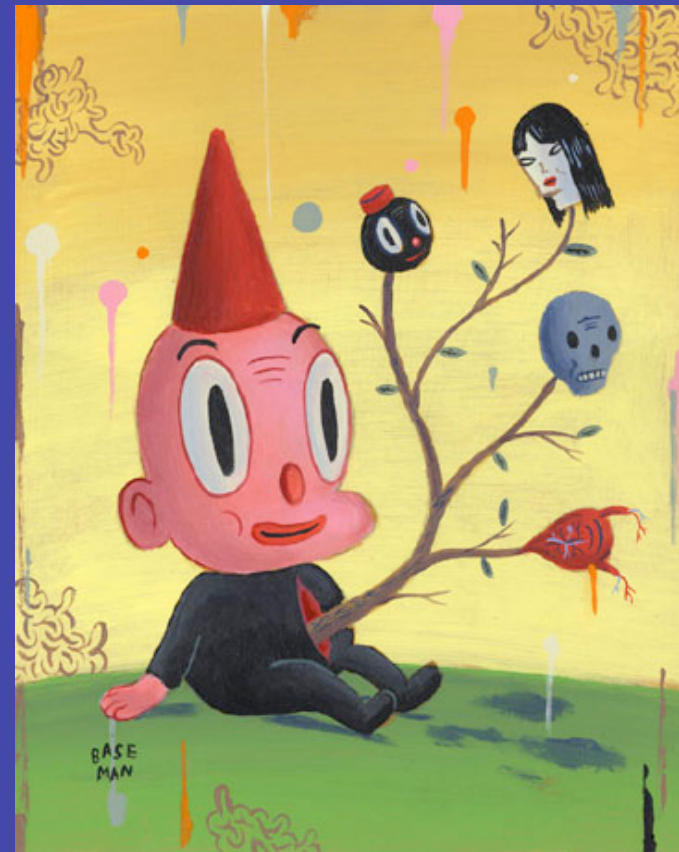


Today

- Phrase structure rules, trees
- Constituents
- Recursion
- Conjunction

Readings: 6.4 – 6.5





Phrase structure (review)

- 1) Every word belongs to a *lexical category*
- 2) Lexical categories forms heads of *phrases*
- 3) How phrases are formed is governed by rules (= '*phrase structure rules*')



Phrase structure rules

- Rules that determine...
 - ...what goes into a phrase (**‘constituents’**)
 - ...how the constituents are ordered
- **Constituent:** a word or group of words that function as a unit and can make up larger grammatical units

Phrase structure rules

- General schema:

$$X \rightarrow Y Z$$

“X consists of Y followed by Z”

Phrase structure rules

Noun phrase (NP)

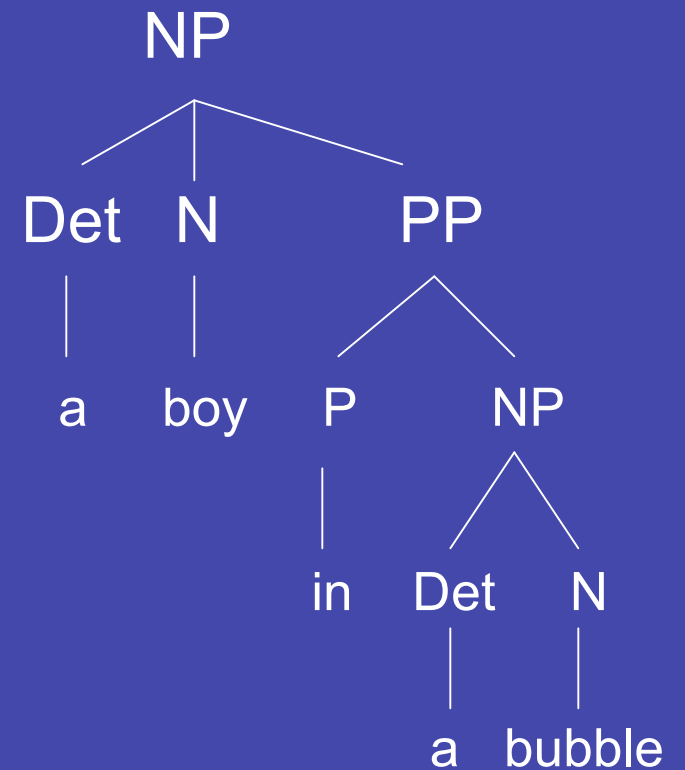
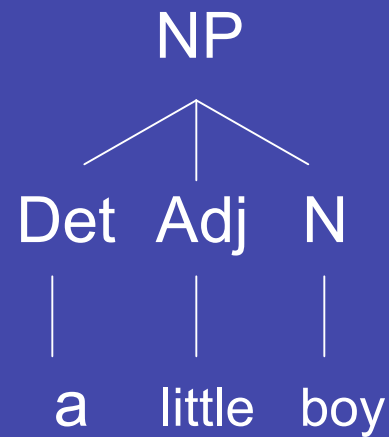
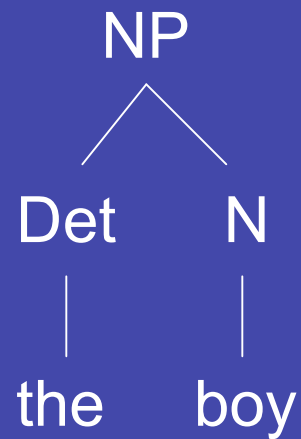
- | | |
|---------------------|-----------|
| □ John | N |
| □ the boy | Det N |
| □ a little boy | Det Adj N |
| □ a boy in a bubble | Det N PP |

