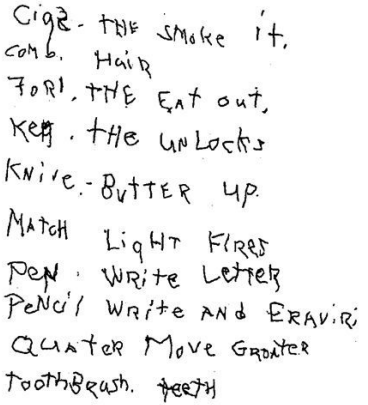
Syntax I

Tuesday, 27 August 2019

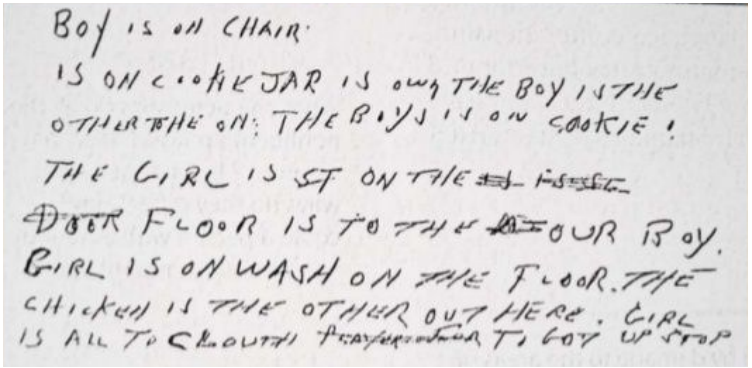
Class Business

- Great job on the midterm!
- There was an error in HW2's answer key for a question that everyone got right, so everyone has gotten 2 more points.
- It looks like phonology was difficult for many-- what kinds of resources would help make the material better understandable?

Reading and Writing with Aphasia



Broca's



Wernicke's

Simple Version:

Expressive (Broca's) Aphasia: able to read, but limited in writing

Receptive (Wernicke's) Aphasia: both reading and writing are frequently severely impaired.

(National Aphasia Assoc.)

Review: Case

Case is inflectional morphology used to mark a word's role in a sentence.

Kazakh:

bala doptə ujden mektepke tasədə

bala	dop-tə	uj-den	mektep-ke	tasə-də
boy	ball-ACC	house-from	school-to	carry-PAST

"The boy carried the ball from home to school."

In Kazakh, the subject doesn't have a suffix, but the object of the sentence does, as well as the kinds of things English uses prepositions like "to" "from" and "for" to mark.

Review: Derivation vs. Inflection

Inflectional morphology marks time, number, person, gender, etc.

- He runs. I run.
  - The suffix <-s> doesn't change the meaning of <run>, but just agrees with <he> in the sentence. The only question is about who is doing the running? <-s> makes sure we know that the runner is someone who isn't the speaker (1st person) or hearer (2nd person).

Derivational morphology changes the meaning of a word, and often changes its category.

- hospital + ize = noun → verb
  - The category is changed an the meaning is changed.
- un + do = verb → verb
  - The meaning in <undo> is changed. <undo> means to do the opposite of <do>.

Where are we??

Last week we talked about morphology, about the internal structure of words.

We discussed:

- morphemes, affixes, roots, stems, compounds, etc
- how to analyze the morphology of a language
- how complex words are formed
- hierarchical structure created by the word formation process

We didn't discuss much of the actual rules used to generate the hierarchical structure within words.

The level of detail was something like: Adj + ly → Adv

Where are we??

This week we're going to take some of those same insights from morphology, specifically regarding hierarchical structure and apply those to syntax, the structure of sentences.

But we will also focus more on the actual rules that generate structure as well as the structure itself.

Learning Outcomes

By the end of class today you will be able to:

1. Identify the various parts of a sentence (e.g. subject, verb, object)
2. Compare syntax and morphology
3. Diagram sentences using tree structures
4. Understand the role of subcategorization and apply it to constrain our tree structures

What does syntax do?

Syntax does the following:

- Combines words into phrases and phrases into sentences
  - Allows us to produce and interpret an infinite number of sentences
- Specifies grammatical relations (e.g. subject, object)
  - Specify the order that words should occur in (English = Subject-Verb-Object)
- Generates hierarchical structure between words and phrases

Combines words and phrases

Allows us to produce and interpret an infinite number of sentences (productivity of language)

Have you ever heard the sentence,

"The giraffes ate all of my child's cereal this morning" ?

