

Language and its Applications

LT5903



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Lecture 5: Syntax

Lecture plan

- Morphology review
- Syntax v.s Semantics
- Syntactic properties
- Constituency
- Syntactic categories
- Phrase structure rules
- **Short break (15 mins)**
- Group discussion on HW5

Morphology review

The study of **words** and **how words are formed** out of smaller pieces.

Inflection and derivation

home homes homely

root/stem **inflection** **derivation**

misunderstandable
root/stem
_____ **stem**

Allomorphy

intolerable [n] }
inadequate [n] } **phonological**
imprecise [m] } **allomorph:**
incomplete [ŋ] } 'in-': not

bring brought } **weak suppletion**

teach taught }

is was } **strong suppletion**

go went }

Morphological processes

affixation, compounding, reduplication, alternation, metathesis, templatic morphology, suprasegmental morphology

Morphological types of languages

analytic **synthetic**: agglutinating, fusional, polysynthetic

What is syntax?

The study of how **words and phrases** are combined into larger phrases.

Sally likes Bob.

Bob likes Sally.

→ same words, different forms
different meanings

Principle of compositionality: the meaning of a sentence depends upon the **meanings** of the expressions it contains and on **the way they are syntactically combined**

Syntax v.s semantics

Grammaticality doesn't depend on meaning

Colorless green ideas sleep furiously

**Green sleep colorless furiously ideas*

**Me bought dog*

Sally ate an apple.

Sally devoured an apple.

Sally ate.

**Sally devoured.*

→ **eat** does not require an object

→ **devour** must have an object

similar meanings

different syntactic properties

Word order

English:

Sally likes Bob.

Bob likes Sally.

**Likes Sally Bob.*

→ **Subject-Verb-Object (SVO)**

~ 40% of languages

Japanese:

Sarī wa Bobu ga sukidesu.

'Sally Bob likes'

→ **Subject-Object-Verb (SOV)**

~43% of languages

Arabic:

'likes Sally Bob'

→ **Verb-Subject-Object (VSO)**

~10% of languages

Word order restrictions beyond subjects, objects and verbs

determiners and nouns:

English:

these books

**books these*

Malay:

buku-buku ini

'books these'

prepositions and nouns:

English:

with that person

**that person with*

Japanese:

kono kodomo to

'this child with'

Co-occurrence

The set of syntactic properties that determines which expressions may or have to co-occur with some other expressions in a sentence

Arguments: A **required** co-occurring element in an expression

Sally devoured an apple.

**Sally devoured*

**devoured an apple*

Sally and *an apple* are both arguments of the verb **devoured**.

Non-subject arguments → **complements** (*an apple*)

Noun-phrase complements → **objects**

Co-occurrence

Not all complements are noun phrases:

Sally wondered about Bob.

Sally said she was leaving.

Some expressions require **multiple complements**:

Sally told Polly she is leaving.

Sally put the book on the desk.

Sally persuaded Bob to go on vacation.

Co-occurrence

Arguments are not just for verbs

Prepositions:

*Sally put it **on** the table*
**Sally put it on*

→ *the table* is an argument of **on**

Nouns:

*Sally has **a** dog*
**Sally has dog*

→ *a* is an argument of **dog**

Adjectives:

*Sally is fond **of** parties*
**Sally is fond*

→ *of parties* is an argument of **fond**

Conjunctions:

***Sally** and **Bob** are friends*
**Sally and are friends*

→ *Sally* and *Bob* are arguments of **and**

Co-occurrence

Adjuncts: An **optional** co-occurring element in an expression

Any number of adjuncts can be added without disrupting the syntax of a sentence

Sally likes dogs

*Sally likes **small** dogs*

*Sally likes **small fluffy** dogs*

*Sally likes **small fluffy brown** dogs*

Sally went to France

*Sally went to France **last year***

*Sally went to France **last year in July***

*Sally went to France **last year in July with some friends***

*Sally went to France **last year in July with some friends to study French***

Agreement

Distinct expressions in a sentence may be required to have the same value for some grammatical features (person, number, gender, etc.)

subject-verb agreement:

Sally likes Bob

[I/You/We/They] like Bob

**Sally like Bob*

**[I/You/We/They] likes Bob*

determiner-noun agreement:

This girl came

These girls came

**This girls came*

**These girl came*

Quiz

1. What is the principle of compositionality?
2. Name three syntactic properties.
3. What are the differences between arguments and adjuncts?

