• Structural ambiguity
• Modifier phrases

Background reading and preparation:

• CL Ch 5, §5.1
• CL Ch 6, §3.2
• Recommended: Video “Structural Ambiguity” (by Ling Vids)
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
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!
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?
2. Structural ambiguity

• 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

• 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

- This sentence has **two possible meanings**
  
  *Ingrid saw the Martian with a telescope*

  → How can the mental grammar give two different meanings to the same set of words?
2. Structural ambiguity

- This sentence has **two possible meanings**
  
  *Ingrid saw the Martian with a telescope*

  → How can the mental grammar 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

• This sentence has **two possible meanings**

  *Ingrid saw the Martian with a telescope*

  → How can the mental grammar 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

- 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

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

• 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.

Ingrid saw it with a telescope.
2. Structural ambiguity

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

→ It depends on which meaning we consider!
2. Structural ambiguity

- Which group of words is a constituent?

#1: the Martian has a telescope

- Ingrid saw [the Martian with a telescope].
  - ✔ Ingrid saw it.
  - ✗ Ingrid saw it with a telescope.

#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
  - 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 goes with this tree? How can we tell?

#1: the Martian has a telescope

#2: the seeing happened by means of a telescope
2. Structural ambiguity

• **Which meaning** goes with this tree? How can we tell?

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

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

→ Check for constituency!
2. Structural ambiguity

- **Which meaning** goes with this tree? How can we tell?

  #1: the Martian has a telescope

  [the Martian with a telescope] is a constituent (NP)
2. Structural ambiguity

• How do we get the other meaning?

• 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 here is a head that needs XP?

\[
\text{NP}
\]

\[
\text{Det} \quad \text{Deg} \quad \text{A} \quad \text{N}
\]

*those very expensive cars*
3. Modifiers

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

```
NP
```

```
Det  Deg  A   N
those very expensive cars
```
3. Modifiers

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

```
those very expensive cars
```
3. Modifiers

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

*those very expensive cars*
3. Modifiers

• Since a modifier is an “add-in” to the X' schema, there can be **multiple** modifiers in an XP
  - There can be unlimited APs in an NP!
    - *those red cars*
    - *those expensive red cars*
    - *those big expensive 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*
We conclude that this PP is a modifier in the VP
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')
  - 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 this
4. Two meanings — two structures

• Returning to the original problem:
  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

• 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 under the NP whose head is *Martian*
4. Two meanings — two structures

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

  - the PP tells us something about saw, so it is under the VP whose head is saw
5. Some examples to practice

- Try it: Draw trees for these sentences, some of which need the modifier structure

  (1) *Grover put the book on the table.*
  (2) *A very large green balloon floated by.*
  (3) *Susan will follow the man in my car.*

- Do any of these sentences have two meanings, corresponding to two different tree structures?
- If so, how are the meanings related to the structures?

→ Answers will be posted later for you to check