

- **Structural ambiguity**
- **Modifier phrases**

Background reading and preparation:

- CL Ch 5, §5.1, “Modifiers”
- CL Ch 6, §3.2, “Structural ambiguity”
- Video “[Structural Ambiguity](#)” (Ling Vids)

0. Course information

- **HW #7 (*optional!*) is due**

- Please put it in the pile on the table that is labeled with your TA's name & recitation number
- **Make sure your recitation number is visible on your homework paper**

Yuhan (10:10) — 601

Esther (10:10) — 602

Esther (11:15) — 603

Yuhan (11:15) — 604

- Reminder: **HW is due at 10:10** with a grace period until 10:30. After 10:30, HW is **late**.

1. Review and context for this discussion

- Syntax is **creative**: The mental grammar has a way of **building sentences** (and understanding them)
- Linguists want to know: How does this work?
- Goal is to build a syntax **model** that can:
 - Produce only sentences that native speakers find **grammatical**
 - Make the right predictions about which words in a sentence form **constituents** (units, subgroups)
- Building an effective model helps us understand the properties of the actual human mental grammar

1. Review and context for this discussion

- A big piece of our model of the syntax component of human mental grammar is the **X' schema**
 - Word combinations that **don't fit** into the X' schema are predicted to be **ungrammatical**
 - Anything that is an **XP** in the X' schema is predicted to be a **constituent**
- If human speakers differ from our model in terms of what is grammatical or what is a constituent, we need to **adjust** our model!

1. Review and context for this discussion

Some useful constituency tests (*CL* Ch 5, sec 1.4)

- Which words do **native speakers** group as **constituents**?
- Our **trees** should treat any **constituent** as an **XP**
- **Substitution test**: Can the group of words be **substituted by a single word** (or *do so*)?
- **Movement test**: Can the group of words be **moved** as a unit (often to the front of the sentence)?
- **Coordination test**: Can the group of words be **linked by a conjunction** to another group of words already known to be a constituent? [use with some care]

2. Structural ambiguity

- *Data*: How many meanings does this sentence have?

Ingrid saw the Martian with a telescope

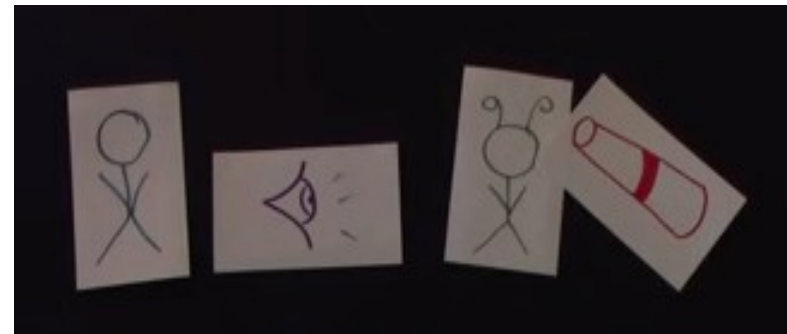
(this sentence is from the [Ling Vids video](#))

2. Structural ambiguity

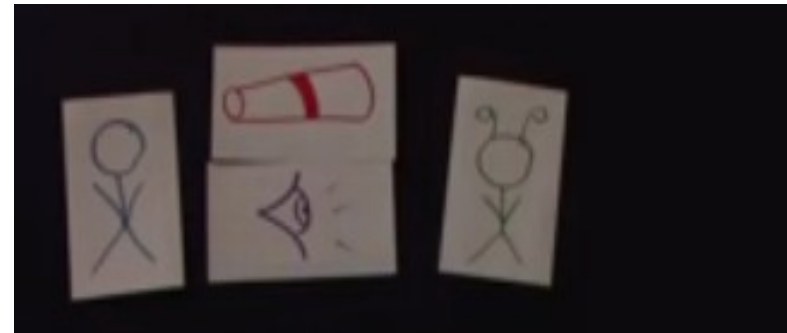
- *Data:* This sentence has **two possible meanings**

Ingrid **saw** **the Martian** **with a telescope**

#1: **the Martian has**
a telescope



#2: **the seeing happened**
by means of
a telescope



(graphics from the [Ling Vids video](#))

2. Structural ambiguity

- *Data:* This sentence has **two possible meanings**
Ingrid saw the Martian with a telescope
→ How can our mental grammar model give two different meanings to the same set of words?

2. Structural ambiguity

- *Data:* This sentence has **two possible meanings**
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 - How can our mental grammar model give two different meanings to the same set of words?
- Remember *unlockable*? How did we account for the fact that this **word** had **two meanings**?
 - 'able to be unlocked' / 'not able to be locked'

2. Structural ambiguity

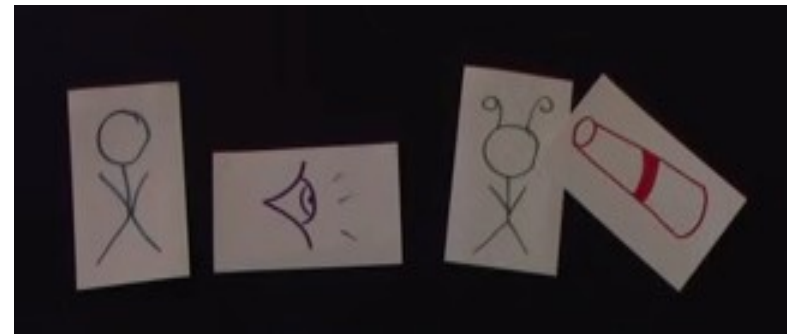
- *Data*: This sentence has **two possible meanings**
Ingrid saw the Martian with a telescope
 - How can our mental grammar model give two different meanings to the same set of words?
- Remember *unlockable*? How did we account for the fact that this **word** had **two meanings**?
 - **Two word trees**: [*un-lock*]+*able*, *un*+ [*lock-able*]
 - We can take a similar approach in syntax: if a sequence of words can have **more than one structure**, it can have more than one meaning

2. Structural ambiguity

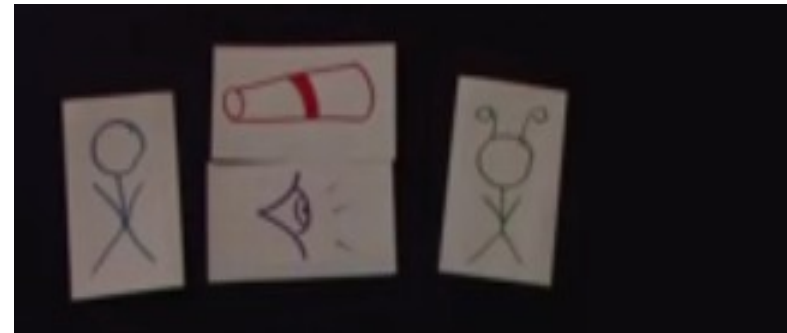
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- So we need our mental grammar to be able to give it **two different structures**

2. Structural ambiguity

- *Data: Which group of words is a constituent in the mental grammar of a native speaker?*

Ingrid saw the Martian with a telescope.

