

- Introduction to syntax
- The X' schema Heads and phrases

Background reading:

- *CL* Ch 5, §1 through §1.3 (§1.1 is review)
- CL Ch 5, Appendix sections on Merge

- So far, we have looked at
  - *phonetics* the articulation (and acoustics and perception) of **speech sounds**
  - *phonology* how **speech sounds** are represented and altered by the mental grammar
  - *morphology* how the mental grammar puts
     *morphemes* together to form *words*
- Next we will look at *syntax* how the mental grammar puts words together to form phrases and sentences

 The mental grammar must include a mechanism for generating and analyzing previously unknown sentences — Why?

- The mental grammar must include a mechanism for generating and analyzing previously unknown sentences — Why?
  - → Human syntax is creative: humans can produce and understand sentences never seen before
- Linguists want to know: What is this mechanism?
  - How does the mental grammar combine words into phrases and sentences?

Review (from the first week of class)

- **Descriptive** grammar
  - What people **do** say (and understand)
- Mental grammar = Linguistic competence
  - "What do we know when we know a language?"
- Linguistics is a scientific approach to language
  - Our **data**: What people say (and understand)
  - Using this data, we aspire to build a **model** of human **mental grammar**

- **Descriptive grammar** We want to know how a native speaker would do the following:
  - Classify possible sentences (arrangements of words and phrases) as grammatical versus ungrammatical
  - Group the words in a sentence into larger units (called syntactic **constituents**)

- After we discover what native speakers *do*, we want to determine what speakers' **mental grammar** *must be like* for their language to be that way
- We do this by developing a model of mental grammar that can:
  - Produce sentences that native speakers find grammatical, and not produce sentences that native speakers find ungrammatical
  - Make the right predictions about which words in a sentence form **constituents** (units, subgroups)

Review (from the first week of class)

- A word, sentence, etc. is grammatical with respect to a particular language variety if:
  - Native speakers produce it (and it's not a speech error)
  - When native speakers hear it, their mental grammar classifies it as grammatical (part of the language; structurally acceptable)
- Being grammatical is <u>NOT</u> the same thing as "being true" or "making sense"!
  - For more on this point, review the slide set
     "Grammaticality judgments" from W Aug 12

- "Sentences are not formed by simply stringing words together like beads on a necklace." (*CL*, p 172)
  - Words (and phrases) are **grouped** into larger phrases
  - The internal structure of a sentence is not flat, but **hierarchical**
- We have already modeled hierarchical structure inside words with word trees (which affix attaches first?)
- Now we will apply a similar tree technique in analyzing phrase and sentence structure

- Overview of our phrase-structure discussion:
  - First, we will look at a linguistic model that is designed to generate the structure of phrases within a sentence: the X' schema
  - Then, we will investigate how well the phrase structures produced by this model **match** grammaticality judgments by native speakers
  - We will make some additions and refinements to our model when needed to account for the data

- The X' schema (pronounced "X-bar") is a blueprint for sentence structure in our model of mental grammar
- Consider this phrase: *a book about rabbits* 
  - What is the **head** (core word) of the phrase?
  - The word category of the head is: \_\_\_\_\_
  - Thus, we call this phrase a \_\_\_\_ **phrase**

- The X' schema (pronounced "X-bar") is a blueprint for sentence structure in our model of mental grammar
- Consider this phrase:
   a book about rabbits
  - What is the **head** (core word) of the phrase?
  - The word category of the head is: N (noun)
  - Thus, we call this phrase a **noun phrase (NP)**

• We can draw a tree structure for this noun phrase as follows:



This is the basic idea behind the X' schema

 The X' schema is a key piece of our model of the syntax component of human mental grammar



 Another key piece of our model is the Merge operation (*CL*, p 175), which builds **phrases**

**Merge:** Combine words in a manner compatible with the X' schema.

- The **X' schema** is a key piece of our model of the syntax component of human mental grammar
  - 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 (discussed next time)
- If human speakers differ from our model in terms of what is grammatical or what is a constituent, we need to **adjust** our model!

