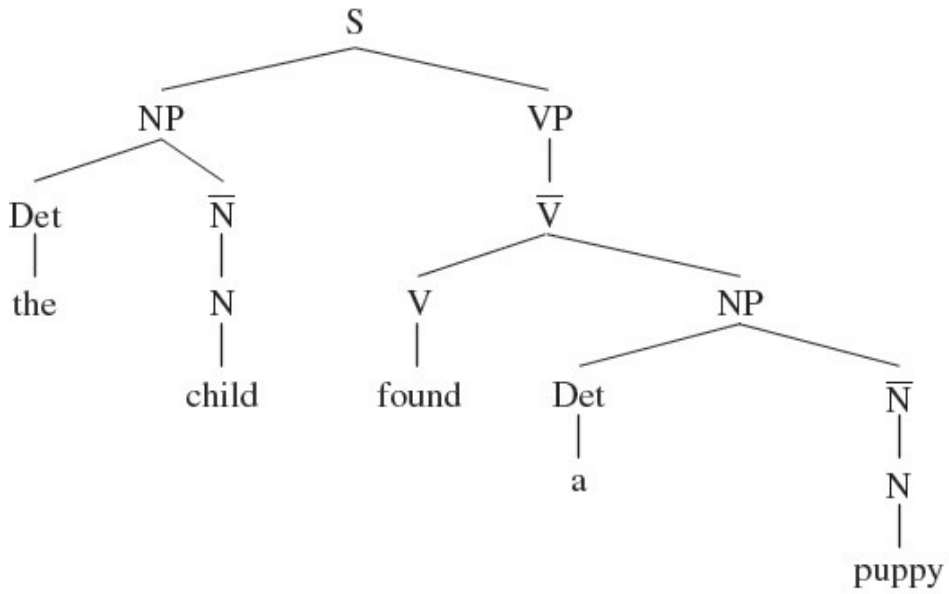


This should be A



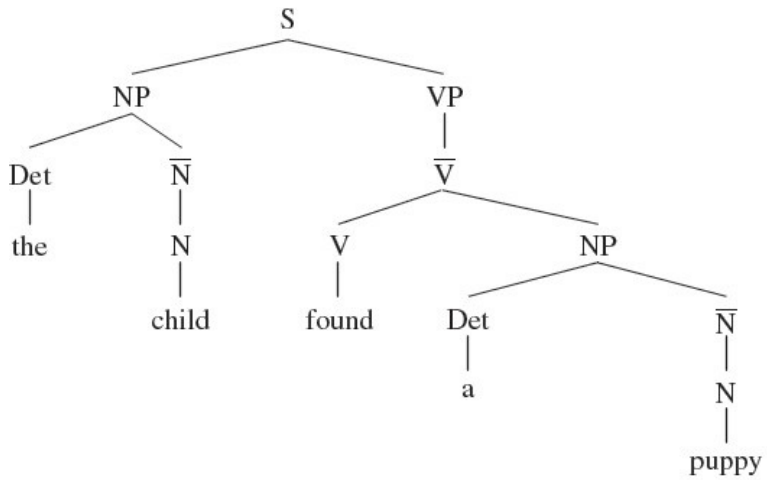
Phrase Structure Trees

Phrase structure (PS) trees show the internal structure of a sentence along with syntactic category information:



Phrase Structure Trees

- In a PS tree, every higher node dominates all the categories beneath it
  - S dominates everything



- A node immediately dominates the categories directly below it

- Sisters are categories that are immediately dominated by the same node
  - The V and the NP are sisters

Phrase Structure Trees: Selection

- Some heads require a certain type of complement and some don't
  - The verb find requires an NP: Alex found the ball.
  - The verb put requires both an NP and a PP: Alex put the ball in the toy box.
  - The verb sleep cannot take a complement: Alex slept.
  - The noun belief optionally selects a PP: the belief in freedom of speech.
  - The adjective proud optionally selects a PP: proud of herself
- **C-selection** or **subcategorization** refers to the information about what types of complements a head can or must take

Phrase Structure Trees: Selection

- Verbs also select subjects and complements based on semantic properties (**S-selection**)
  - The verb murder requires a human subject and object

    !The beer murdered the lamp.

  - The verb drink requires its subject to be animate and its optional complement object to be liquid

    !The beer drank the lamp.

- For a sentence to be well-formed, it must conform to the structural constraints of PS rules and must also obey the syntactic (C-selection) and semantic (S-selection) requirements of the head of each phrase

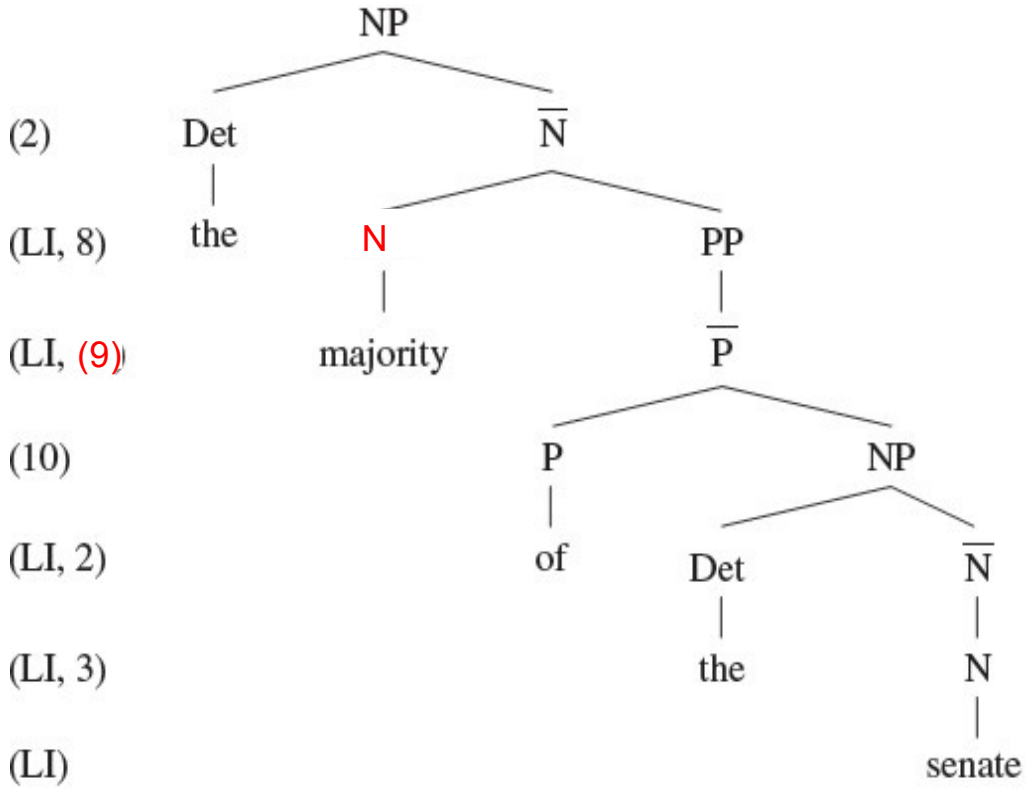
Building Phrase Structure Trees

- Phrase structure rules specify the well-formed structures of a sentence
  - A tree must match the phrase structure rules to be grammatical

1. $S \rightarrow NP\ VP$
2. $NP \rightarrow Det\ \overline{N}$
3. $\overline{N} \rightarrow N$
4. $VP \rightarrow \overline{V}$
5. $\overline{V} \rightarrow V\ NP$
6. $\overline{V} \rightarrow V\ PP$
7. $\overline{V} \rightarrow V\ AP$
8. $\overline{N} \rightarrow N\ PP$
9. $PP \rightarrow \overline{P}$
10. $\overline{P} \rightarrow P\ NP$
11. $AP \rightarrow \overline{A}$
12. $\overline{A} \rightarrow A$
13. $\overline{A} \rightarrow A\ PP$

Building Phrase Structure Trees

The majority of the senate became afraid of the vice president.