Ingrid saw it.

Ingrid saw the Martian with a telescope.

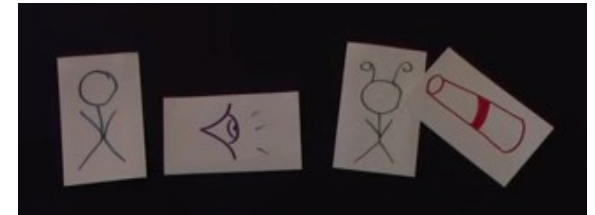
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2. Structural ambiguity

- *Data*: **Which group of words** is a **constituent** in the mental grammar of a native speaker?

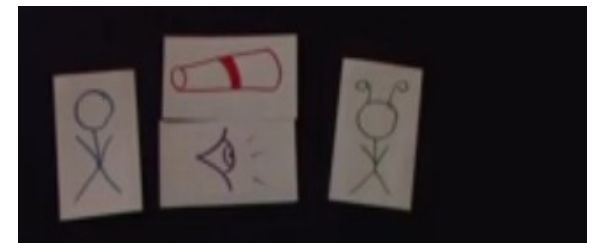
Ingrid saw the Martian with a telescope.

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Ingrid saw the Martian with a telescope.

Ingrid saw it with a telescope.



→ It depends on **which meaning** we consider!

2. Structural ambiguity

- *Data*: **Which group of words** is a **constituent**?

meaning #1: **the Martian has** a telescope

Ingrid saw [the Martian with a telescope].

✓ *Ingrid saw it.*

✗ *Ingrid saw it with a telescope.*

meaning#2: **the seeing happened by means of** a telescope

Ingrid saw [the Martian] with a telescope.

✗ *Ingrid saw it.*

✓ *Ingrid saw it with a telescope.*

2. Structural ambiguity

- As things now stand...

If we apply our X' schema to this sentence, there is **only one tree** that we can construct

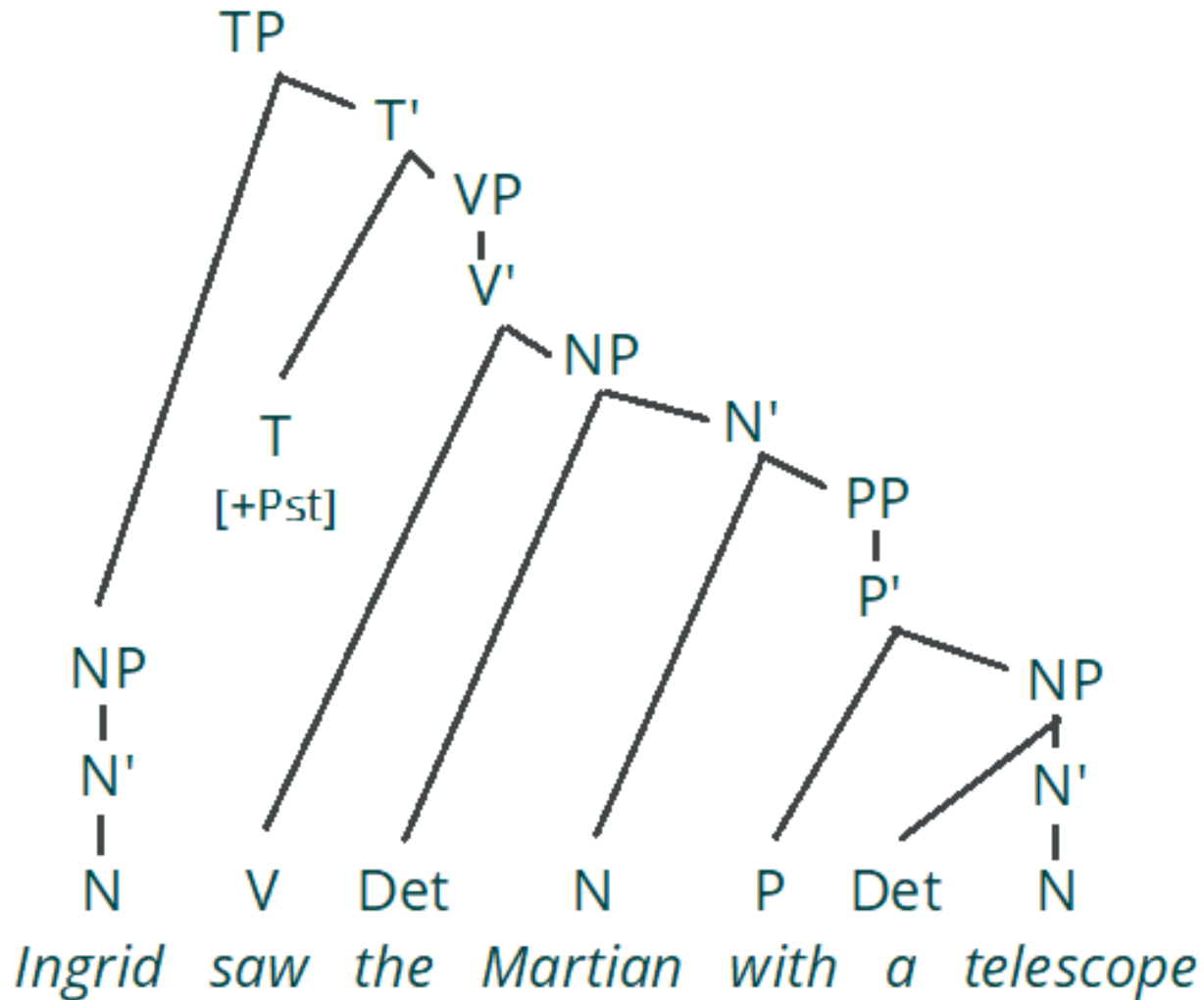
- Try it: What does your tree look like?

*Ingrid **saw** the Martian with a telescope*

- Reminders for sentence trees
 - Start by labeling word categories
 - Find subject and predicate
 - Look for constituents
 - Heads (N V A P T) project phrases
 - Specifiers are “special”—each XP category has particular kinds

2. Structural ambiguity

- Were you able to draw this tree?