Phrase structure rule for NPs:

$NP \rightarrow (Det) (Adj) N (PP)$

(where '()' indicates optionality)

Phrase structure trees



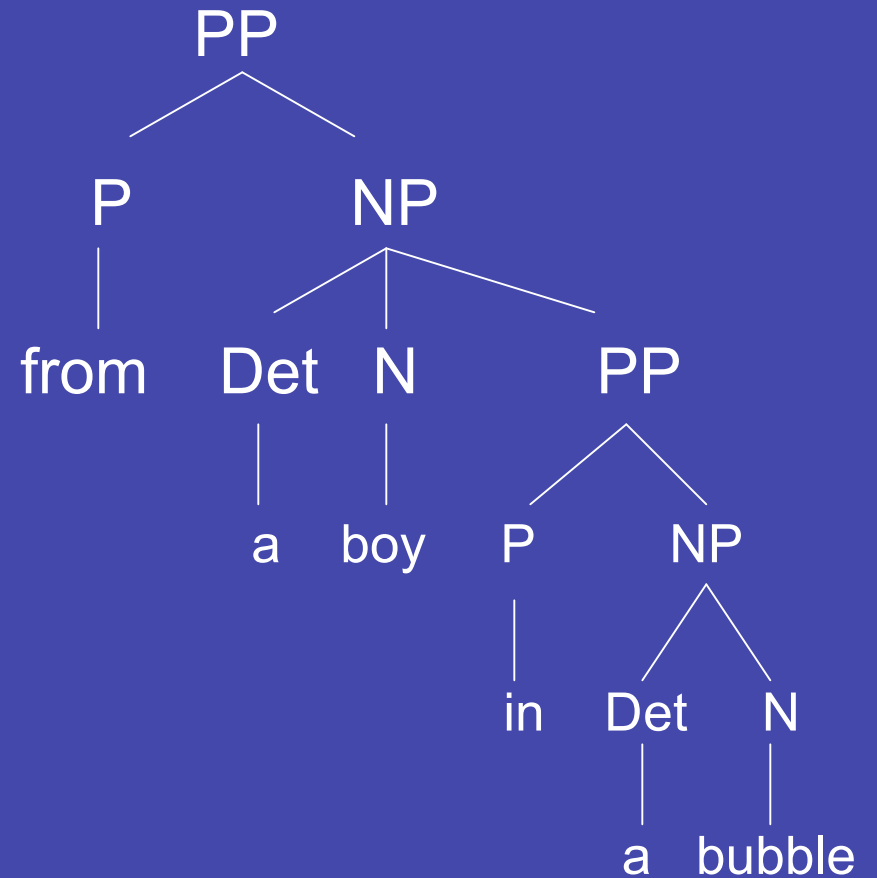
Prepositional phrase (PP)