Probably not, but you have no trouble understanding it.

Combines words and phrases

Allows us to produce and interpret an infinite number of sentences (productivity of language)

If we didn't have syntactic rules to generate structure, then we wouldn't be able to produce new sentences or interpret new sentences.

Recall from last week that we can't just memorize morphology. Kids start that way, but abandon it in favor of rule-based learning. Similarly, we can't just memorize syntax. We need something like rules to put words and phrases together.

Specifies grammatical relations

Specify the order that words should occur in

English = Subject-Verb-Object

Why are (a) and (b) ungrammatical?

a. *Man the bought a car.
b. *Bought the man a car.

Specifies grammatical relations

Specify the order that words should occur in

English = Subject-Verb-Object

Why are (a) and (b) ungrammatical?

a. *Man the bought a car.
b. *Bought the man a car.

In (a), the determiner follows the noun.

In (b), the verb precedes the subject.

Specifies grammatical relations

“The boy found the ball.”

- Subject: the boy
- Verb: found
- Object: the ball

“The ball found the boy.”

- Subject: the ball
- Verb: found
- Object: the boy

Why do these two sentences mean very different things?

Specifies grammatical relations

(a) Jack and Jill ran up the hill.

(b) Jack and Jill ran up the bill.

Specifies grammatical relations

(a) Jack and Jill ran up the hill.

- Subject: Jack and Jill
- Verb: ran
- Object: none
- **Adjunct**: up the hill

(b) Jack and Jill ran up the bill.

Specifies grammatical relations

(a) Jack and Jill ran up the hill.

- Subject: Jack and Jill
- Verb: ran
- Object: none
- **Adjunct**: up the hill

(b) Jack and Jill ran up the bill.

- Subject: Jack and Jill
- Verb: ran up
- Object: the bill

Specifies grammatical relations

(a) Jack and Jill ran up the hill.

- Subject: Jack and Jill
- Verb: ran
- Object: none
- **Adjunct**: up the hill

(b) Jack and Jill ran up the bill.

- Subject: Jack and Jill
- Verb: ran up
- Object: the bill

(c) Up the hill Jack and Jill ran.

(d) *Up the bill Jack and Jill ran.

Specifies grammatical relations

- In “Jack and Jill ran up the bill”, the phrase “the bill” is the object of the verb, “ran up.”
- In contrast, in “Jack and Jill ran up the hill”, “the hill” is not the object of the verb, but rather part of the adjunct prepositional phrase, “up the hill.”

Adjuncts are always optional. They add meaning about how, when, etc and are often adverbs or prepositional phrases.

Specifies grammatical relations

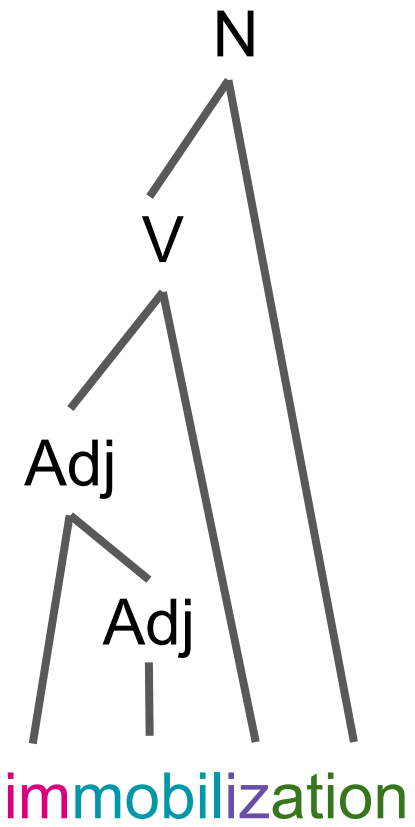
Within every sentence, certain words form natural groupings, called constituents.

When we diagram sentences, we want our trees to model these constituent structures.

We did the same in morphology.