Syntactic constituency

A group of linguistic expressions that function as **a syntactic unit** within some larger expression. They show how the sentence was built out of smaller expressions

The cat was sleeping on the desk.

[[The cat] [was [sleeping [on [the desk]]]]].

Tests for constituency:

Answer to questions

- *Where was the cat sleeping?*
On the desk.
- *What was the cat doing?*
Sleeping on the desk.
- *Who was sleeping on the desk?*
The cat.

Syntactic constituency

Clefting: moving constituents to the left

*It was **on the desk** that the cat was sleeping.*

*It was **the cat** that was sleeping on the desk.*

It was **on the that the cat was sleeping desk.*

It was **sleeping on the desk that the cat was.*

→ Clefting will not work for all constituents. Needs multiple tests.

Syntactic constituency

Pro-form substitution: replacing constituents with pro-forms (*pronouns, do so, be, have, there, then, such, etc.*)

~~The cat~~ She was sleeping on the desk.

The cat was sleeping ~~on the desk~~ there.

The cat was ~~sleeping on the desk~~ doing so.

The cat was sleeping on ~~the desk~~ it.

*The cat was sleeping ~~on the~~ [it/there/then/such/do so] desk.

Syntactic categories

Lexical categories:

Noun (N): *apple, cat, desk*

Verb (V): *sleep, listen, walk*

Adjective (Adj): *red, big, cold*

Adverb (Adv): *fast, slowly, extremely*

Pronoun (Pron): *she, he, it, they*

Preposition (P): *with, of, on, under*

Determiner (D): *a, the, this, that, those*

Conjunction (Conj): *and, or, but*

Open lexical category

Close lexical category

Phrasal categories:

Sentence (S): *Sally thinks that she likes Bob*

Noun phrase (NP): *Sally, she, a big cat, the cat in the hat*

Verb phrase (VP): *sleep, put the book on the desk, thinks that she likes Bob*

Preposition phrase (PP): *on the desk, with a hat*

Phrase structure rule

- represents patterns of syntactic combination
- contains only syntactic categories

Phrase structure rule	Example
$S \rightarrow NP VP$	<i>Sally likes Bob</i>
$NP \rightarrow D N$	<i>the cat, an apple</i>
$N \rightarrow Adj N NP$	<i>big cat beautiful Sally</i>
$N \rightarrow N PP$	<i>cat in the hat</i>
$NP \rightarrow NP S$	<i>the cat I like</i>
$VP \rightarrow V$	<i>sleep, walk</i>
$VP \rightarrow V NP$	<i>eat an apple</i>
$VP \rightarrow V NP NP$	<i>give John the book</i>
$VP \rightarrow VP Adv$	<i>run fast</i>
$VP \rightarrow VP PP$	<i>sleep on the desk</i>
$VP \rightarrow V S$	<i>think she likes Bob</i>
$PP \rightarrow P NP$	<i>on the desk</i>