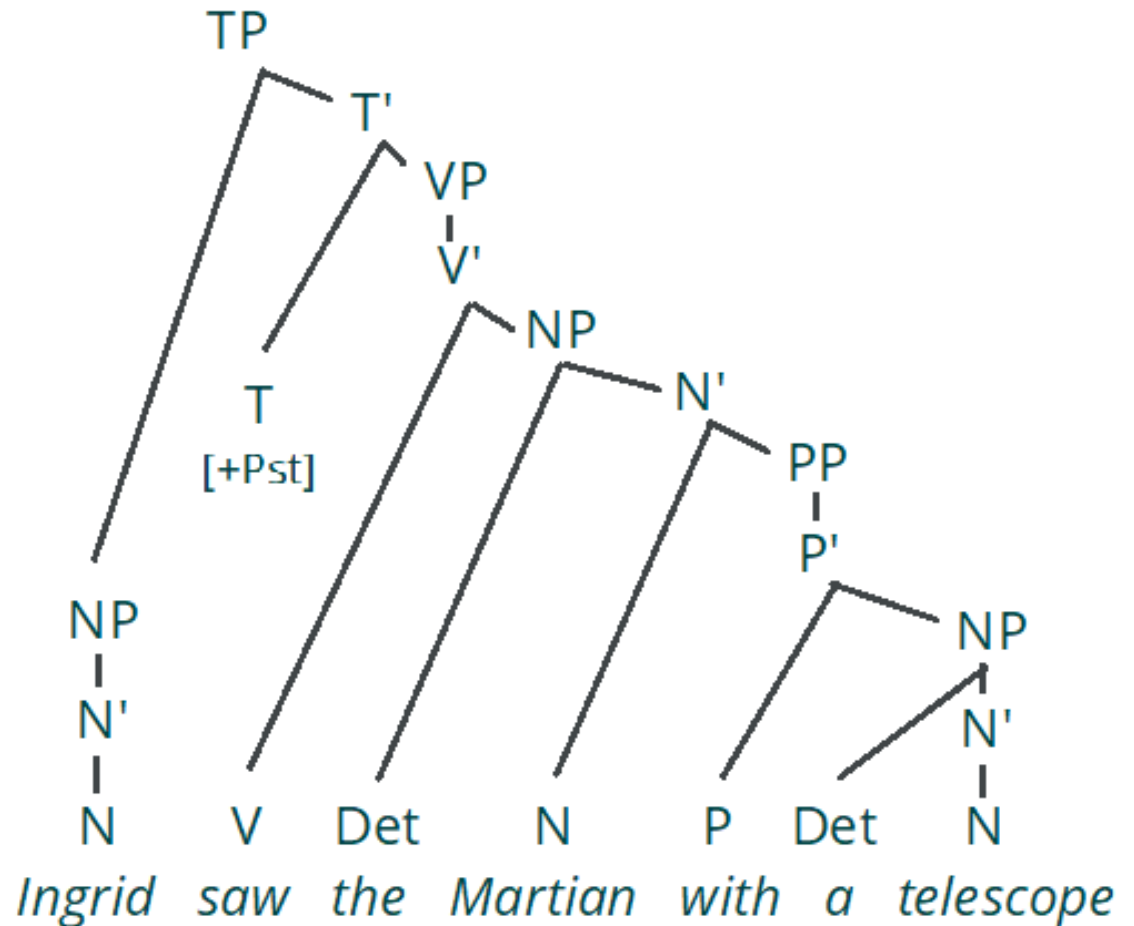


2. Structural ambiguity

- **Which meaning** is predicted by this tree? How can we tell?

#1: **the Martian**
has a telescope

#2: **the seeing**
happened
by means of
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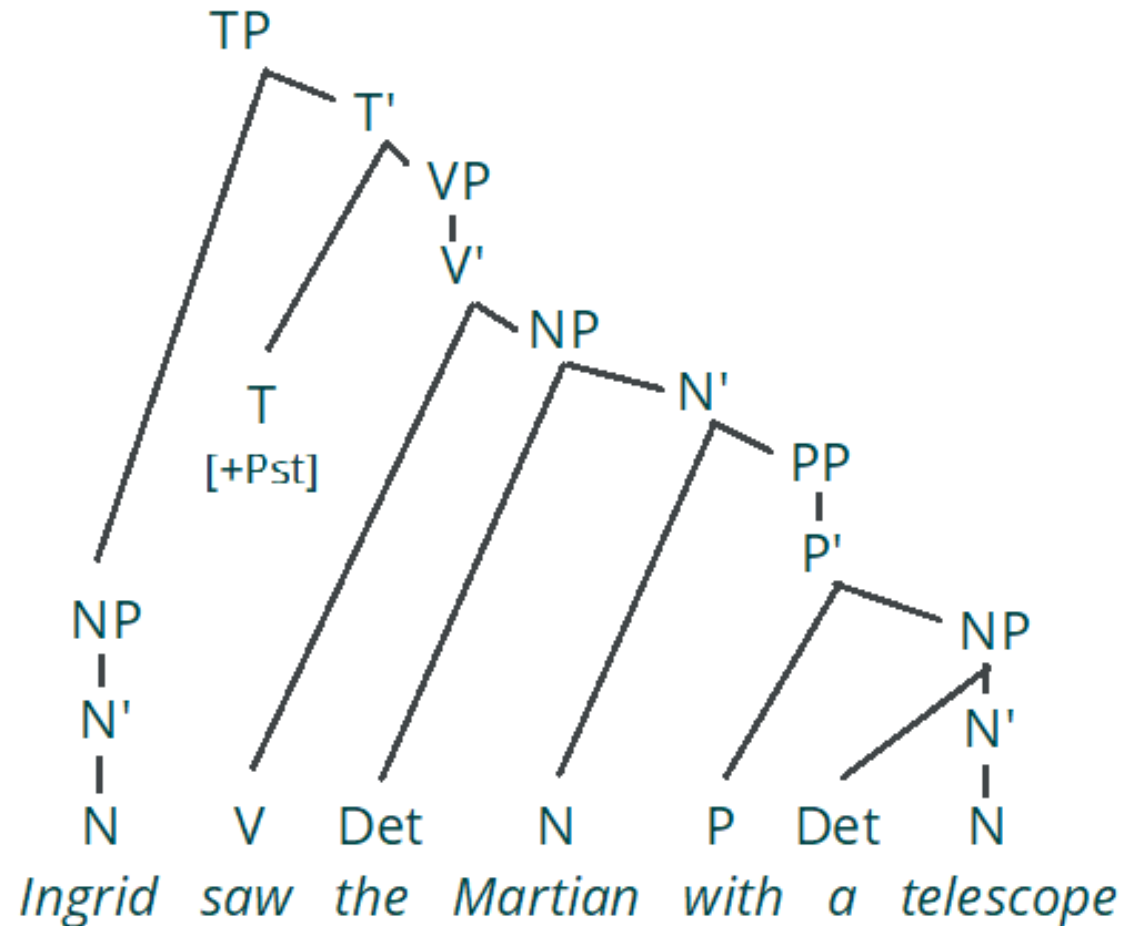