In <immobilization>, the constituents are:

- <mobile> (root)
- <immobile> (stem)
- <immobilize> (stem)



Specifies grammatical relations

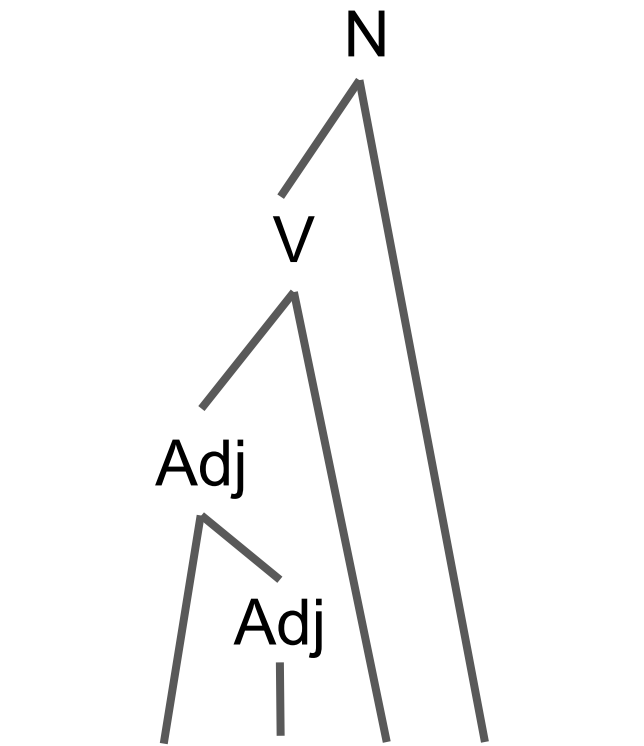
Within every sentence, certain words form natural groupings, called constituents.

When we diagram sentences, we want our trees to model these constituent structures.

We did the same in morphology.

In <immobilization>, the constituents are:

- <mobile> (root)
- <immobile> (stem)
- <immobilize> (stem)



structure represented with brackets

Generates hierarchical structure

In morphology, we wanted every new affix to create real word. In other words, each new node dominated a possible English word.

We'll do the same for syntax, except the we aren't trying to generate real words along the way, but phrases, which will be **constituents** (natural word groups) in our sentences.

Generates hierarchical structure

What kinds of phrases will we generate?

- We'll start out with 4 kinds: noun phrases (NP), verb phrases (VP), prepositional phrases (PP), and sentences (S)

What kinds of phrases are these?

- hit the ball
- at the beach
- slept
- Jose
- Sandra watched a movie with friends.
- gave a gift to the teacher
- over the moon
- the boy who lived down the street from my parents in Fresno

Generates hierarchical structure

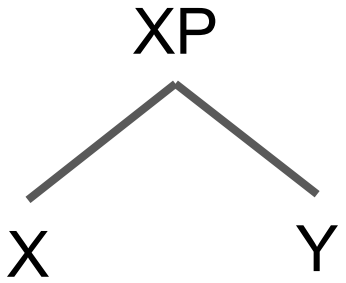
We didn't talk about the actual rules much in morphology, but more about the structure they created.

Now, we'll define some rules (rewrite rules or phrase structure rules).

They will generally take the form, XP → X Y

Interpret this as "XP consists of X and Y" (in that linear order)

That will generate the structure to the right



Generating the right stuff

This is very important: we want our rules to generate the actual structures in a language (in this case, English) and only the actual structures.

Two types of problems:

- **Undergeneration**: our rules don’t generate the actual patterns they’re supposed to
- **Overgeneration**: our rules generate things that don’t actually happen in the language