- in P
- from a boy in a bubble P NP

Phrase structure rule for PPs:

$PP \rightarrow P (NP)$

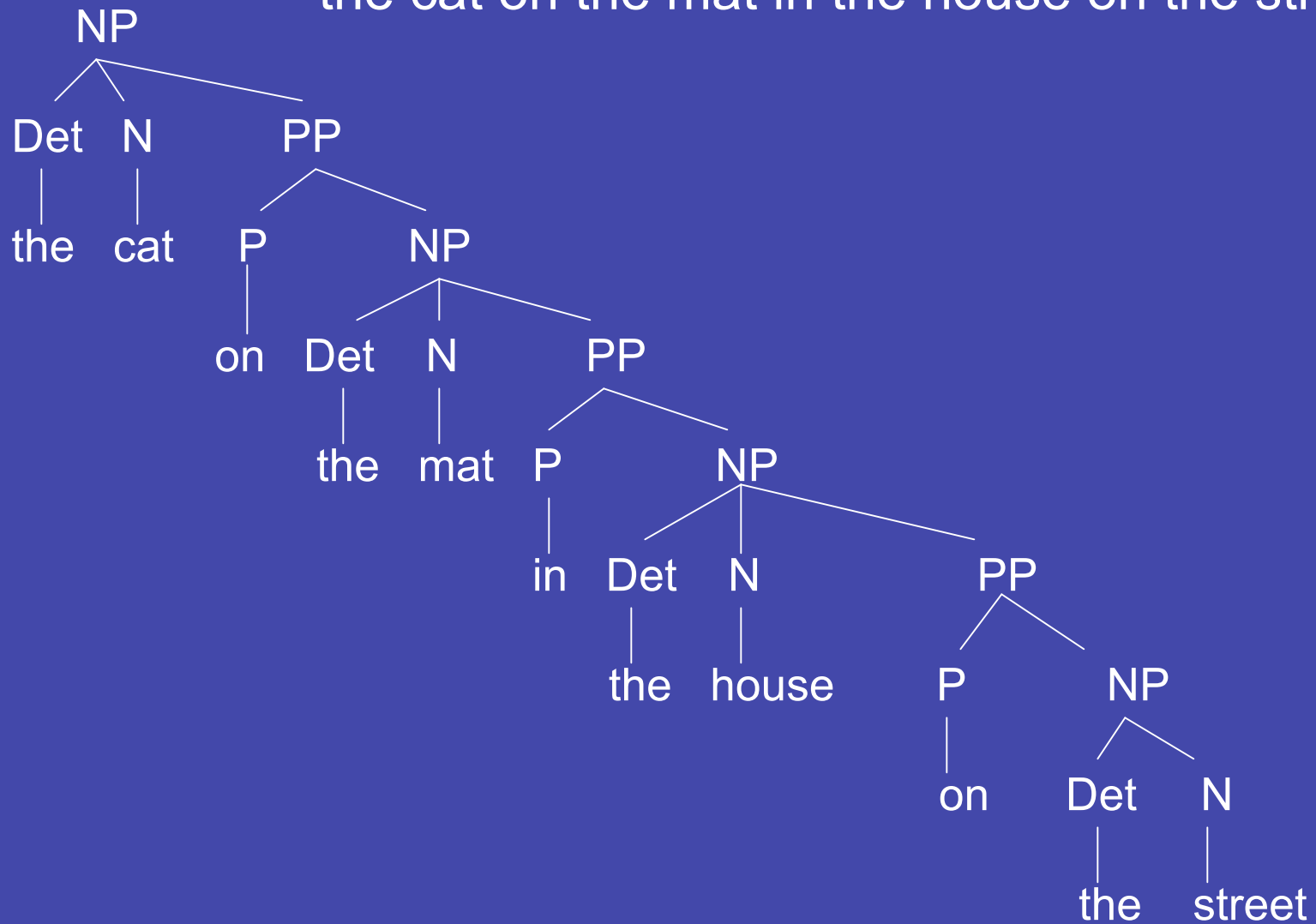
Phrase structure trees



Recursion

- Some phrasal categories may appear to the left or right of the arrow
 - NP \rightarrow (Det) N (PP)
 - PP \rightarrow P (NP)
- **Recursion:** the property of language that allows for the embedding of categories (which can yield infinitely long phrases)

the cat on the mat in the house on the street



Verb phrase (VP)