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5. $\bar{V} \rightarrow V\ NP$
6. $\bar{V} \rightarrow V\ PP$
7. $\bar{V} \rightarrow V\ AP$
8. $\bar{N} \rightarrow N\ PP$
9. $PP \rightarrow \bar{P}$
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Building Phrase Structure Trees

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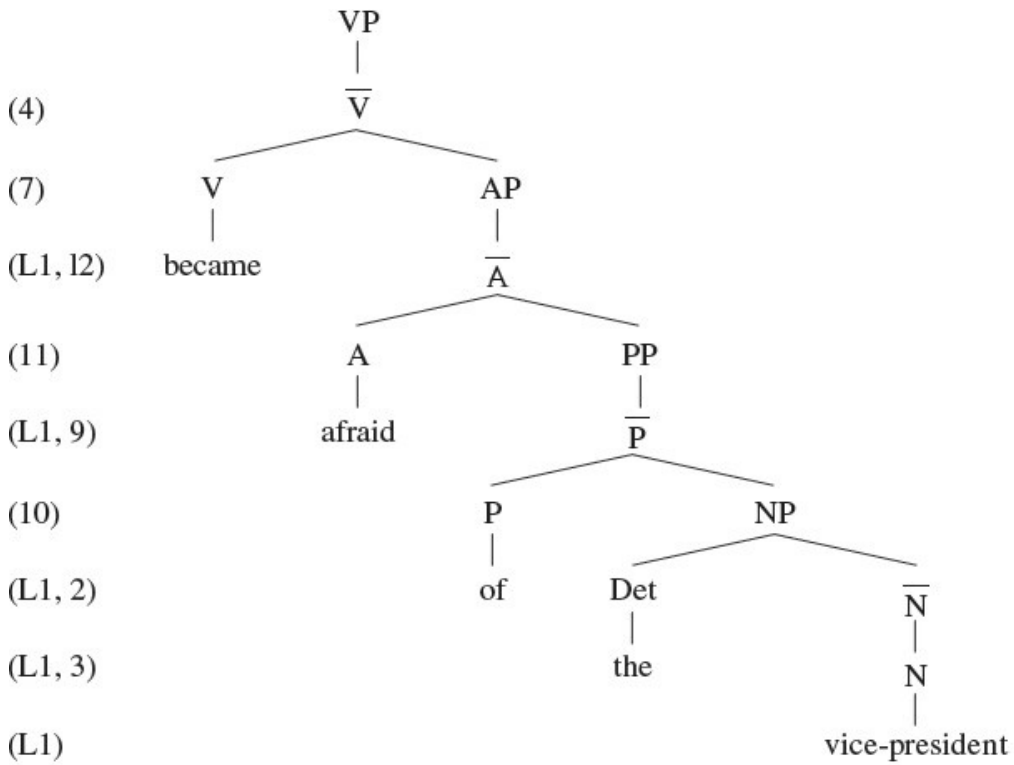

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13. $\bar{A} \rightarrow A\ PP$

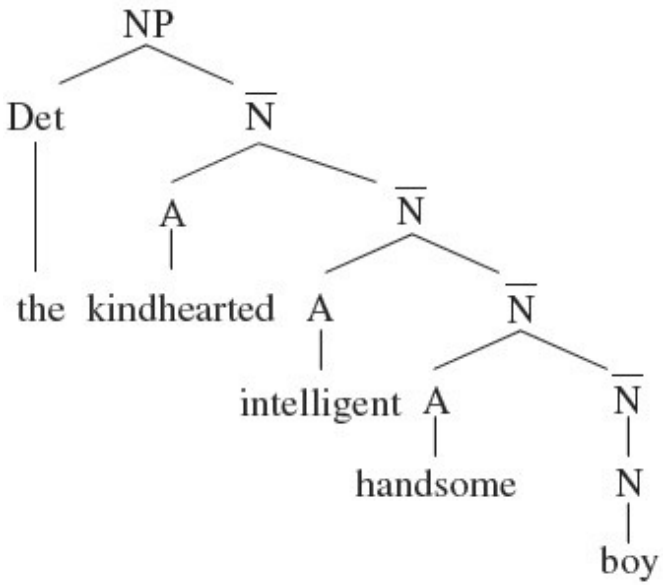
The Infinity of Language: Recursive Rules

- **Recursive** rules are rules in which a phrasal category can contain itself

14. $\overline{N} \rightarrow A\ \overline{N}$

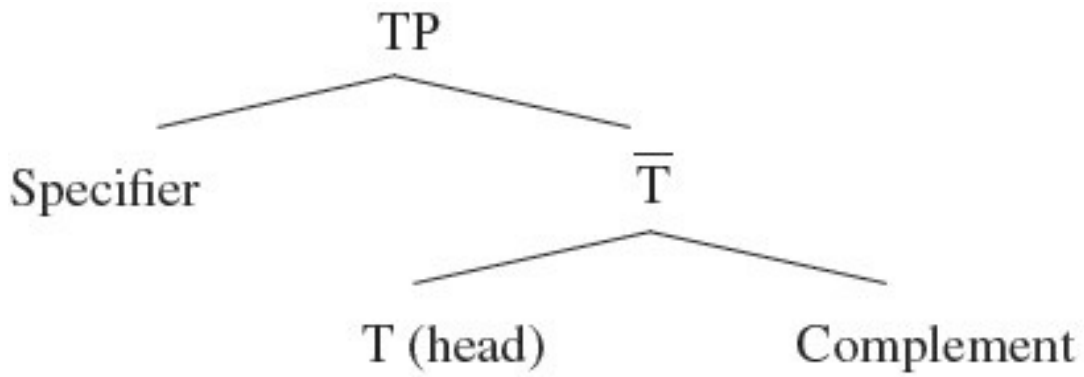
- Recursive rules allow a grammar to generate an infinite number of sentences

–the kindhearted, intelligent, handsome, … boy



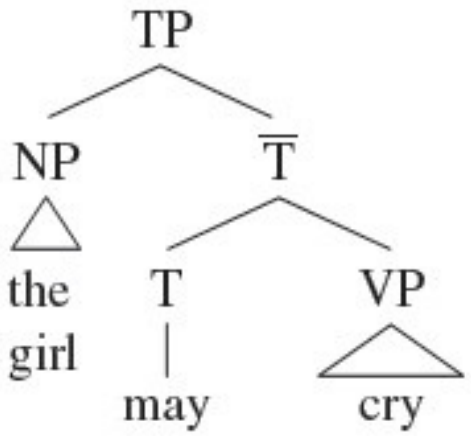
What Heads the Sentence

- All sentences contain information about tense—when a certain event or state of affairs occurred, so we can say that Tense is the head of a sentence
  - So sentences are TPs, with T representing tense markers and modals

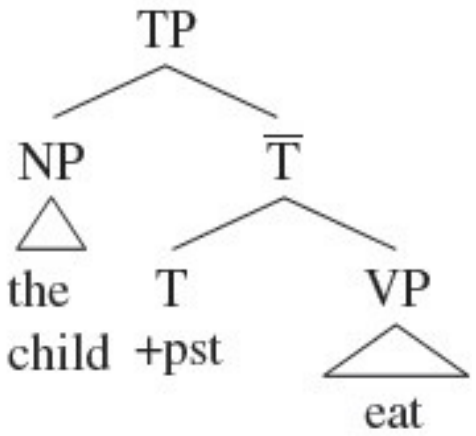


What Heads the Sentence

The girl may cry.