Let’s come up with some NPs

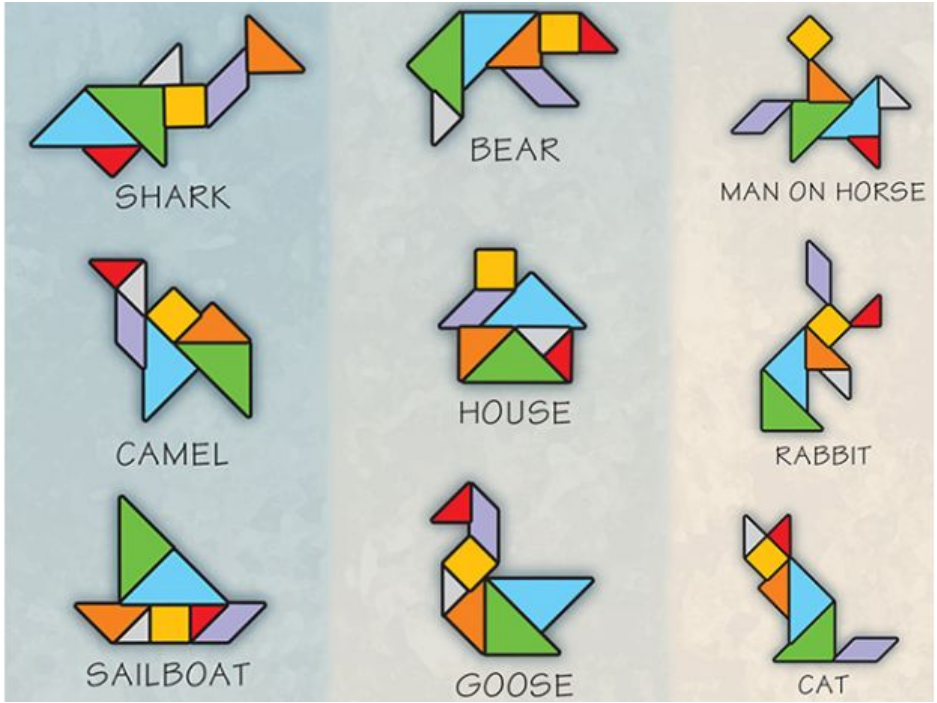
Let’s come up with some PPs

Let’s come up with some VPs

List of rules

S → NP VP
NP → Det N’
NP → NP PP
NP → N’
N’ → N
N’ → Adj N’
Det → NP Poss
PP → P NP
VP → V NP
VP → V PP
VP → VP PP
VP → V

Phrase structure rules are like the building blocks of sentences



Syntactic Trees

How to draw syntactic trees:

1. Write out the sentence at the bottom of a large white space.
2. Label every word in the sentence according to its grammatical category.
3. Use our set of syntactic rules to combine those categories into phrases, and phrases into sentences.

How to check your trees:

1. Make sure that every word in the sentence is part of the structure.
2. Make sure that you didn’t violate any of our rules.

Practice

Quiz Practice

1. How are syntax and morphology similar?
2. How are they different?
3. What is the productivity of language?
4. Are there any parts of today’s lesson that you’re struggling with?

Break

Kazakh syntax

1. Ali menɪ ʊrdə.
   Ali me hit
   “Ali hit me.”

2. Samal tamaqtə ækeldɪ.
   Samal food brought
   “Samal brought food.”

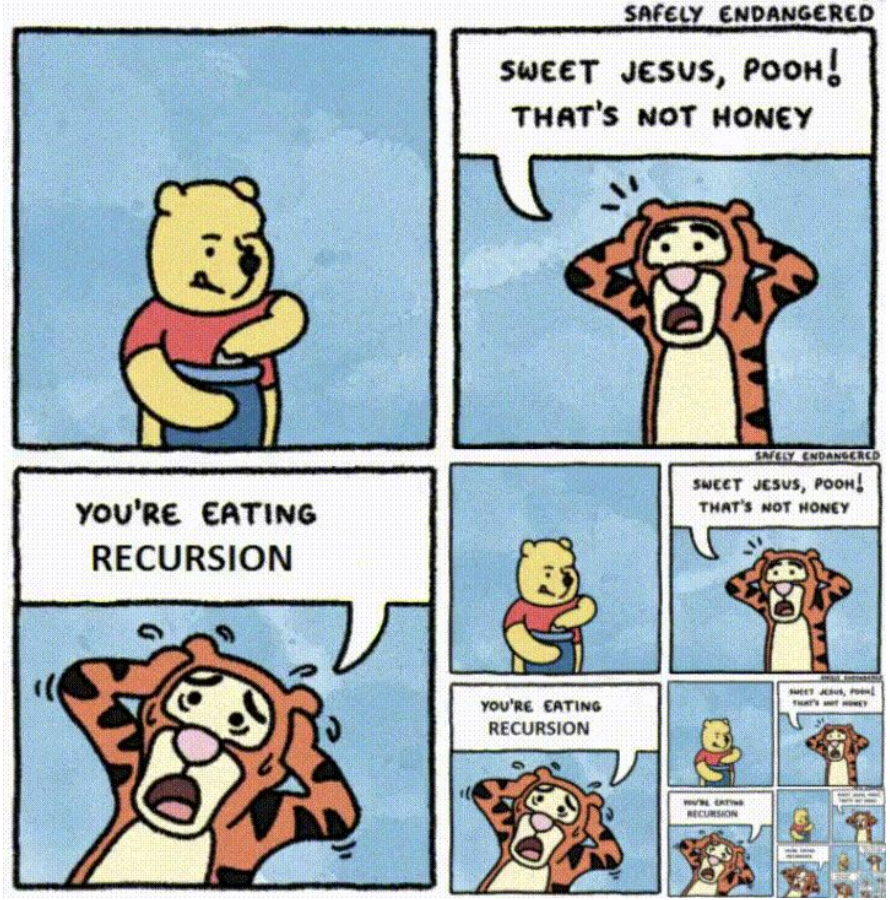
How are these two Kazakh sentences different from English syntactically?