- | | |
|-----------------------------|----------|
| □ sang | V |
| □ ate the cake | V NP |
| □ ate the cake hungrily | V NP Adv |
| □ sang a song in the shower | V NP PP |
| □ fell into the pond slowly | V PP Adv |

Phrase structure rule for VPs:

$VP \rightarrow V (NP) (PP) (Adv)$

VP

V

sang

VP

V

ate

NP

Det

the

N

cake

VP

V

sang

NP

Det

a

N

song

the

P

in

NP

shower

Adv

badly

Det

N



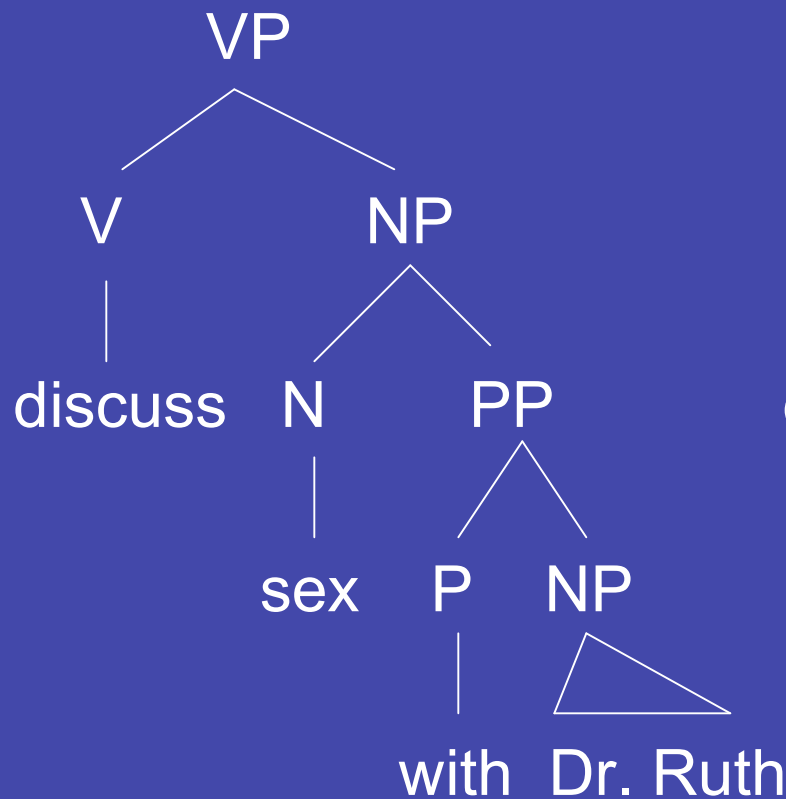
Structural ambiguity

discuss [sex with Dr. Ruth]

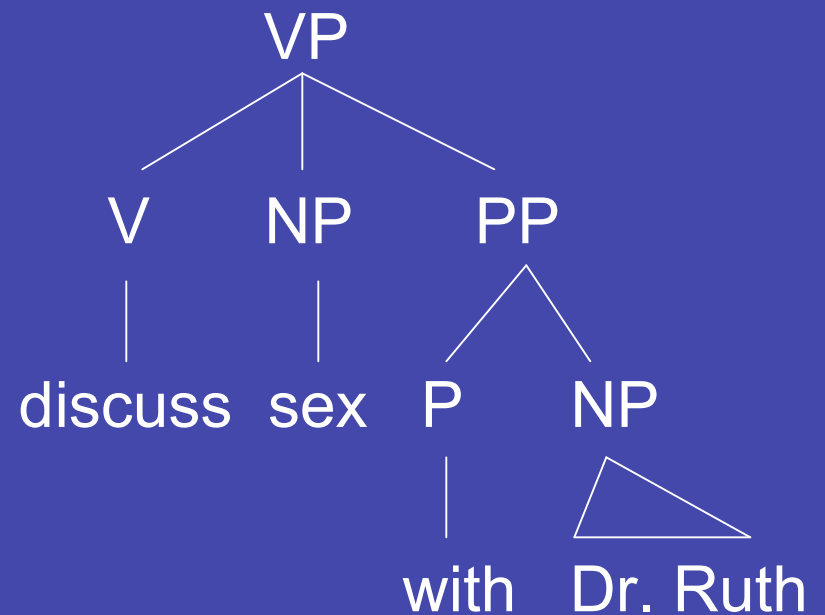
[discuss sex] with Dr. Ruth

Structural ambiguity

discuss [sex with Dr. Ruth]