Phrase structure tree

S → NP VP

NP → D NP

VP → V PP

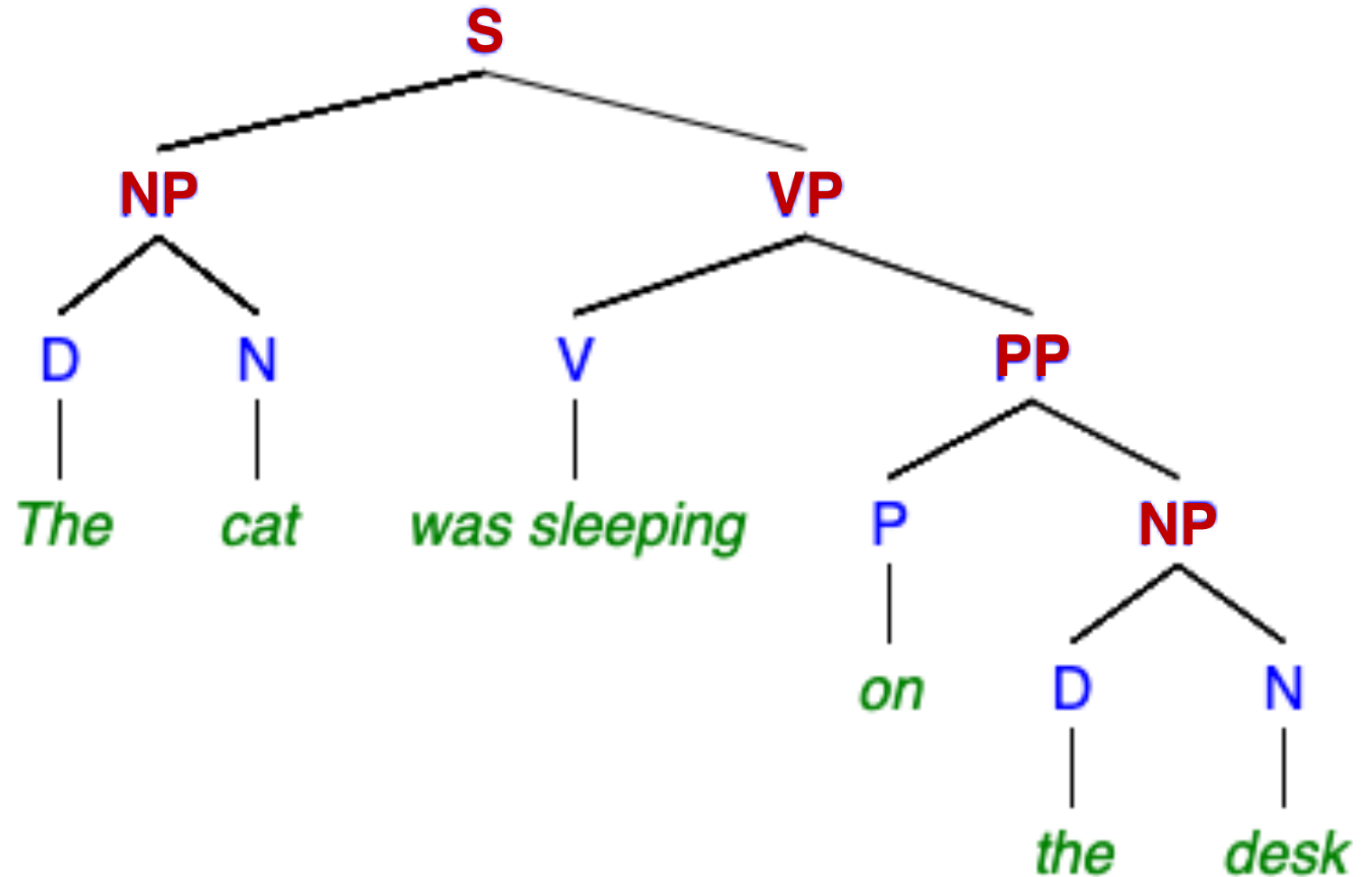
PP → P NP

D → the