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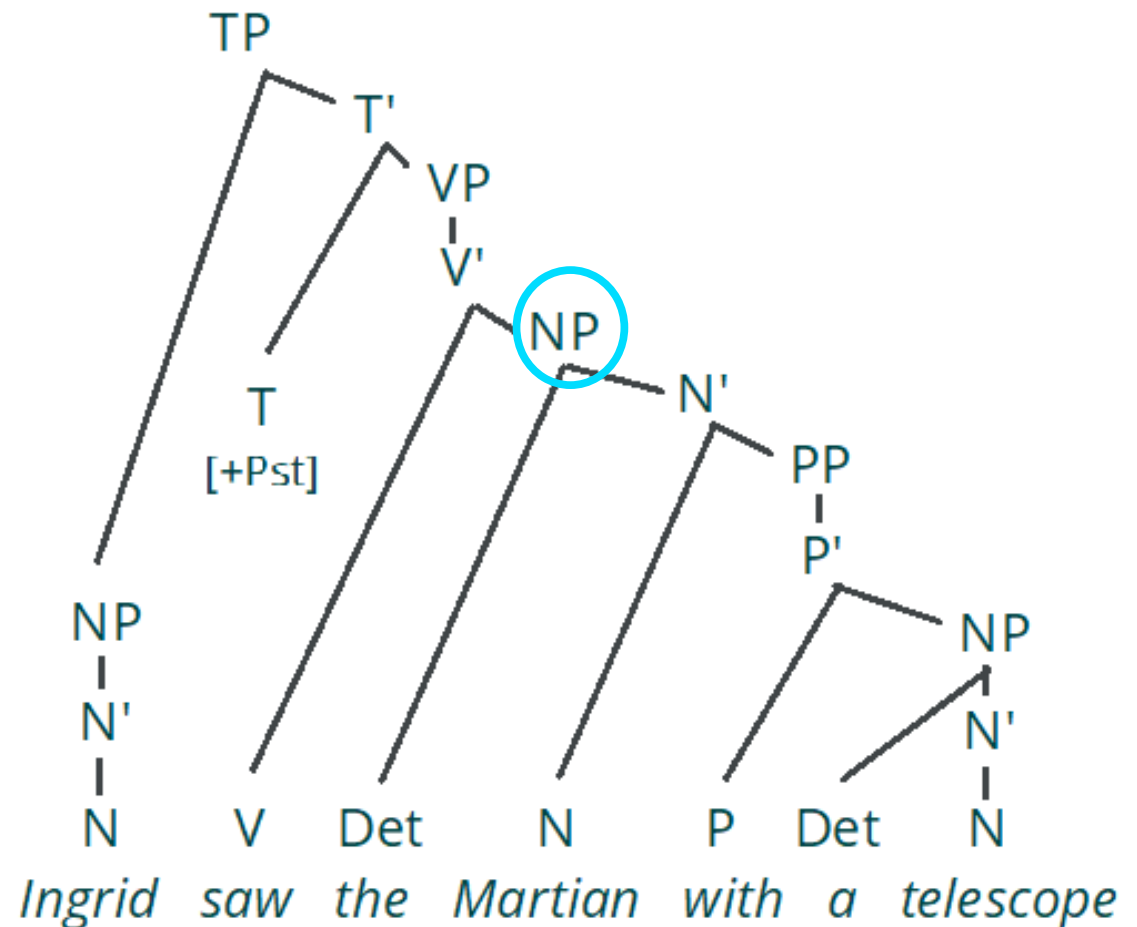
→ **Check for constituency!**

2. Structural ambiguity

- **Which meaning** is predicted by this tree? How can we tell?