[discuss sex] with Dr. Ruth



Sentences

- Must contain an NP and a VP

The dog barked.

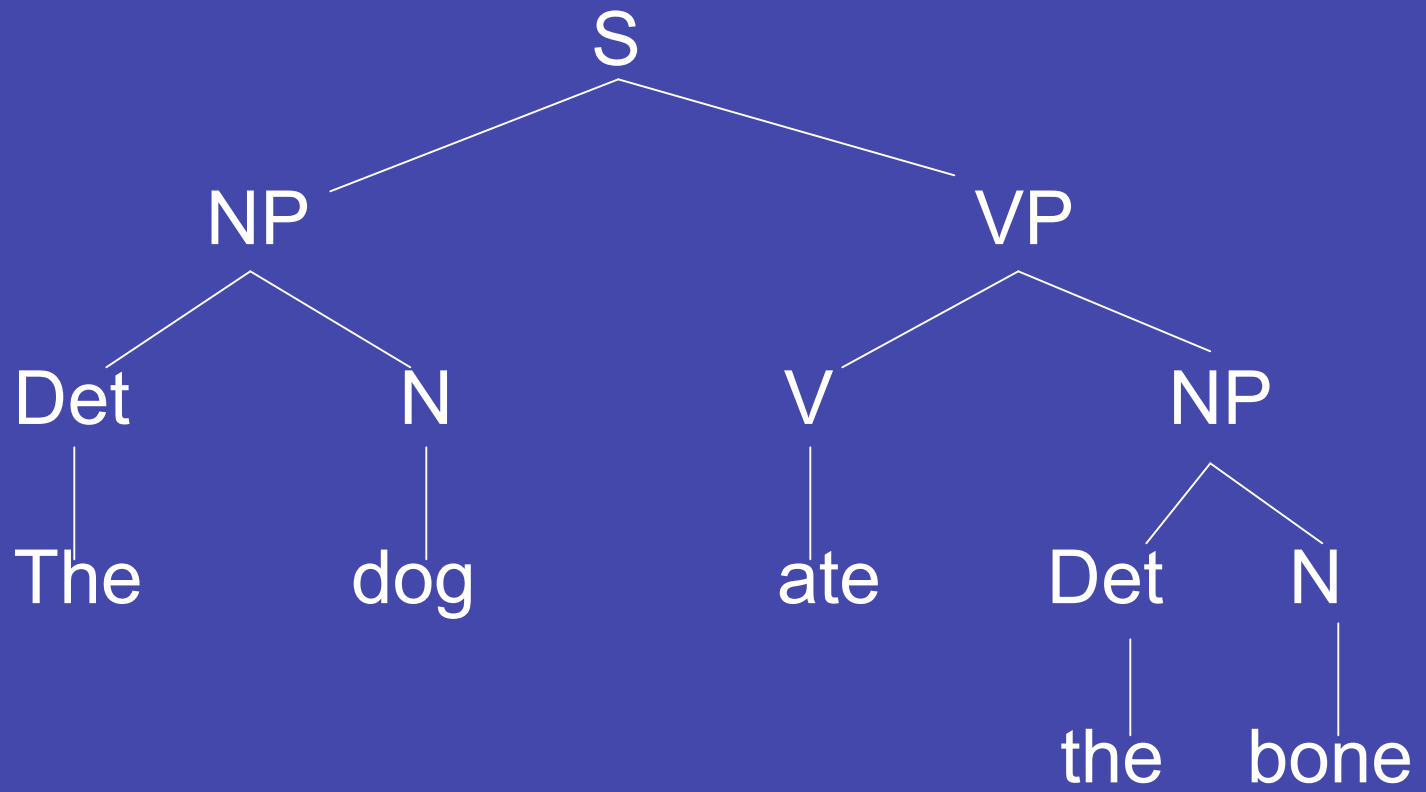
*The dog.