How would we diagram these? What would we need to do?

Recursion

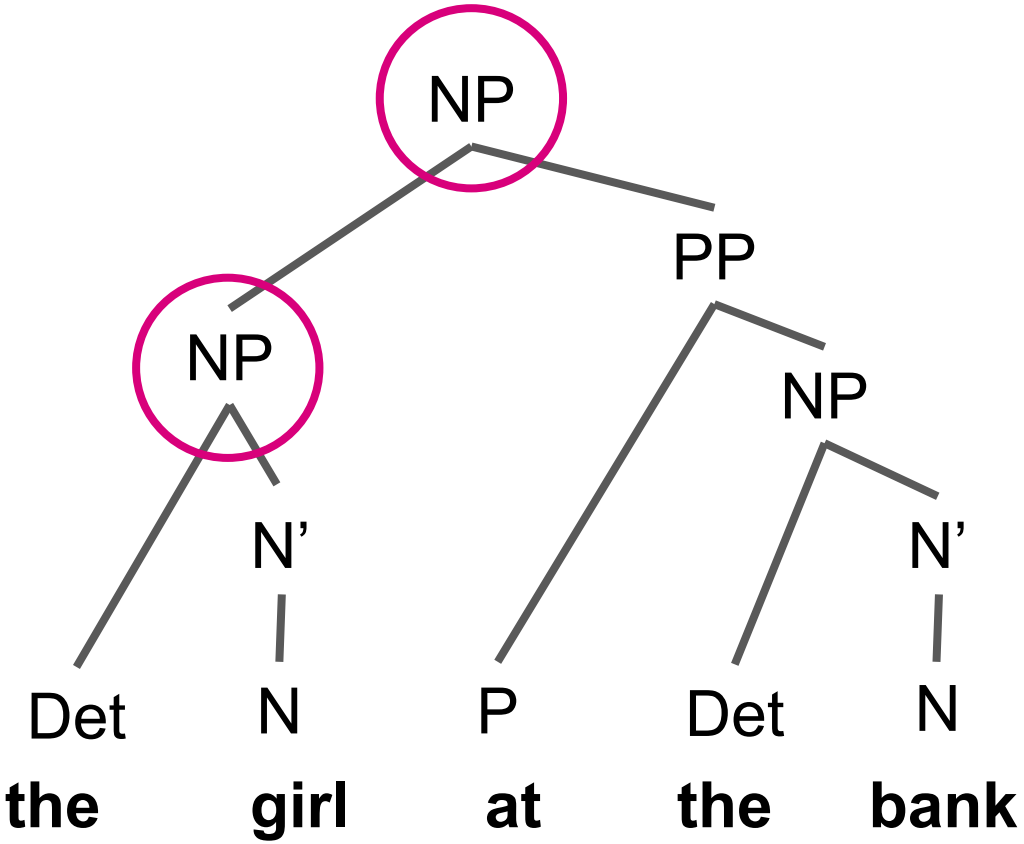
A **recursive rule** permits phrase structures of potentially unlimited length by repeating a phrasal category on both sides of the arrow.

This is one of the key parts of the whole infinite possibilities from finite means stuff (productivity of language).