The child ate.



Structural Ambiguities

- The following sentence has two meanings:

  The boy saw the man with the telescope.

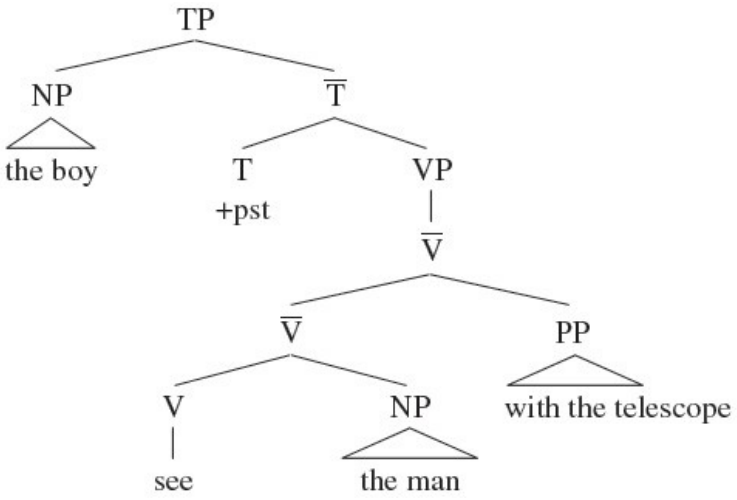
- The meanings are:

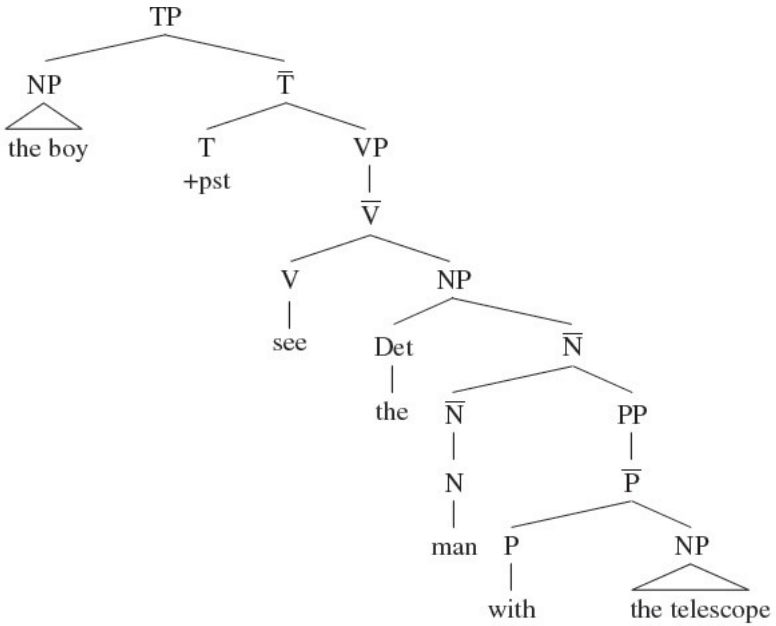
  - 1. The boy used the telescope to see the man
  - 2. The boy saw the man who had a telescope

- Each of these meanings can be represented by a different phrase structure tree

  - The two interpretations are possible because the PS rules allow more than one structure for the same string of words

Structural Ambiguities



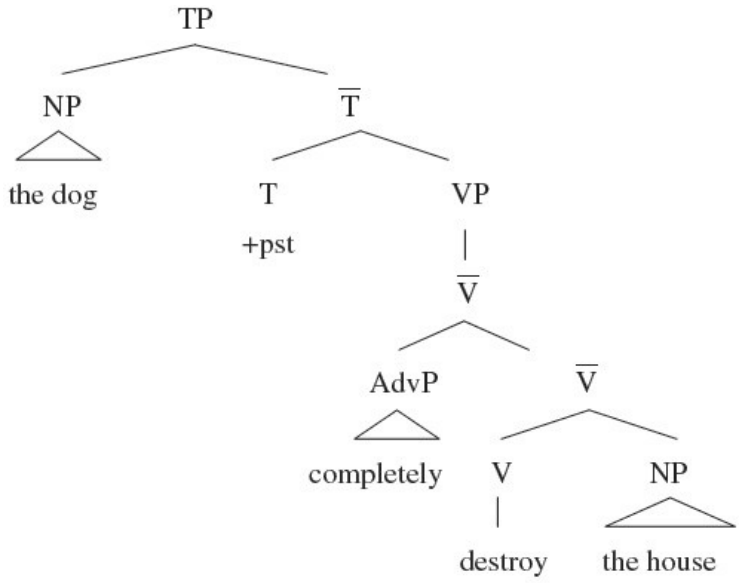


- The boy used a telescope to see the man
- The boy saw the man who had a telescope

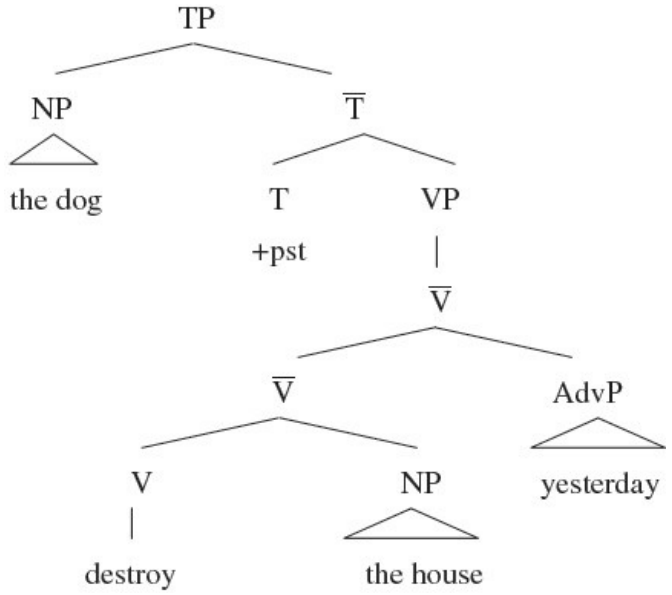
More Structures

- Adverbs are modifiers that can specify how (quickly, slowly) and when (yesterday, oNen) an event happens

17. $\overline{V}$ ✎ AdvP $\overline{V}$



16. $\overline{V}$ ✎ $\overline{V}$ AdvP



Transformational Analysis

- Recognizing that some sentences are related to each other is another part of our syntactic competence

  The boy is sleeping. Is the boy sleeping?

- The first sentence is a **declarative sentence**, meaning that it asserts that a particular situation exists

- The second sentence is a **yes-no question**, meaning that asks for confirmation of a situation

- The difference in meaning is indicated by different word orders, which means that certain structural differences correspond to certain meaning differences
  - For these sentences, the difference lies in where the auxiliary occurs in the sentence

Transformational Rules

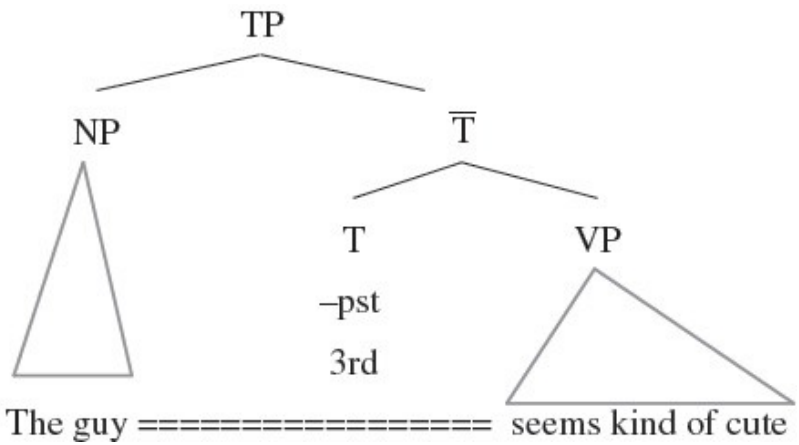
- Yes-no questions are generated in two steps:
  - 1. The PS rules generate a declarative sentence which represents the basic structure, or **deep structure** (**d-structure**) of the sentence
  - 2. A **transformational rule** then moves the auxiliary before the subject to create the **surface structure** (**s-structure**)

Transformational Rules

- Other sentence pairs that involve transformational rules are:
  - Active to passive
    - The cat chased the mouse. ✎ The mouse was chased by the cat.
  - there sentences
    - There was a man on the roof. ✎ A man was on the roof.
  - PP preposing
    - The astronomer saw the quasar with the telescope. ✎ With the telescope, the astronomer saw the quasar.