N → cat | desk

V → was sleeping

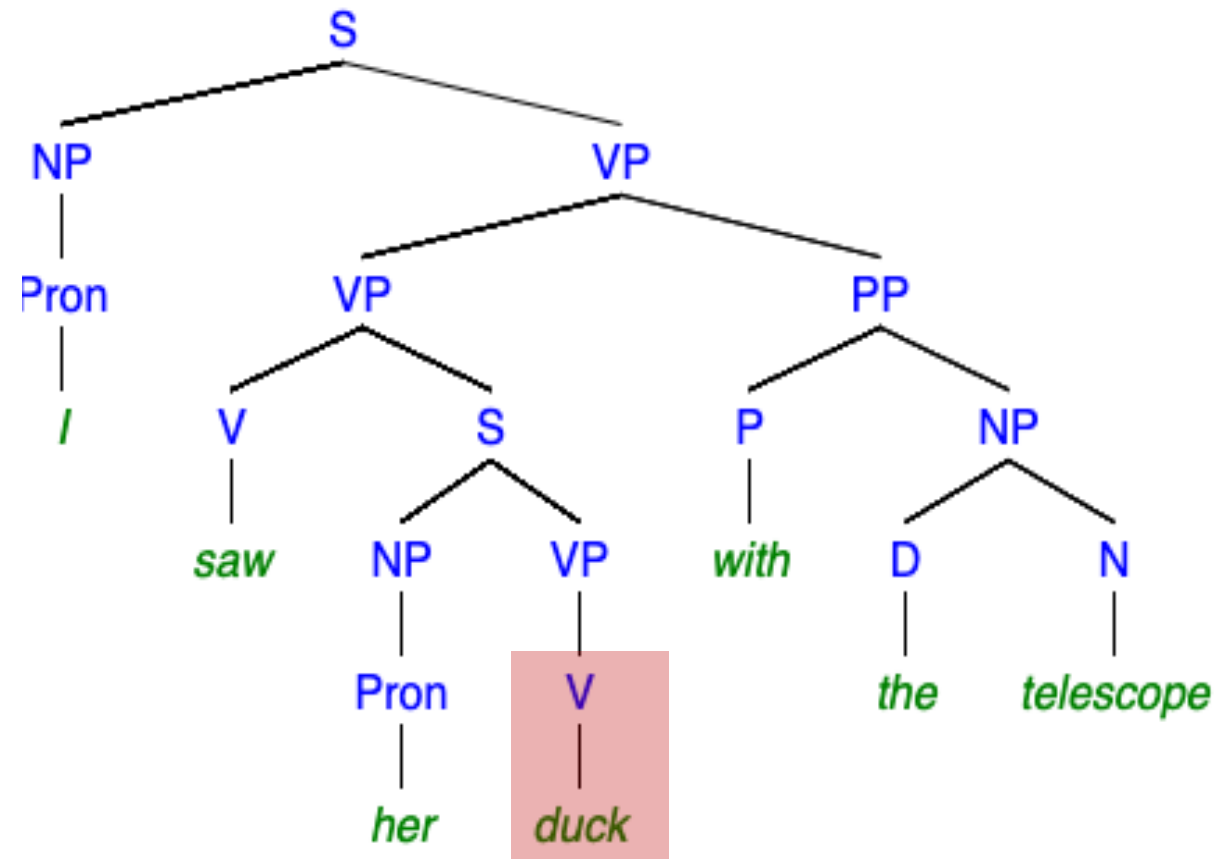
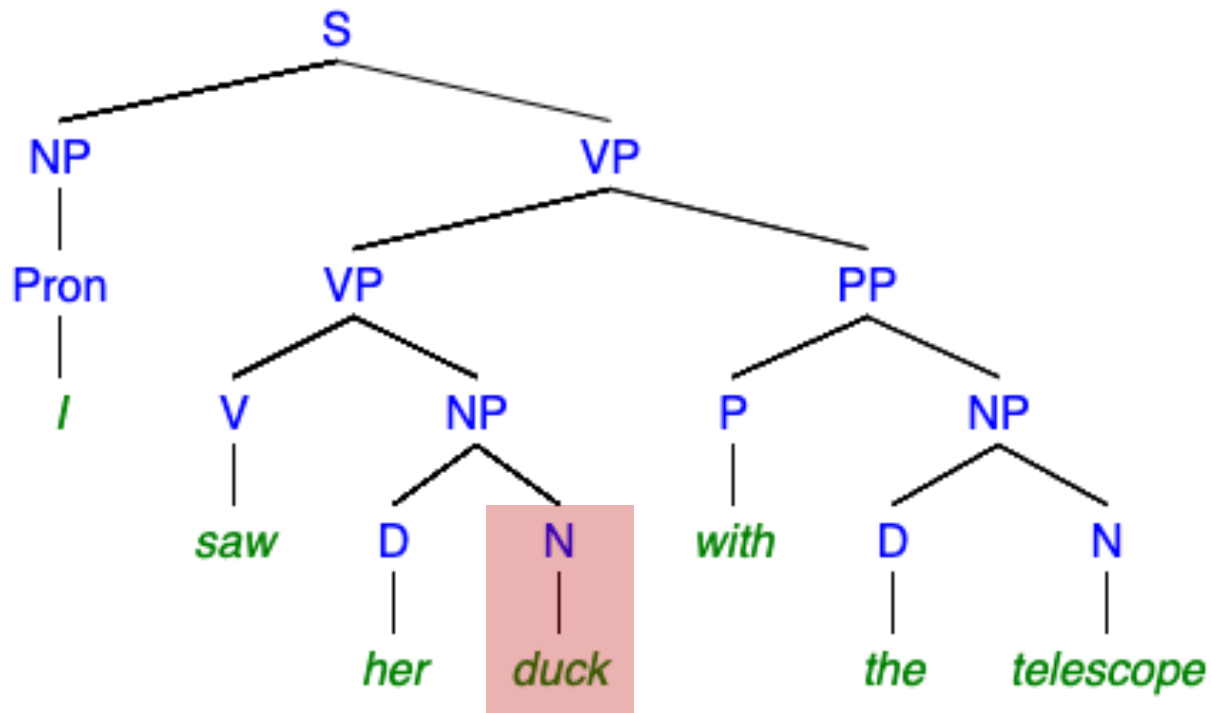
P → on