#1: **the Martian**
has a telescope

**[the Martian with
a telescope]** is a
constituent (NP)

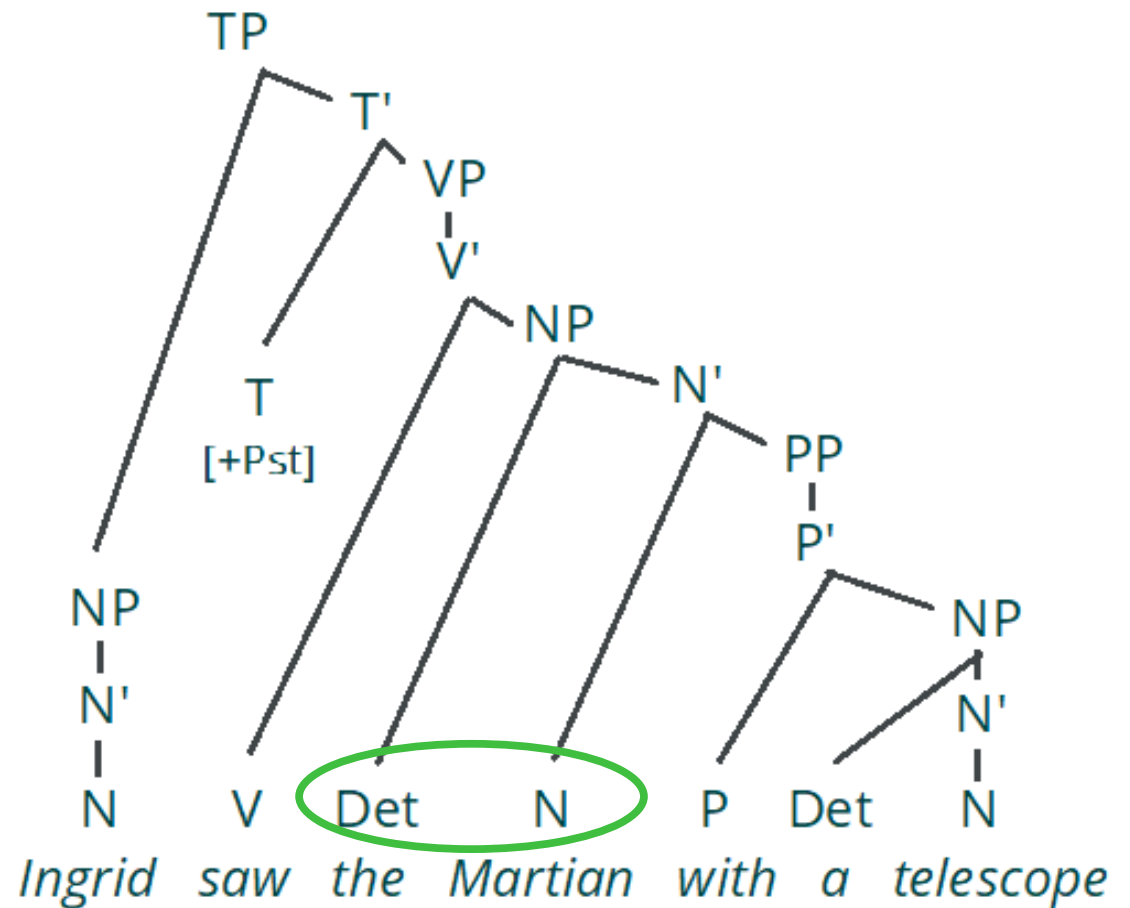


2. Structural ambiguity

- This meaning is **not predicted** by this tree...

#2: **the seeing**
happened
by means of
a telescope

...because
[the Martian] is
NOT a constituent



2. Structural ambiguity

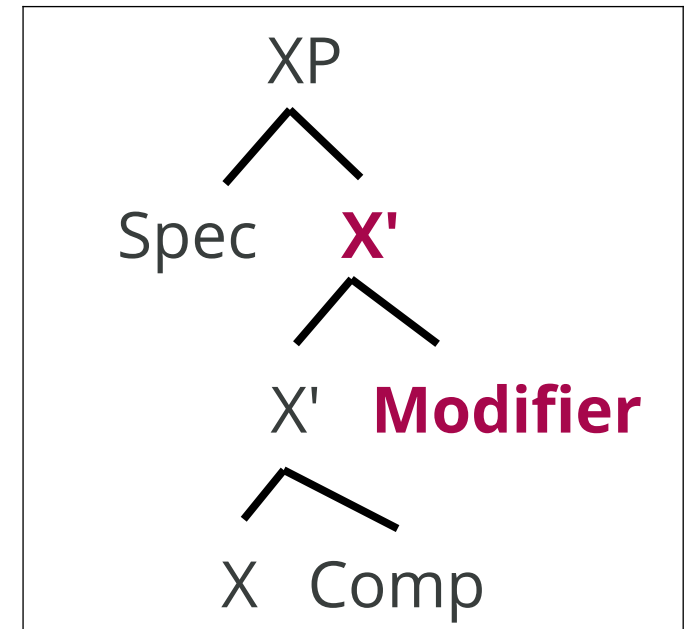
- How do we get our model to predict meaning #2?
- Reminder...
If human speakers differ from our model in terms of what is grammatical or what is a constituent, we need to **adjust** our model!

3. Modifiers

- This example shows us that we need **more options** for syntactic structure than the basic X' schema allows
 - One further development: **modifiers**

3. Modifiers

- One further development: **modifiers**
 - Modifiers are optional, extra information about the head of a phrase
 - They are included in the X' schema by **repeating the X' level** — modifiers combine with X' and the new node formed is also X'
 - Which side of the X' a modifier appears on (left or right) depends on the type of modifier



3. Modifiers

- Example: What is the structure of this phrase?
 - What is always the first step?

those very expensive cars

3. Modifiers

- Example: What is the structure of this phrase?
 - What kind of XP is this? What is the **head**?

Det Deg A N
those very expensive cars

3. Modifiers

- Example: What is the structure of this phrase?
 - What other word is a head that has to form XP?

NP

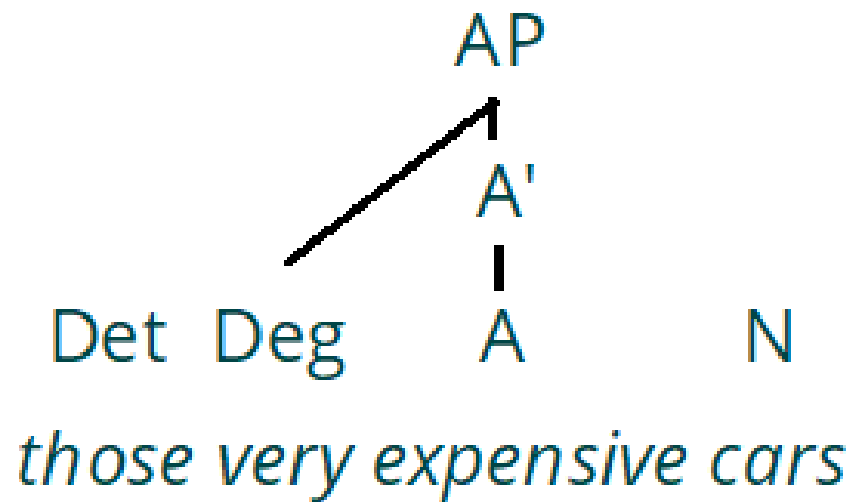
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3. Modifiers