The Structural Dependency of Rules

- Transformations are structure-dependent, which means they act on phrase structures without caring what words are in the structures
  - The Move rule can be applied to any PP as long as it is an adjunct to V.
  - Subject-verb agreement stretches across all structures between the subject and the verb:

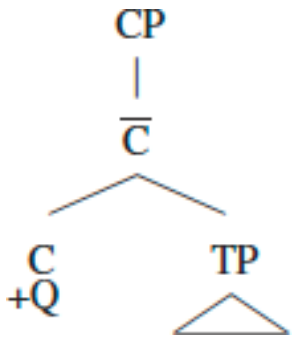


Yes/No

- The formation of yes—no questions comes from the transformation Move relocating the T from the corresponding declarative sentence:
- The boy will sleep will the boy sleep

C takes TP

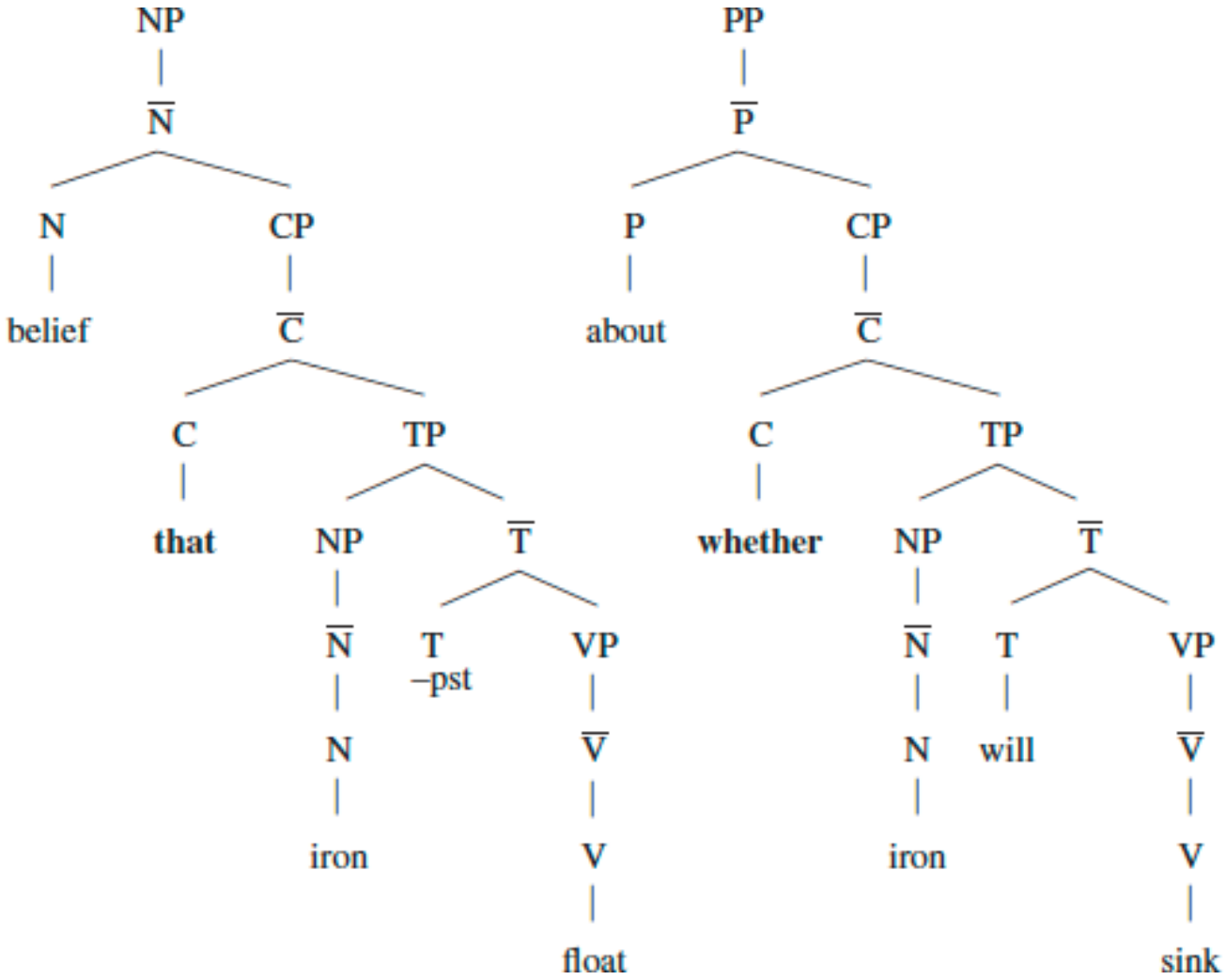
- C takes TP as its complement, C can have Q feature, but not always



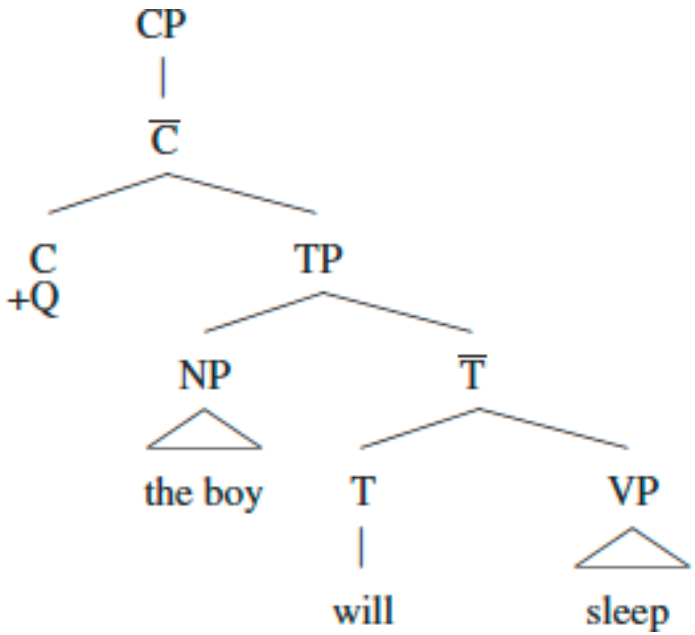
Embedded CP's

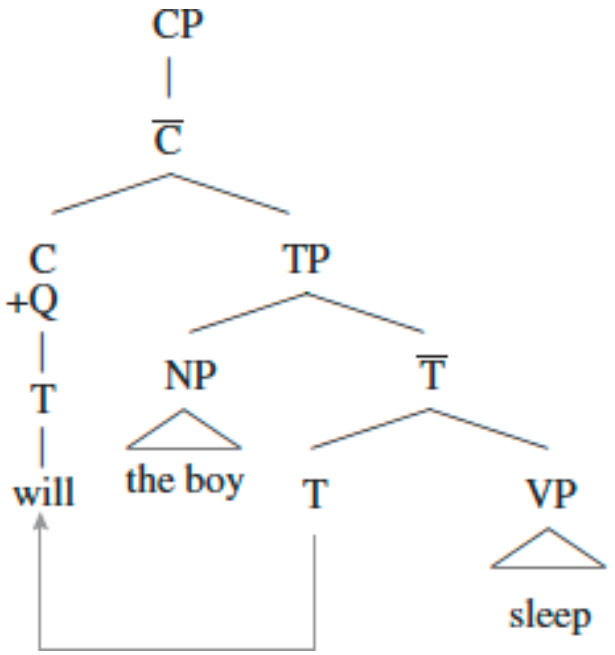
- CP's are needed not just for questions:
  - belief that iron floats (NP complement)
  - wonders if iron floats (VP complement)
  - happy that iron floats (AP complement)
  - about whether iron will sink (PP complement)