Ambiguity

lexical-category ambiguity

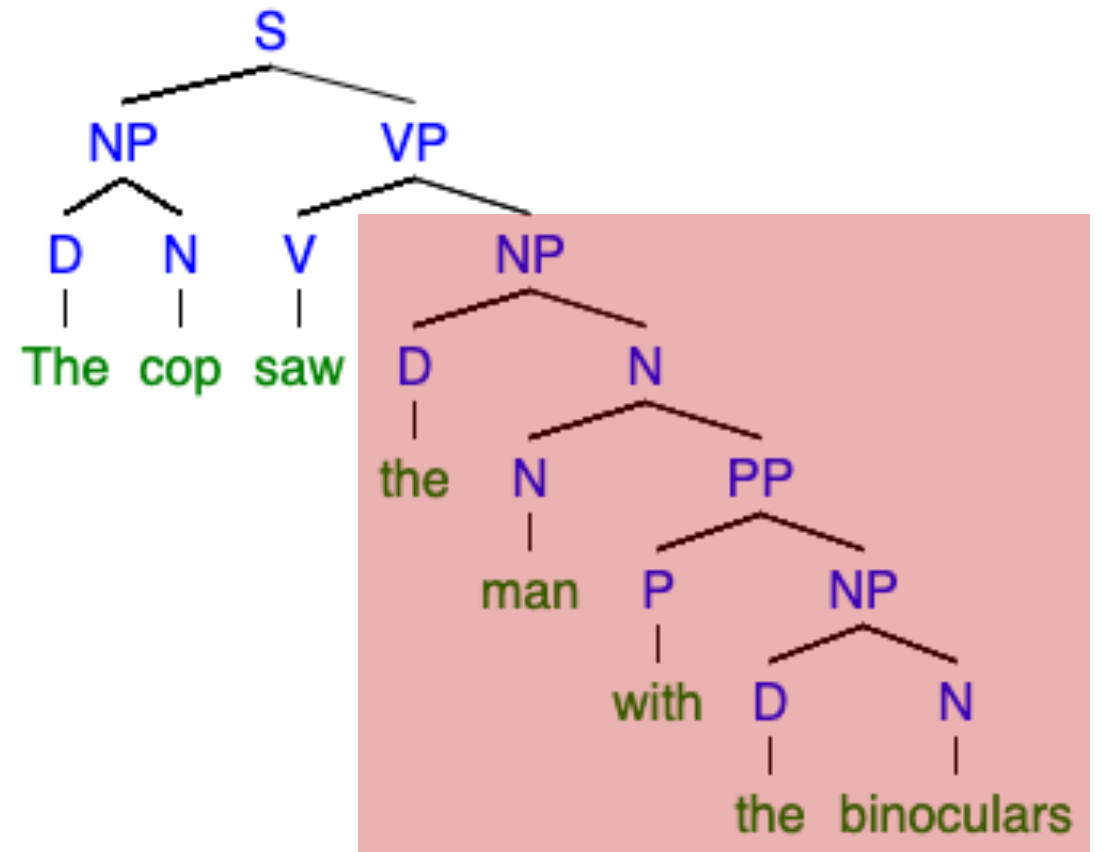
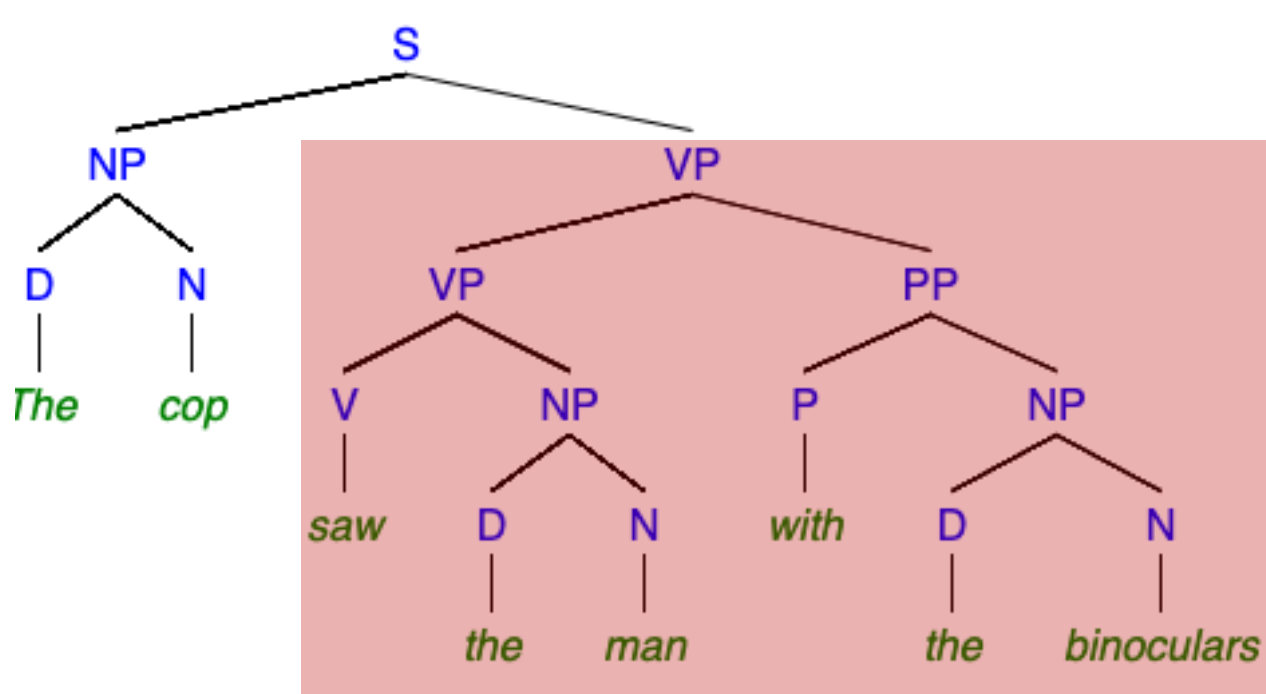
*I saw her **duck** with the telescope.*