Recursion

NP → NP PP

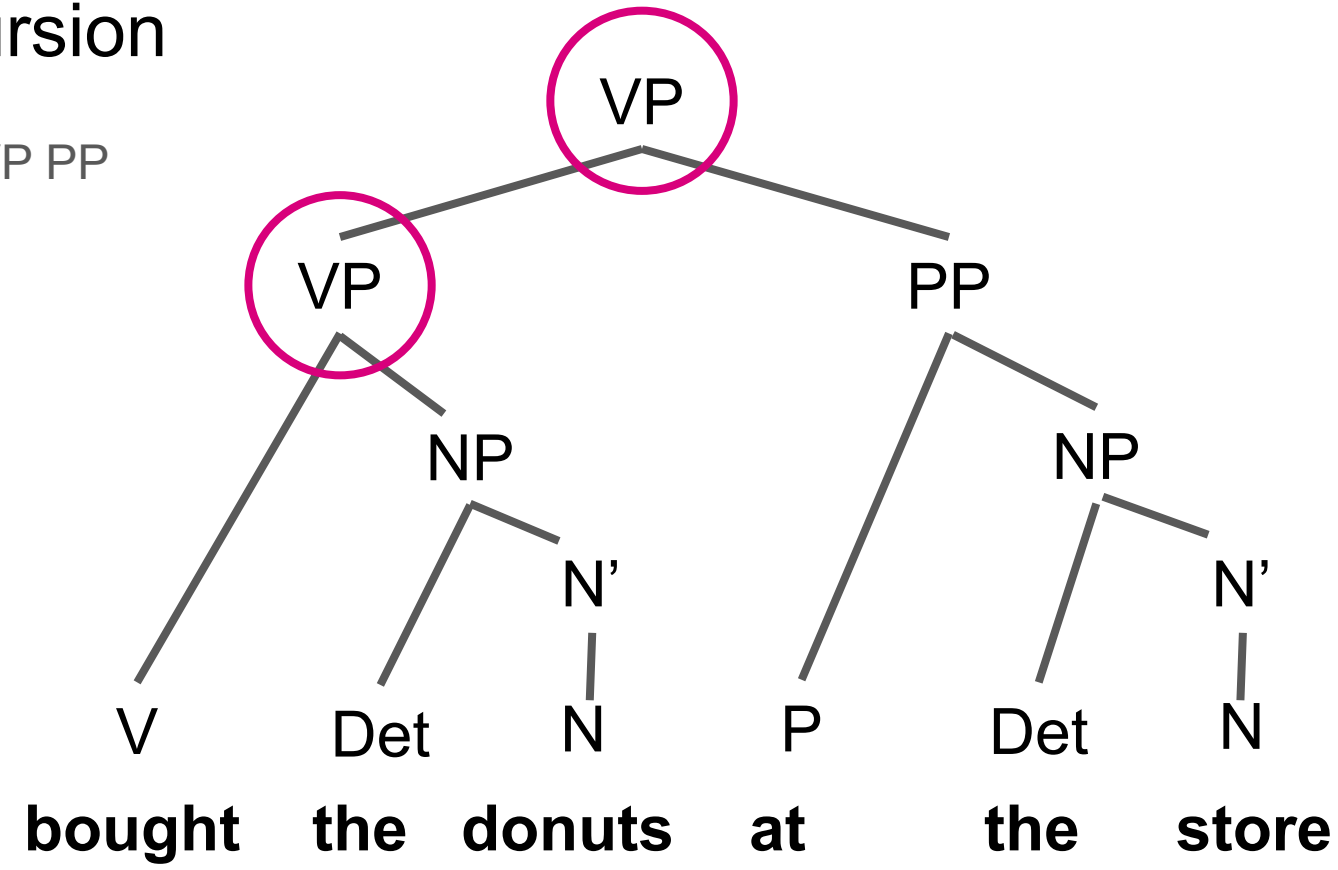


Recursion

The girl at the bank bought some donuts.

Recursion

VP → VP PP



Recursion

The girl at the bank bought some donuts from Krispy Kreme.

Conjunction

Thus far, we have nothing to handle “and” or any of its conjunction friends.

- “The two girls from the beach and Sandra aced the test.”
- “I rode my bike and swam at the gym.”

How are the above 2 uses of “and” different?

How can we make one single rule to account for both?

Conjunction

Thus far, we have nothing to handle “and” or any of its conjunction friends.

- “The two girls from the beach and Sandra aced the test.”
- “I rode my bike and swam at the gym.”