Examples of embedded CP



Yes/No questions T–>C





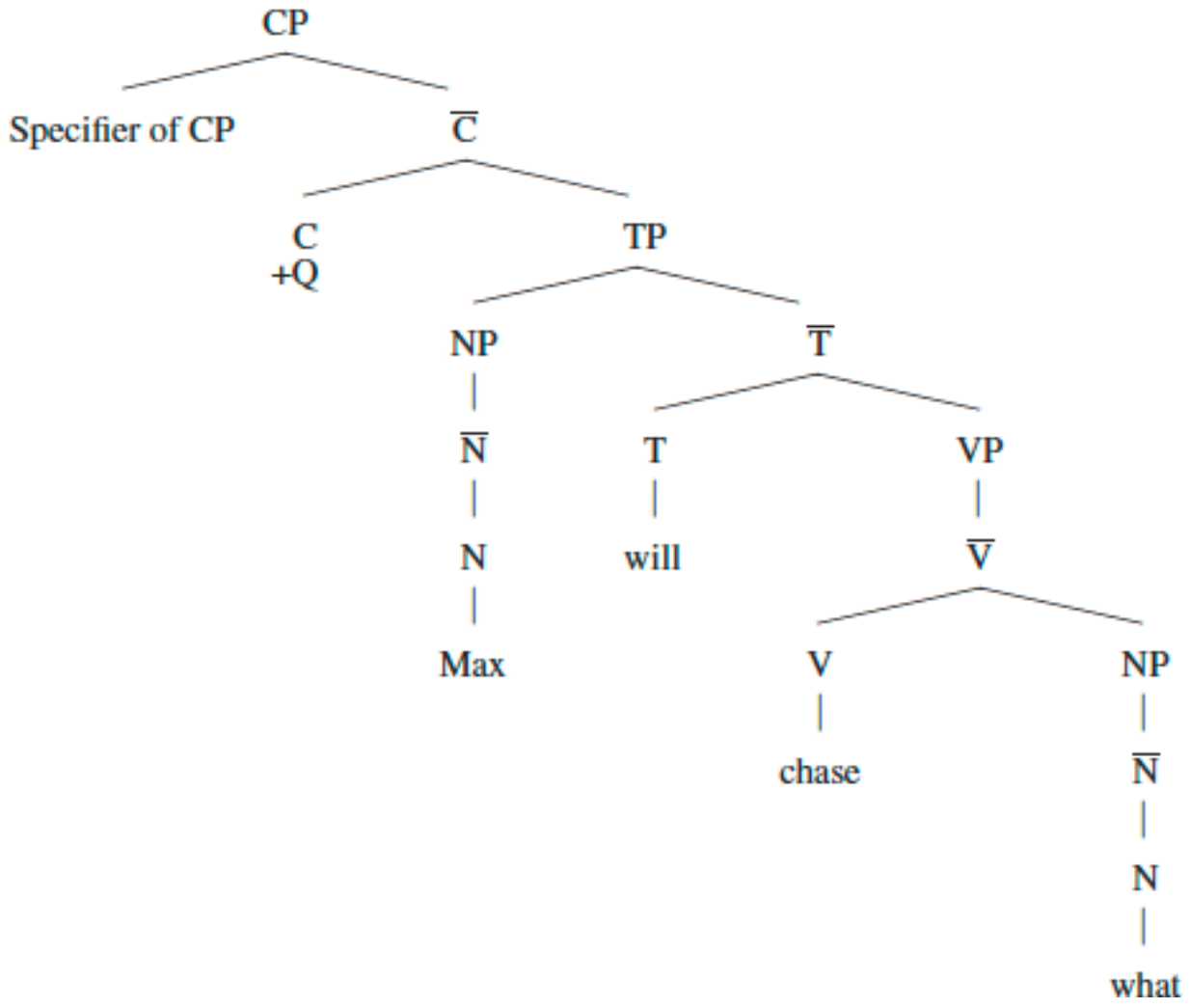
Wh Questions

Example: What will Max chase?

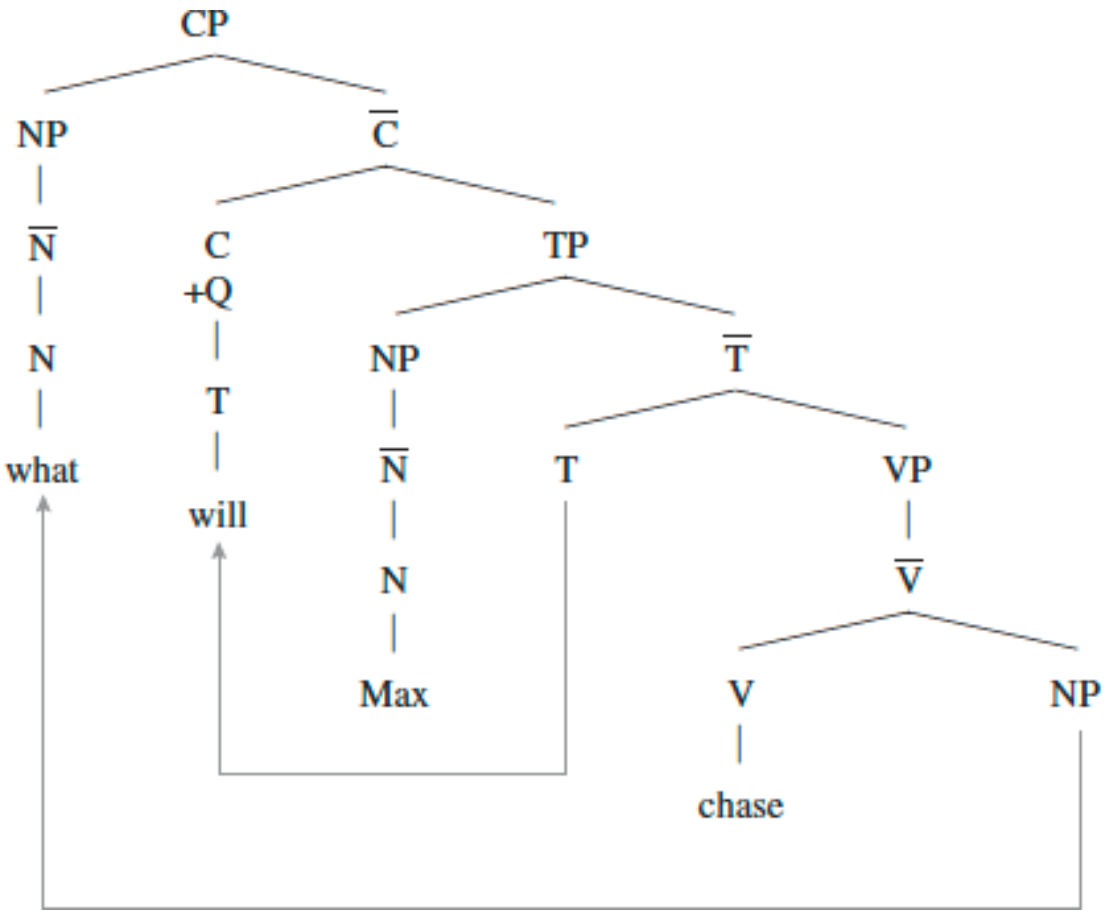
- This Wh question is formed in three steps:
  - 1. The PS rules generate a basic declarative word order: Max will chase what?
  - 2. Move shiNs the word what to the beginning of the sentence: What Max will chase?
  - 3. Move shiNs the modal will to occur before the subject NP: What will Max chase?