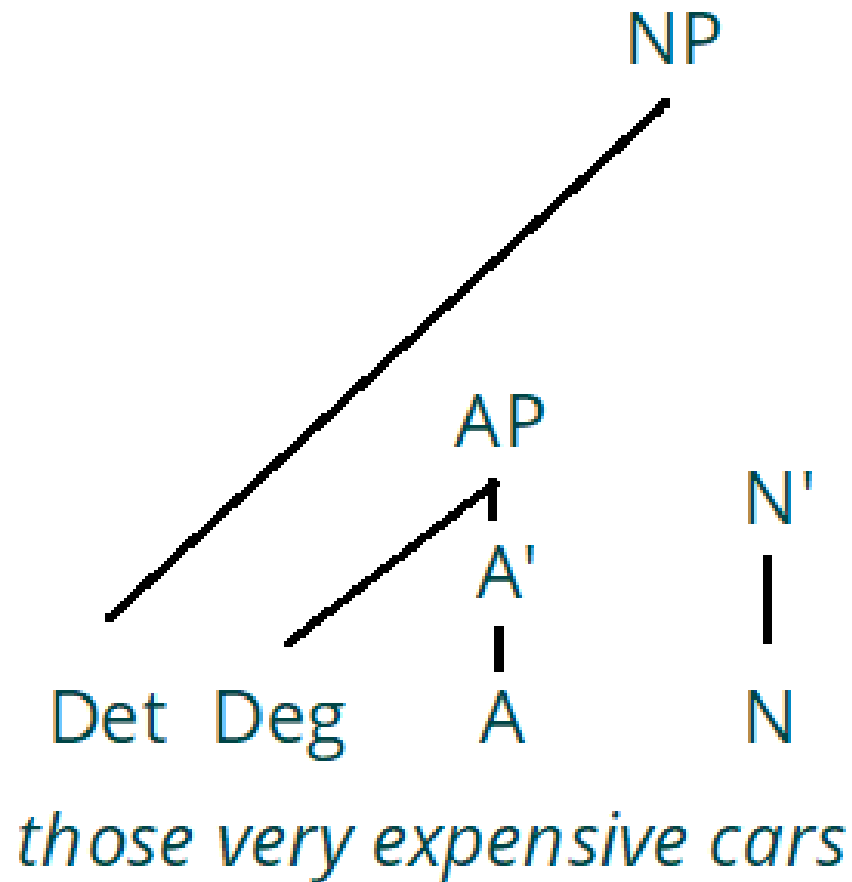
- Example: What is the structure of this phrase?
 - Can the AP be a **complement** of the N?

NP



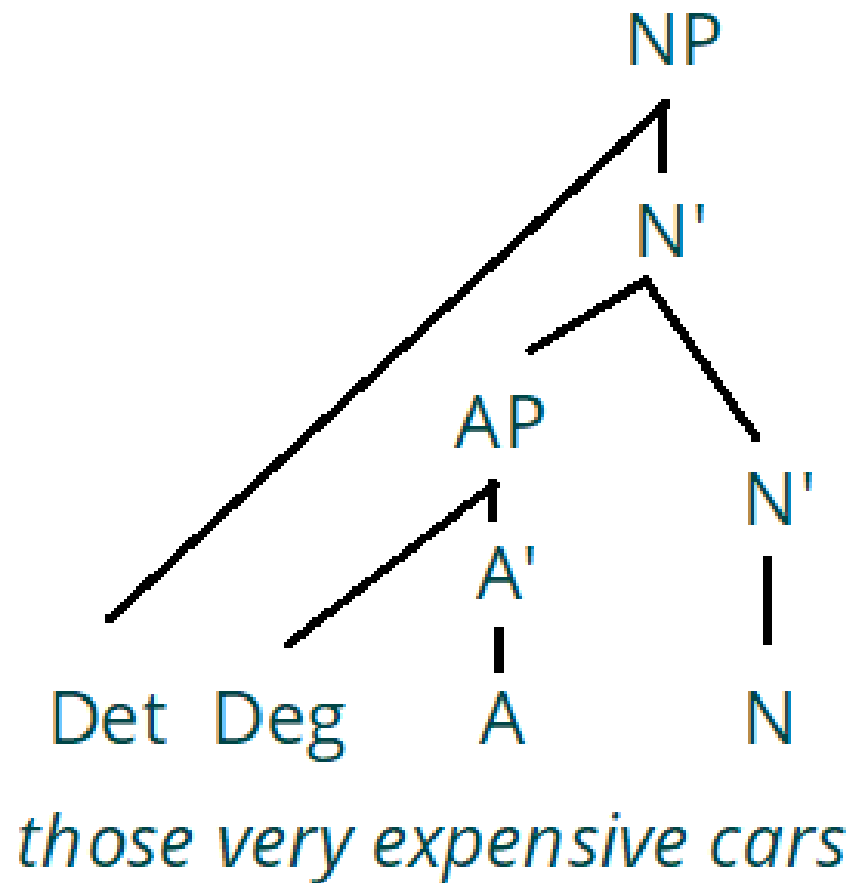
3. Modifiers

- Example: What is the structure of this phrase?
 - The AP is on the **wrong side** to be a complement



3. Modifiers

- Example: What is the structure of this phrase?
 - The AP must be a **modifier**: add another **N'**



3. Modifiers

- Since a modifier is an “add-in” to the X' schema, there can be **multiple** modifiers in an XP
 - This **correctly predicts** that there can be **unlimited** APs in an NP!

those [AP red] cars

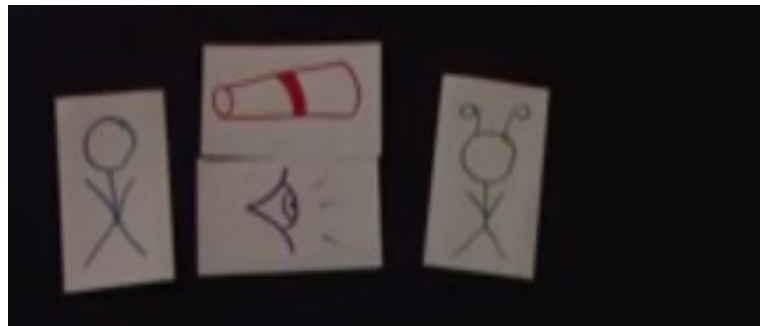
those [AP very expensive] [AP red] cars

those [AP big] [AP very expensive] [AP red] cars

(etc.)

3. Modifiers

- Now that our X' model contains **modifiers**, we have a way to represent the structure of meaning #2:



#2: **the seeing happened by means of** a telescope

*Ingrid saw **[the Martian]** with a telescope.*

✗ *Ingrid saw it.*

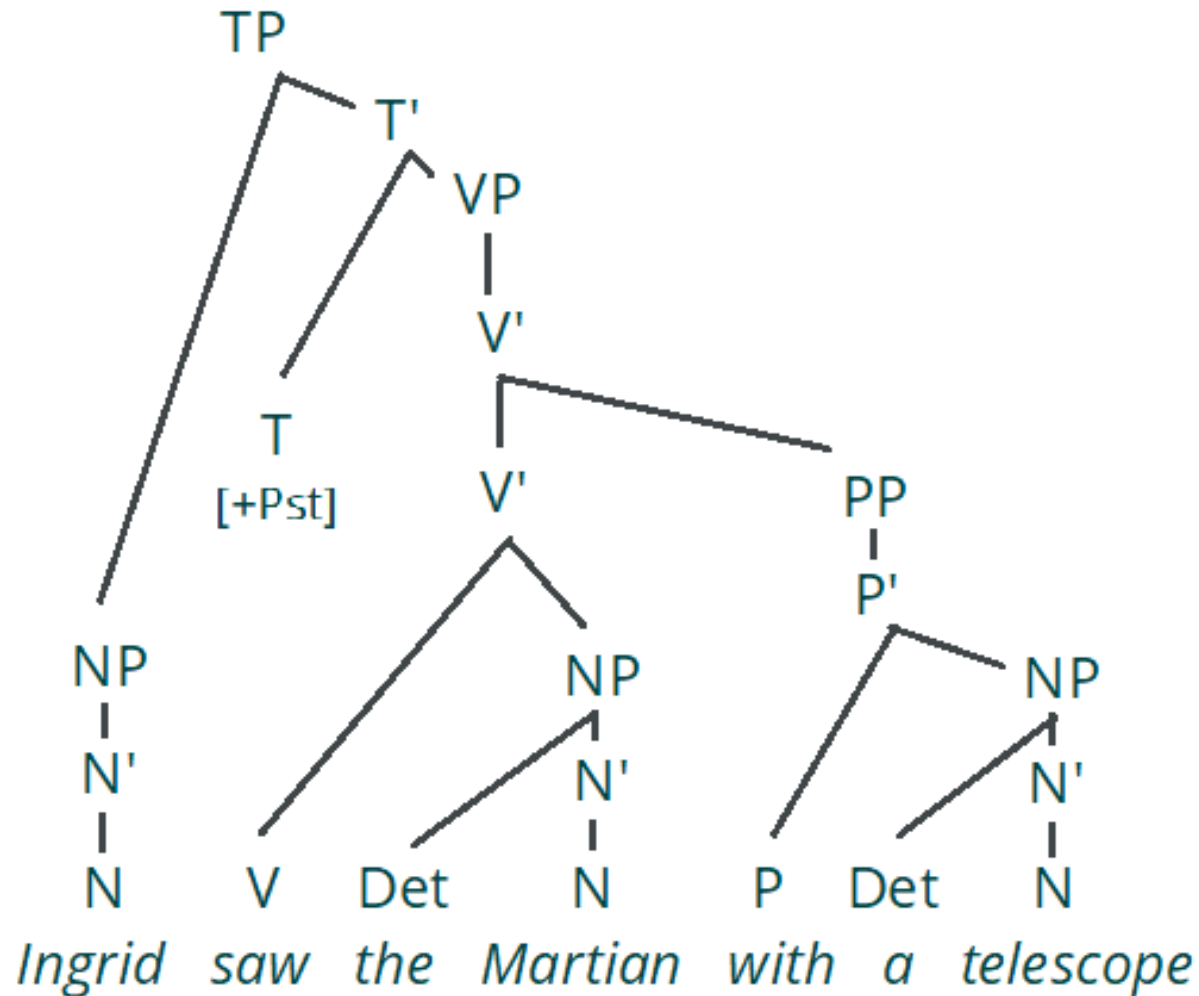
✓ *Ingrid saw **it** with a telescope.*

3. Modifiers

- In this meaning, the PP *with a telescope* is telling us something about the V *saw*
 - But it's **not** the complement of *saw* — that's *the Martian*
 - We also note that the V *see* **doesn't require** a PP (the way the V *put* requires one)
- So we conclude that this PP is a **modifier** in the VP whose head is *saw*

3. Modifiers

- We conclude that this PP is a **modifier** in the VP



3. Modifiers

- Now we have seen three different structures for a **V NP PP** sequence — which do we use when?
 - Consider **constituency**: Is the PP inside the NP, as in [*the Martian with a telescope*]?
 - If the PP is outside the NP and in the VP somewhere: Is it **required** by the V (as with *put*)?
 - If so, use the **double-complement** structure (3-way branching V') | see W Oct 18 outline
 - Otherwise, treat it as a **modifier**

3. Modifiers

- More generally, when to use the modifier structure?
Given [**X YP**], is YP a **complement** or a **modifier**?
- For this class, **use the basic X' schema whenever possible** — only treat a phrase as a modifier if:
 - there are phrases that wouldn't otherwise fit into the XP schema (like an AP before a N), or
 - **constituent structure** requires it:
[*saw [the Martian] [with a telescope]*]
 - There are advanced syntactic theories about systematically distinguishing modifiers from complements, but we won't pursue that in this class

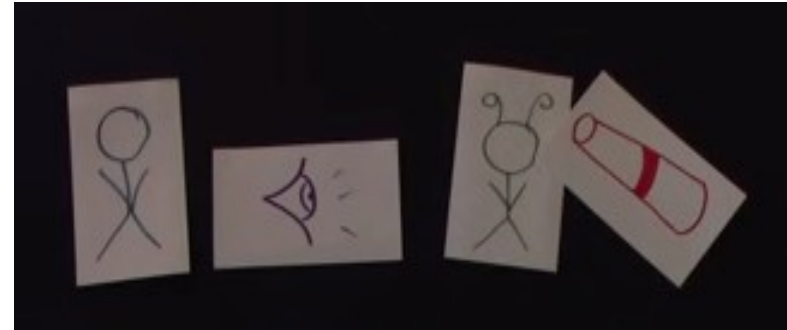
4. Two meanings — two structures

- Returning to the original problem:

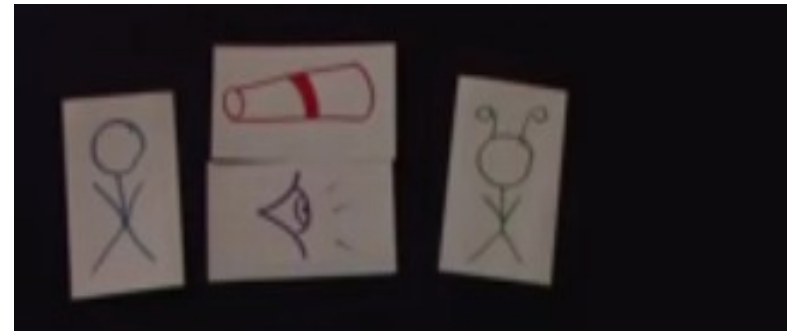
This sentence has **two possible meanings**