How are the above 2 uses of “and” different?

How can we make one single rule to account for both?

XP → XP Conj XP

Conjunction

Tracy and Jen eat sushi.

I studied syntax and got some supper.

List of rules

S → NP VP
NP → Det N’
NP → NP PP
NP → N’
N’ → N
N’ → Adj N’
Det → NP Poss
PP → P NP
VP → V NP
VP → V PP
VP → VP PP
VP → V
XP → XP Conj XP

More Practice

Ambiguity

Like in morphology, there is ambiguity elsewhere in human language.

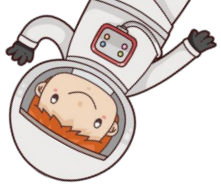
We generally see two kinds: **lexical ambiguity** and **structural ambiguity**.

Lexical:

- *bank*: “financial institution” as well as “edge of river”
- lexical ambiguity is not terribly interesting to syntacticians

Structural:

- When two different interpretations are possible from the same sentence (or in morphology, sequence of morphemes)



Ambiguity

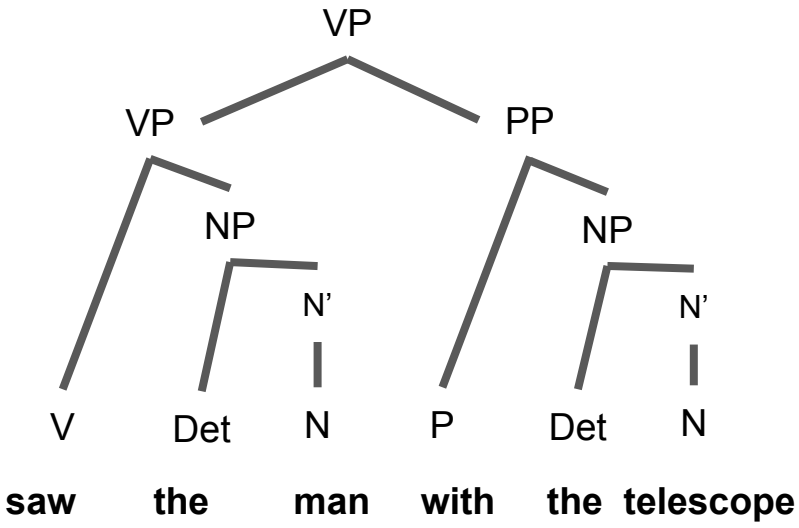
Now that we have recursive rules, including conjunction in our grammar, ambiguity will abound.

For instance,

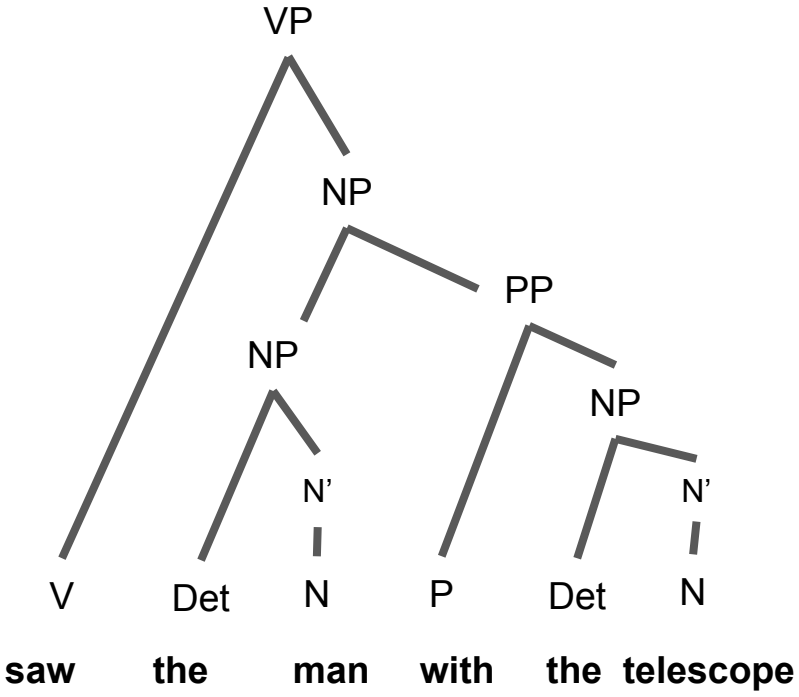
“The child saw the man with the telescope.”