Ambiguity

PP attachment ambiguity

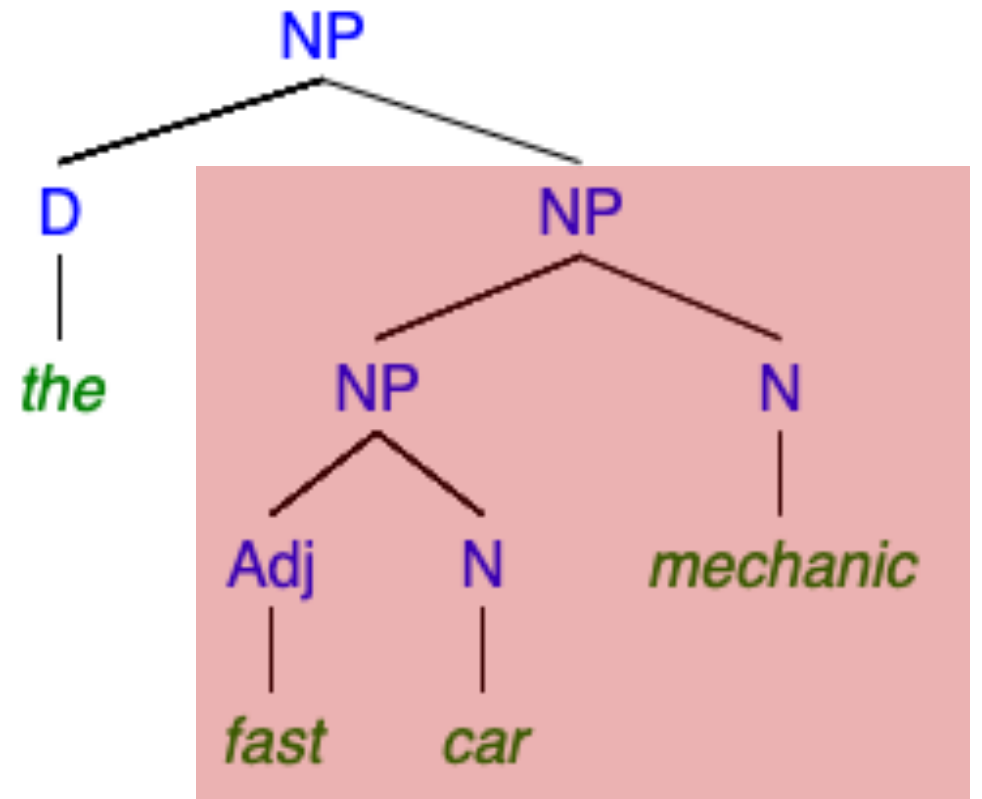
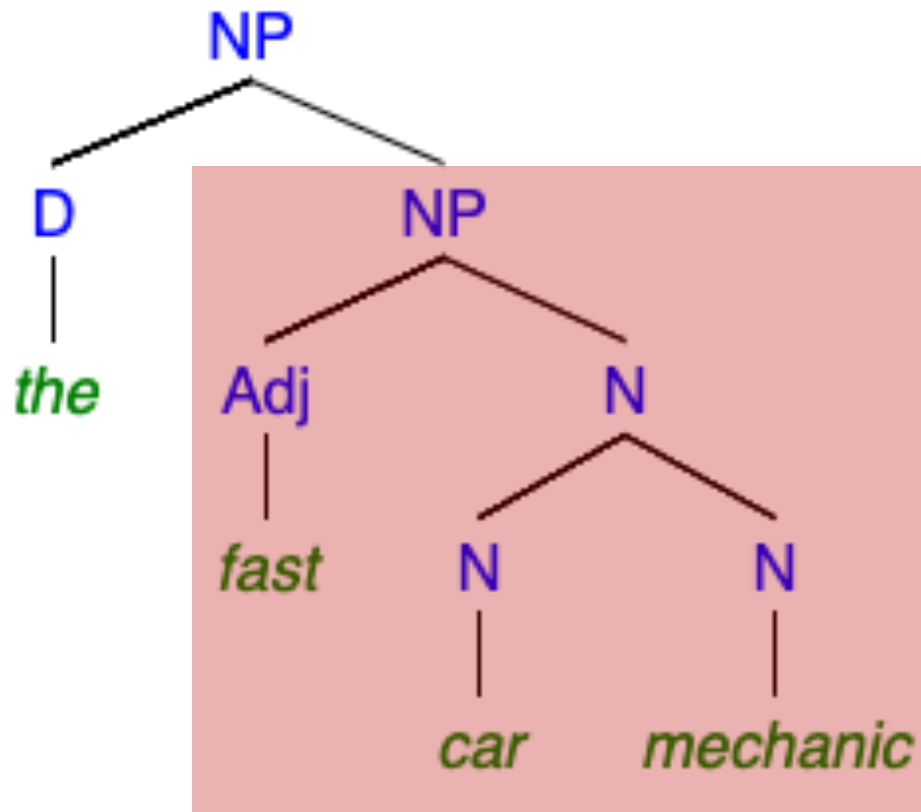
*The cop saw the man **with the binoculars**.*