Ingrid saw the Martian with a telescope

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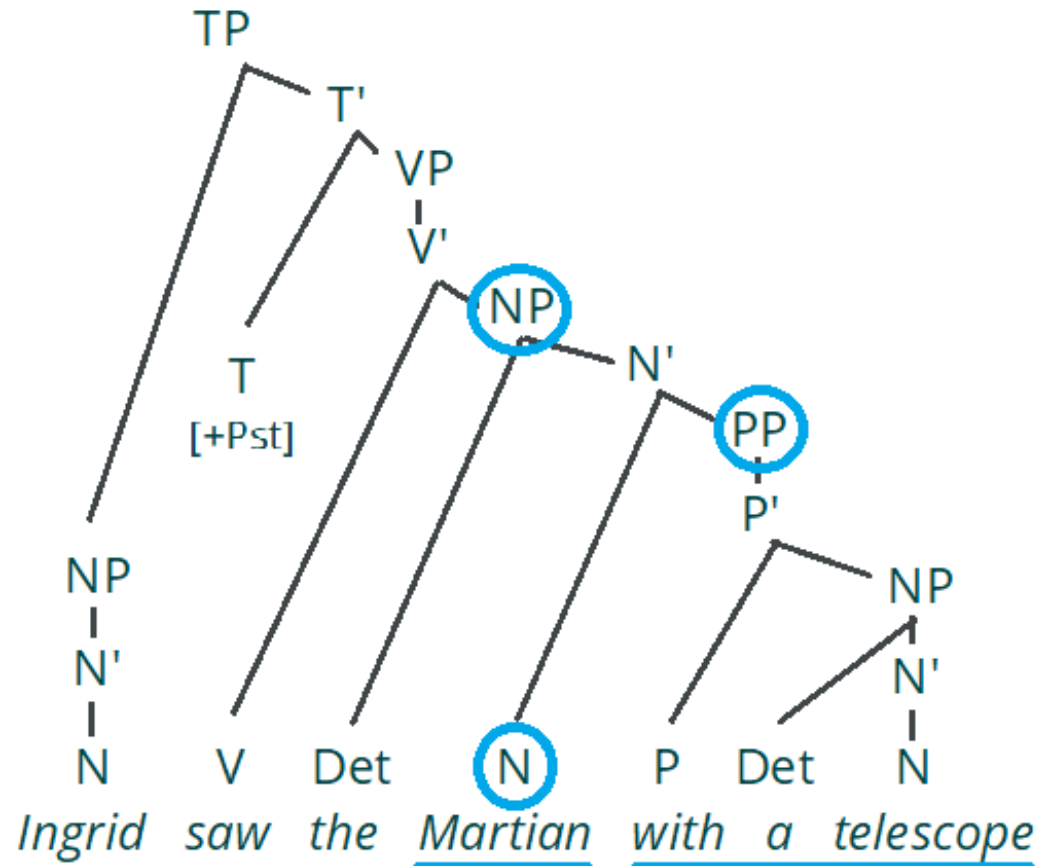


- These **two meanings** need **two structures**

4. Two meanings — two structures

- **Ingrid saw [the Martian [with a telescope]]**

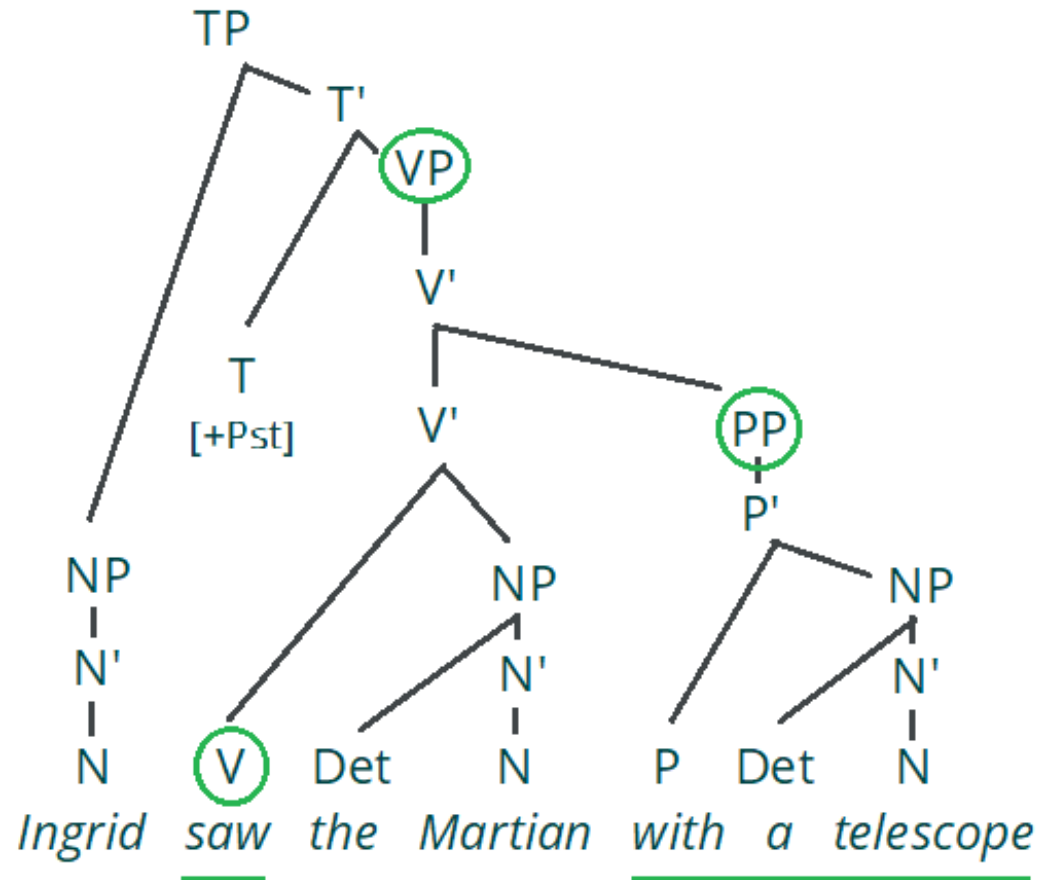
- the PP tells us something about *Martian*, so it is **inside the NP** whose head is *Martian*
- the group of words *the Martian with a telescope* **is** a constituent



4. Two meanings — two structures

- **Ingrid** [**saw** [**the Martian**] [**with a telescope**]]

- the PP tells us something about *saw*, so it is **inside the VP** whose head is *saw*
- the group of words *the Martian with a telescope* **is not** a constituent
- instead, *the Martian* is a constituent



5. Some examples to practice

- Try it: Draw trees for these sentences, some of which need the modifier structure
 - (1) *A very large green balloon floated by.*
 - (2) *Susan will follow the man in my car.*
 - (3) *Grover put the book on the table.*
 - Do any of these sentences have **two meanings**, corresponding to two different tree structures?
 - If so, how are the meanings related to the structures? (Which head is the ambiguous phrase connected with?)
- Answers are posted separately for you to check