(If it isn’t clear to you how this is ambiguous, ask “who has the telescope?” The child might, or the man might. We don’t know.)

Ambiguity



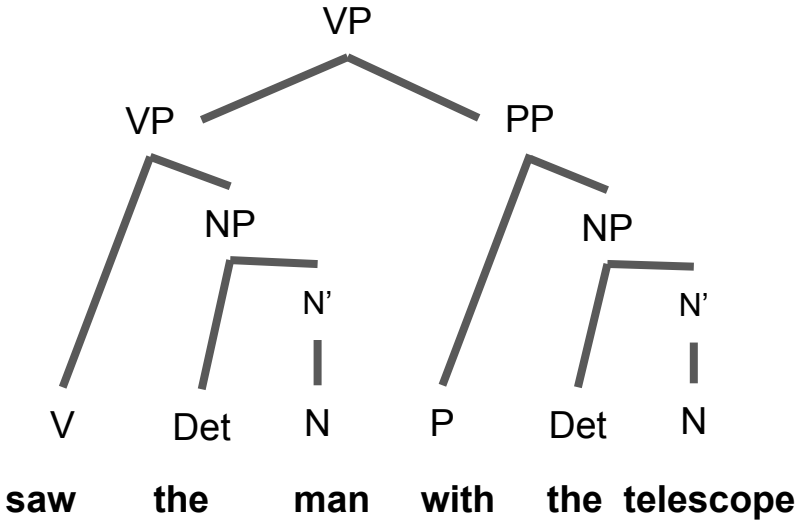
used the telescope to see the man



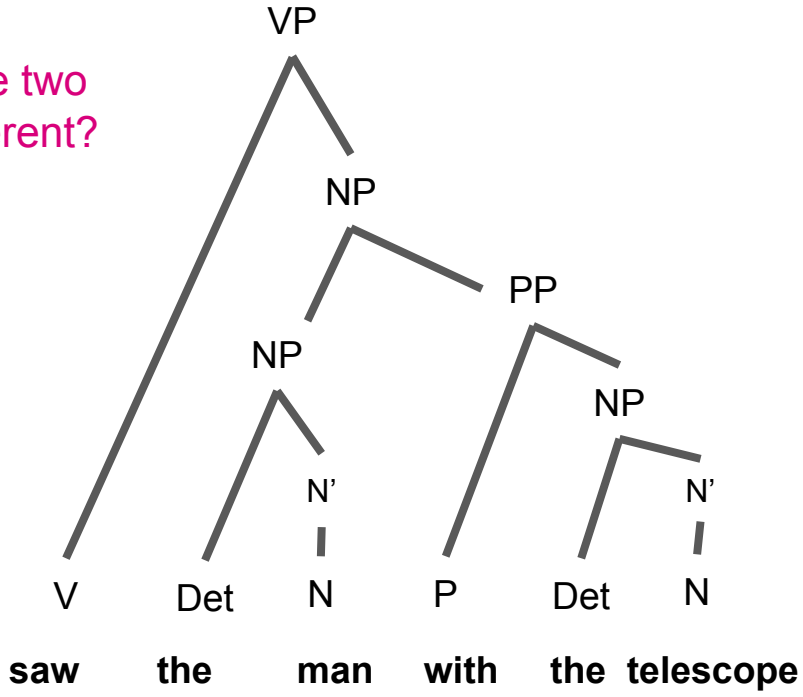
saw the man who is holding the telescope

Ambiguity

How are these two structures different?



used the telescope to see the man



saw the man who is holding the telescope

Ambiguity

Which pets are on sale?

“Black cats and dogs are on sale today.”

A. black cats and black dogs

B. black cats and all dogs

This ambiguity exists because there are two possible structures that correspond to this big NP.

either “black” modifies “cats” only, or “black” modifies “cats and dogs”

Ambiguity

If there were no hierarchical structure in syntax, then we would predict that only interpretation is possible for a given sentence.

The fact that ambiguity is possible and that it occurs when multiple possible structures are generated is good evidence that there really is hierarchy in syntax.

Practice

1. Name one thing that syntax does.

2. How does a theory of syntax account for structural ambiguity?

3. Are there any things from the lesson that are unclear to you?