Wh-derivation

The d-structure for *What will Max chase?* is:

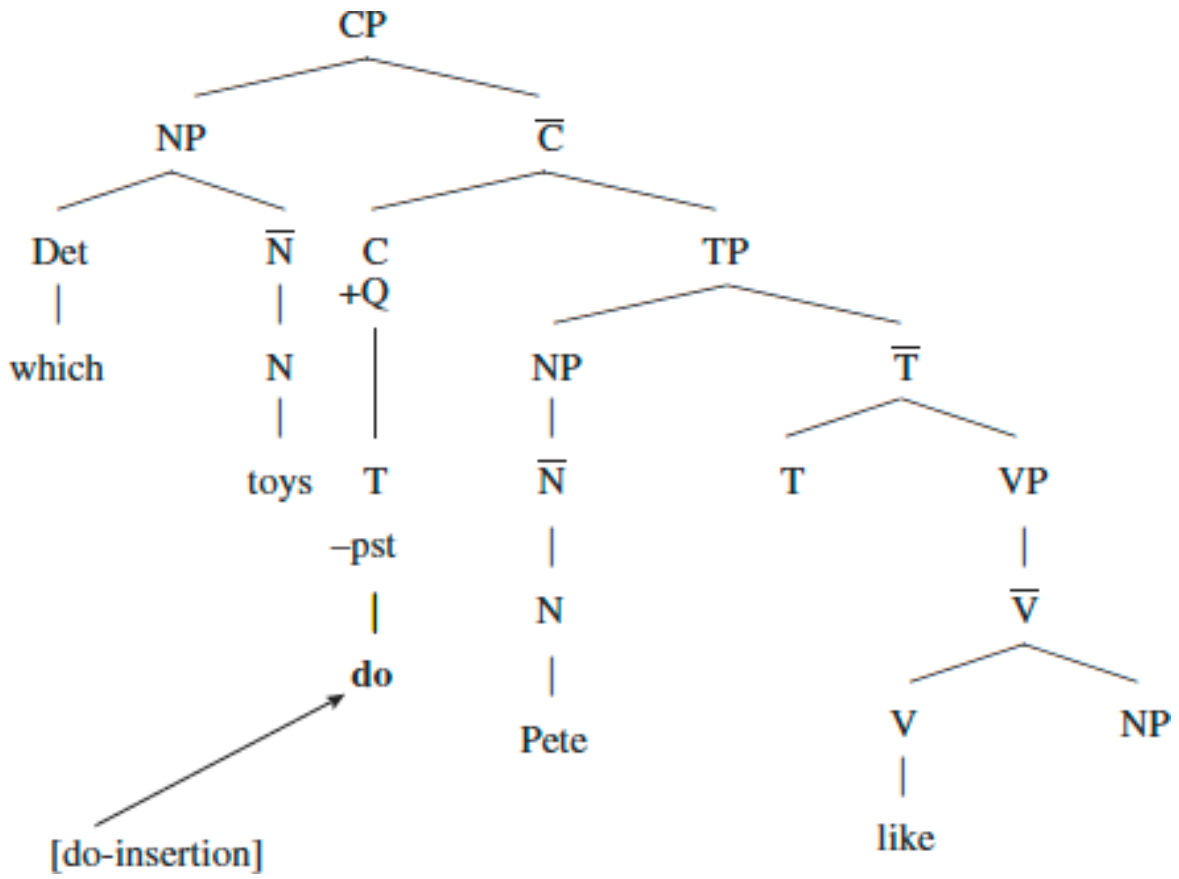


Wh---movement



Do-–-insertion

- Which toys does Pete like



Modals/ Auxiliaries

1. Spot has chased a squirrel.

2. Nellie is snoring.

•Like the modals, the auxiliaries have and be move to the position preceding the subject in both yes–no questions and wh questions.

3. Has Spot_____chased a squirrel?

4. Is Nellie_____snoring?

5. What has Spot_____chased_____?

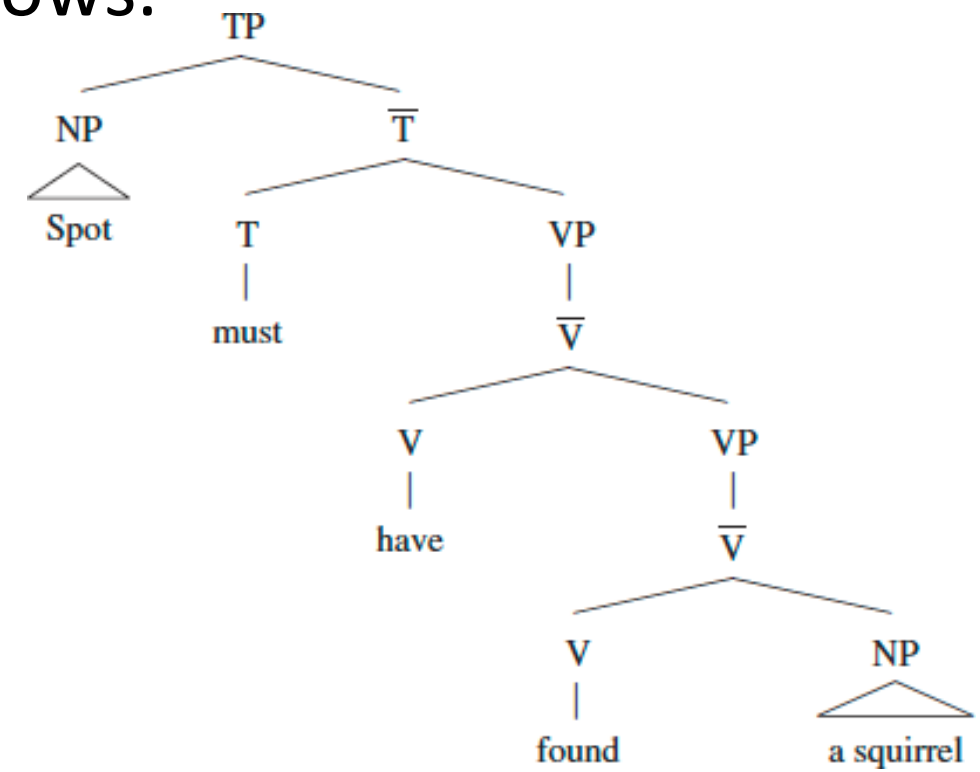
•The question is: where do have and be originate in the d---structure?

•Note that have and be can occur in the same sentence with a modal:

- Nellie may be snoring.
- Spot must have found a squirrel.