 <u>Lexical</u> categories and their phrases

Ν	$\rightarrow$	NP
V	$\rightarrow$	VP
Α	$\rightarrow$	AP
Ρ	$\rightarrow$	PP

• <u>Functional</u> categories (see *CL* p 169, Table 5.1)

Det	determiner	
Deg	degree word	
Aux	auxiliary verb	
Con	conjunction	
Т	→ <b>TP</b>	
С	→ CP	

(we will use C and CP later)

• The **X' schema** is a blueprint for sentence structure in our model of mental grammar



- Note: An element in parentheses (...) is optional



- head—word-level category (N, V, A, P, T, and C);
   determines the category of the whole phrase
  - These category types <u>always</u> project (create) an XP — an N is <u>always</u> part of an NP, etc.



- complement—a phrase-level category that "provide[s] information about entities and locations implied by the meaning of the head" (*CL*, p 173)
  - Some heads, especially V, *require* complements



specifier — "no single semantic function...they occur at the edge of a phrase" (*CL*, p 173)
(a) for NP, VP, AP, PP — can be a word-level category (Det, Adv, Deg)
(b) for TP — this is a special case; see below

WARNING: *CL* says (p 174): "It is common (and practical!) to represent tree structures in an abbreviated way, without the intermediate X', when there is no specifier and/or complement..."

#### **WE WILL NOT DO THIS** in our course. Always show the FULL X' structure in ALL trees!





- A **Det** is a word-level category that includes articles (*a*, *an*, *the*), demonstratives (*this*, *those*...)
  - Only one Det can occur per NP (unlike adjectives!)
  - Det must come **first** in the NP
- **Possessives** (*my, the child's,* ...) are NPs that go in the specifier position of another NP (in place of Det)



- Some examples to try rabbits these rabbits the child's rabbits
  - → See the answers to all of the practice examples in the first slide set on Wednesday



- Adv = adverb (*always, never, happily,* etc.)
- Some examples to try (Oscar) yawned (Grover) always smiles (Susan) read a book (Ernie) usually annoys Bert



- Deg = degree word (*right*, certain adverbs)
- Some examples to try (Oscar went) out (Susan put the basketball) right in (a book) about rabbits (a liking) for truffles from France



 Some examples to try happy very angry pleased with the results fond of her dog

- Sentence = TP: P NP T'VP
- The **head** of a sentence is category **T**, for "tense"
  - T contains a tense feature (+Pst or –Pst) or a modal Aux (which has a tense feature)
  - Modal Aux: may, might, can, could, will, ...
  - (Non-modal Aux = *have, be, do*; these are different)

- Sentence = **TP**: NP T' VP
- The specifier and complement are <u>not</u> optional
- The complement of TP is a VP this is the predicate of the sentence
- The specifier of TP is an NP this is the subject of the sentence (note that this is a phrase, not a word)

• Sentence = **TP**:



Some examples to try

 Oscar snores
 This book is expensive
 Ernie usually annoys Bert
 Susan likes truffles from France
 My friend might sometimes play the oboe

- Let's try one example
  - $\rightarrow$  What are the **categories** of each word in the sentence?

This book is expensive

Let's try one example
 → Where are the **subject** and the **predicate**?



Let's try one example
 → Is there a modal Aux to go in T? If not, use a tense feature



Det N V A This book is expensive

Let's try one example
 → Can the subject phrase be combined as an NP?





- Let's try one example
  - $\rightarrow$  For the predicate, starting from the right often helps



- Let's try one example
  - $\rightarrow$  Can everything in the predicate be combined into a VP?



- Let's try one example
  - $\rightarrow$  All the words fit into the X' schema! Nothing is left over.



## 6. The X' schema and grammaticality

- For a sentence to be grammatical, all of its words must be able to fit into the X' schema
- So, we can already explain why these are not grammatical in English:
  - \*book the

\*Susan ate quickly the cookie

 However, the X' schema is not enough to guarantee that the sentence is grammatical — other requirements may need to be met, such as subcategorization (we'll discuss this next time)