Ambiguity

Premodifier ambiguity

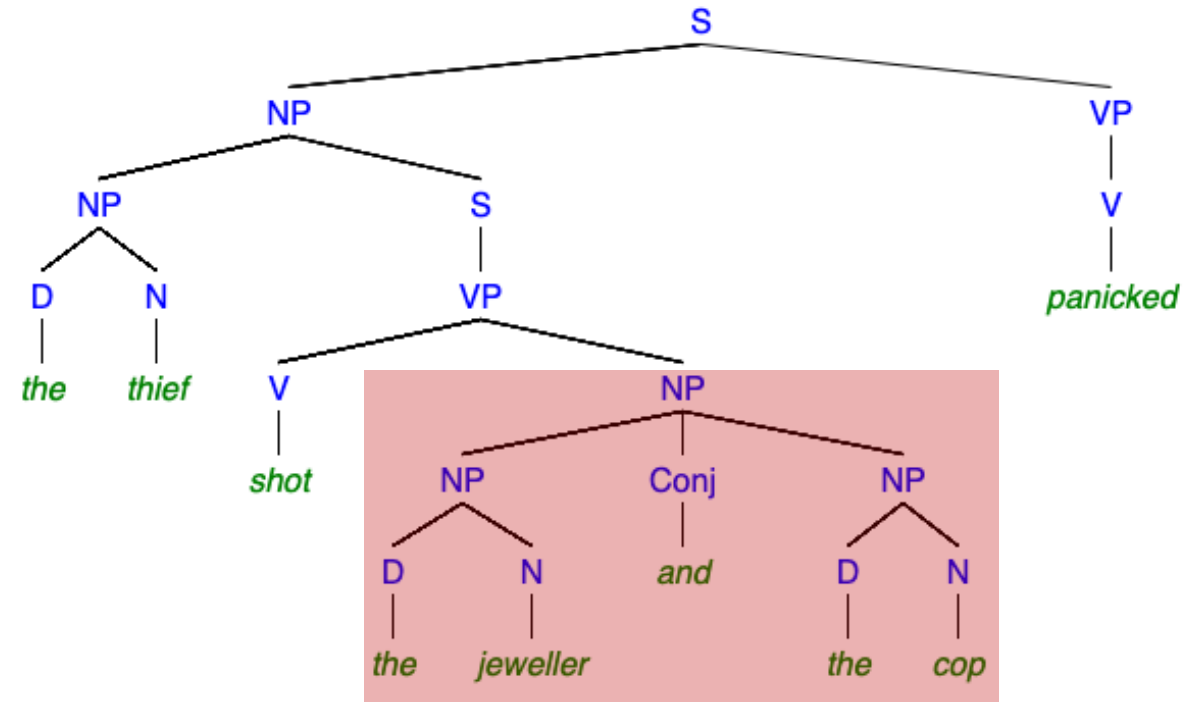
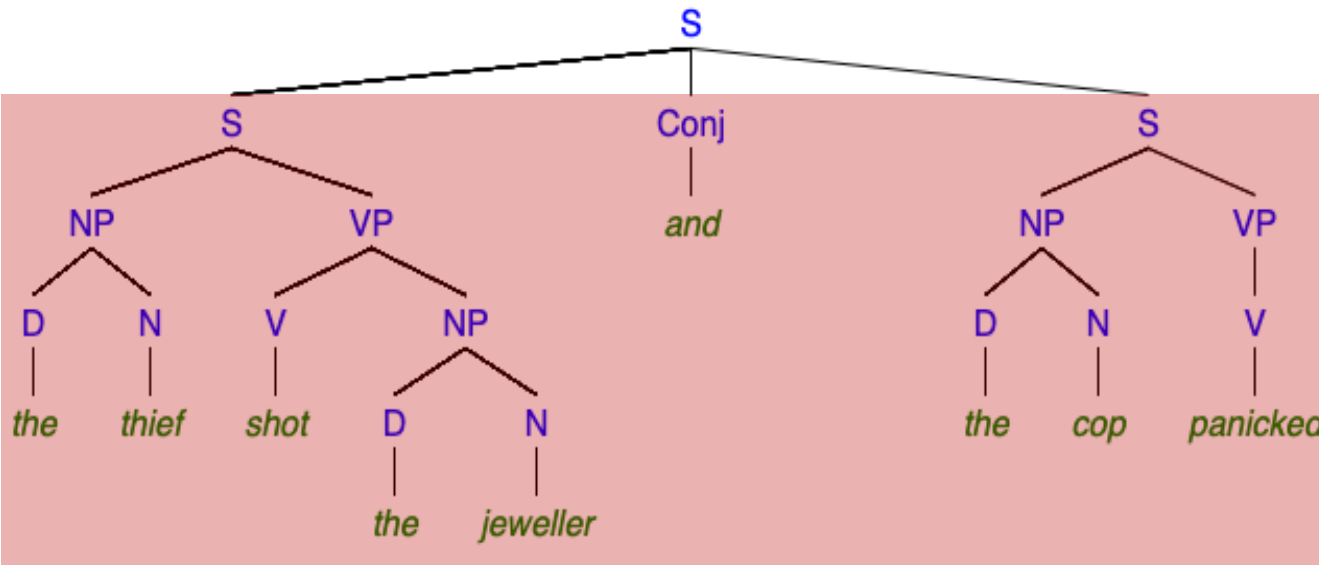
*the **fast car** mechanic*



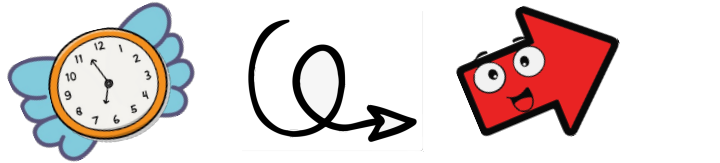
Ambiguity

Coordination ambiguity

The thief shot **the jeweller and the cop** panicked.



Time flies like an arrow



→ lexical category

→ PP attachment

→ coordination

To do

Assign yourself to the correct group under A5!

Do HW5

Read:

This lecture: **File** Ch5

Next lecture: **File** Ch6