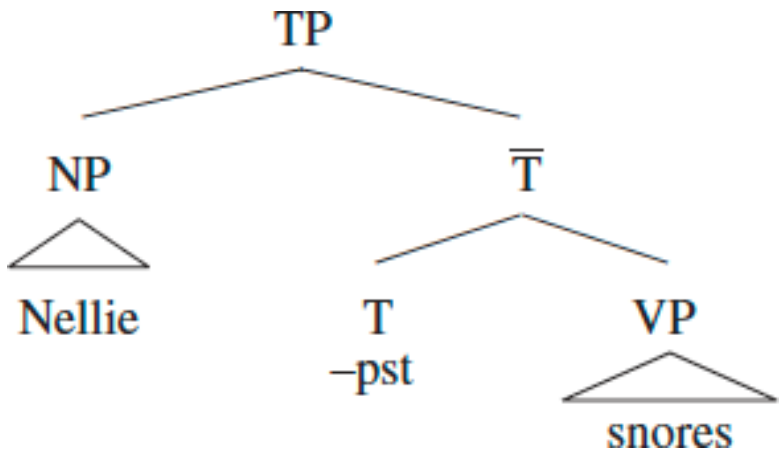
recursive v

- Our analysis leads us to conclude that have/ be originate under V in a recursive V structure,as follows.



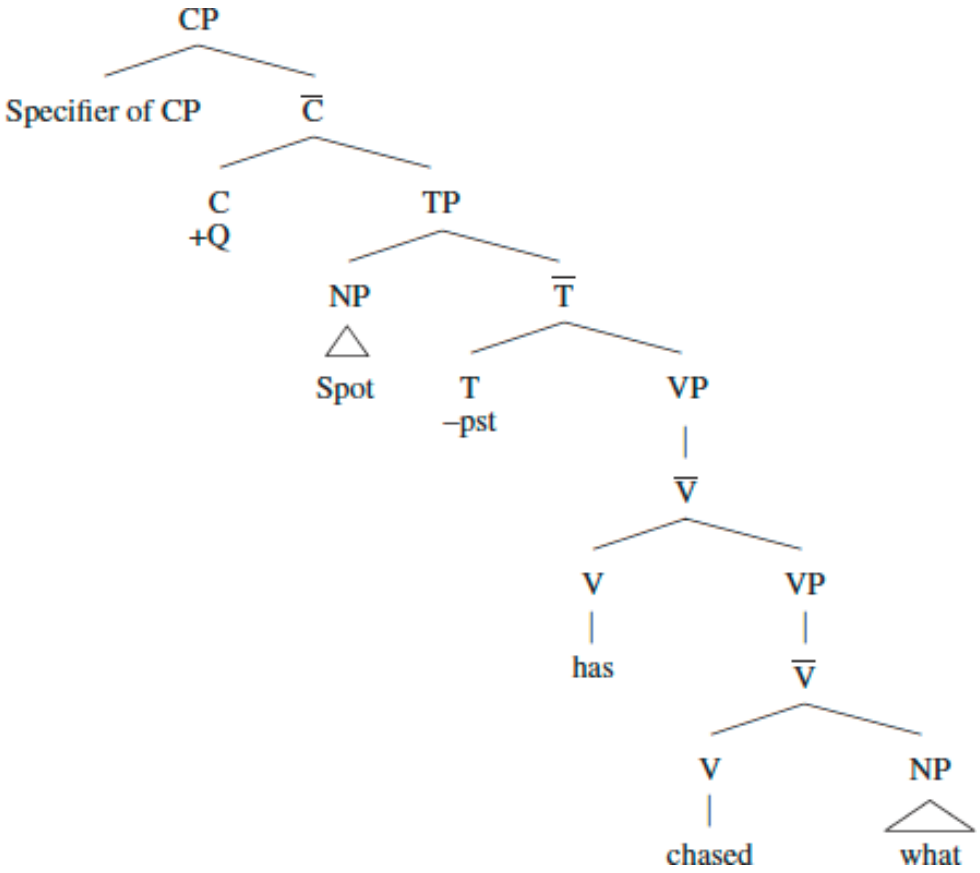
Tense/Modal

- When there is no modal, T is occupied by a tense feature, which is realized on have/be, as would be the case for other verbs like snore:

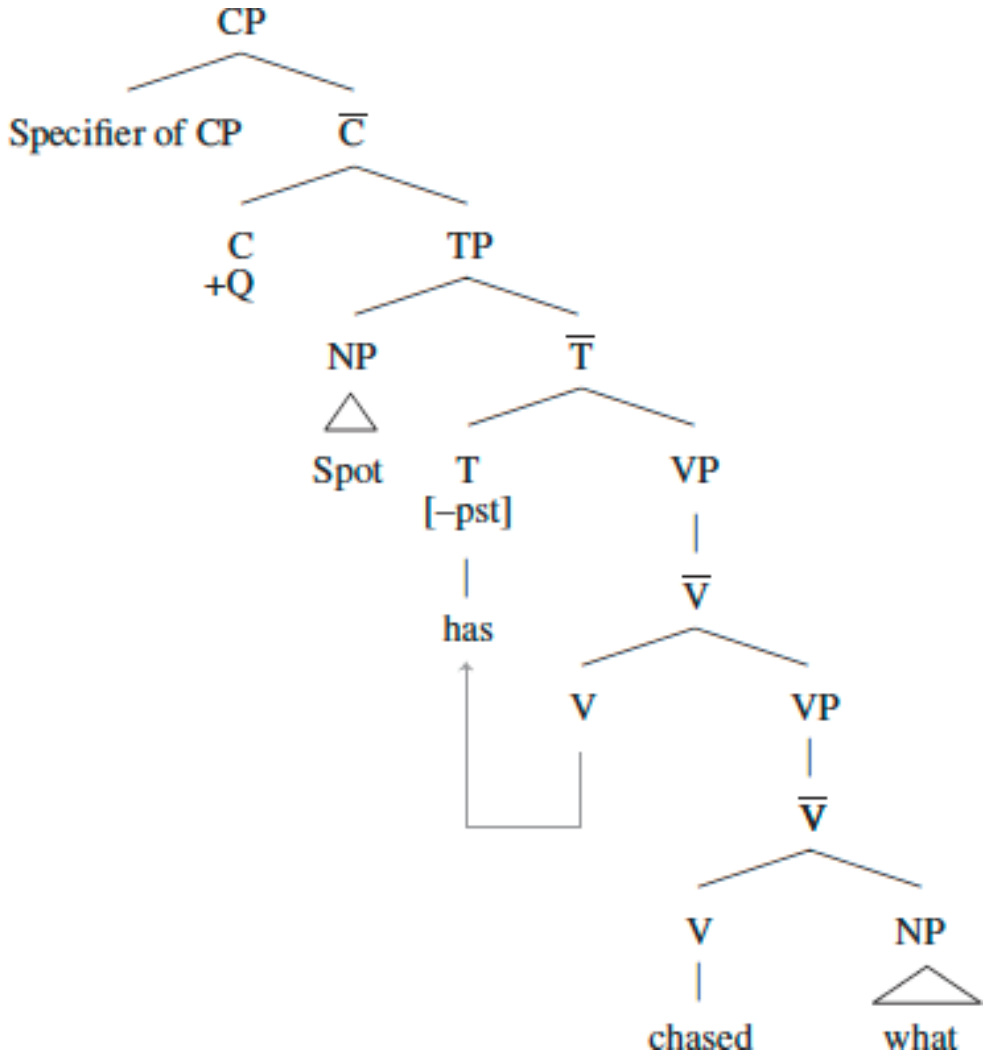


Movement from V—>T—>C

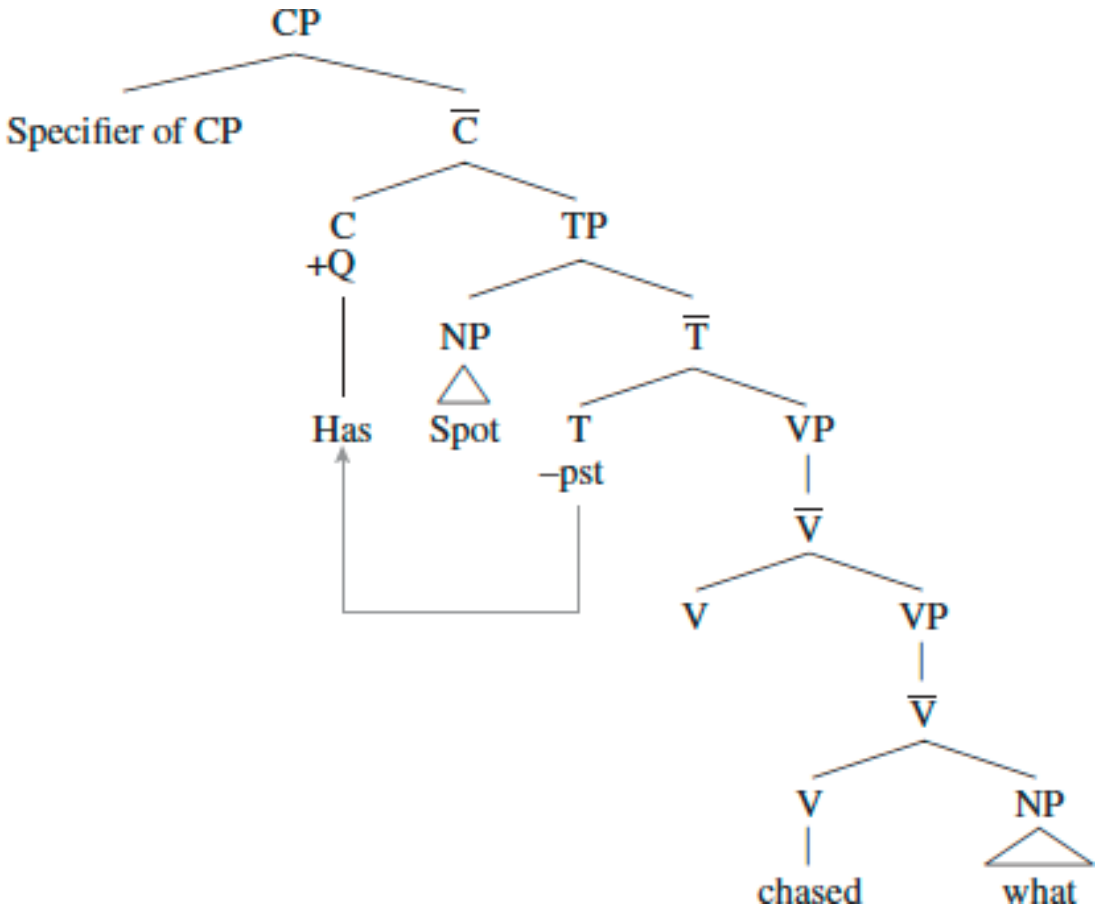
- What has Spot chased?
- Here is the d---structure (from the X—barderived phrase structure rules):



V→T

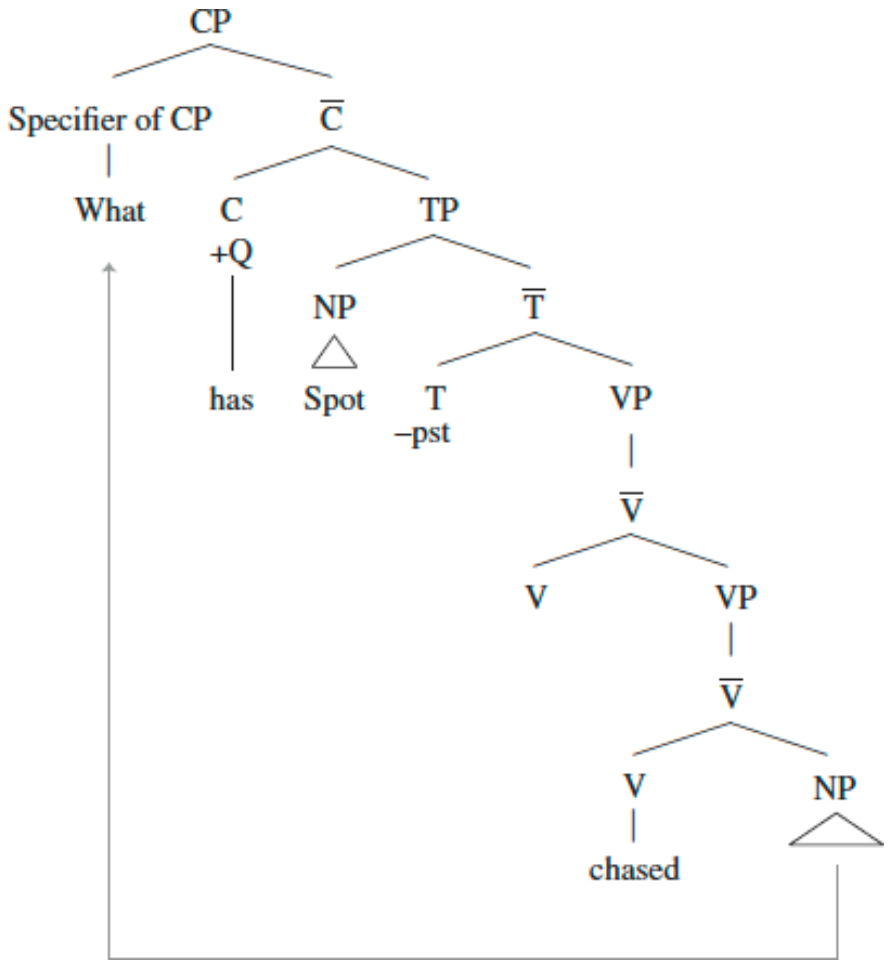

CP
Specifier of CP
C̄
C
+Q
TP
NP
T̄
Spot
T
[–pst]
VP
has
V̄
V
VP
V̄
V
NP
chased
what

T→C


CP
Specifier of CP
C̄
C
+Q
TP
NP
T̄
Has
Spot
T
–pst
VP
V̄
V
VP
V̄
V
NP
chased
what

Wh-–move

- We see that V—>Tfeeds T—>C, which allows wh move.



PS rules – Warning, these are textbook PS rules. For ones recommended by me see my additional text

- 1. S → NP VP
- 2. NP → Det Nd
- 3. Nd → N
- 4. VP → Vd
- 5. Vd → V NP
- 6. Vd→V PP
- 7. Vd → V AP
- 8. Nd → N PP
- 9. PP → Pd
- 10. Pd → P NP
- 11. AP → Ad
- 12. Ad → A
- 13. Ad → A PP
- 14. Nd → A Nd
- 15. Ad → Int Ad
- 16. Vd → Vd PP
- 17. Nd → Nd PP
- 18. Vd → AdvP V
- 19. Vd → Vd Adv
- P20. Vd → V VP

UG Principles and Parameters

- Universal Grammar (UG) provides the basic design for all languages, and each language has its own **parameters**, or variations on the basic plan
  - All languages have structures that conform to X-bar schema
  - All phrases consist of specifiers, heads, and complements
  - All sentences are headed by T
  - All languages seem to have movement rules
  - However, languages have different word orders within phrases and sentences, so heads and complements may be present in different orders across languages

Sign Language Syntax

- The syntax of sign languages also follow the principles of UG and has:
  - Auxiliaries
  - Transformations such as **topicalization**, which moves the direct object to the beginning of a sentence for emphasis, and wh movement
  - Constraints on transformations

- That UG is present in signed languages and spoken languages shows that the human brain is designed to learn language, not just speech.