*Barked.

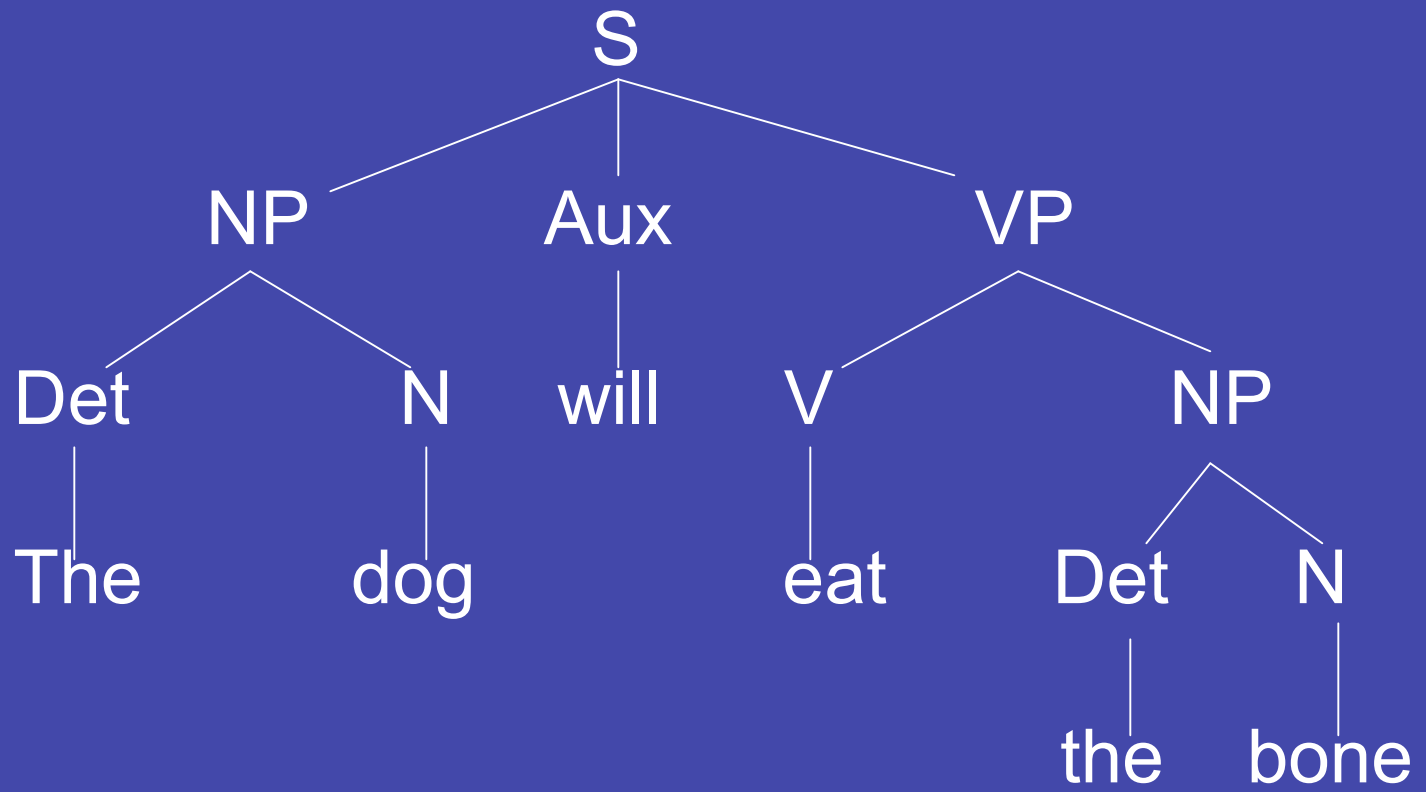
- May contain an auxiliary verb

The dog will bark.

$S \rightarrow NP (Aux) VP$



$S \rightarrow NP VP$



$S \rightarrow NP \text{ Aux } VP$

Conjunction

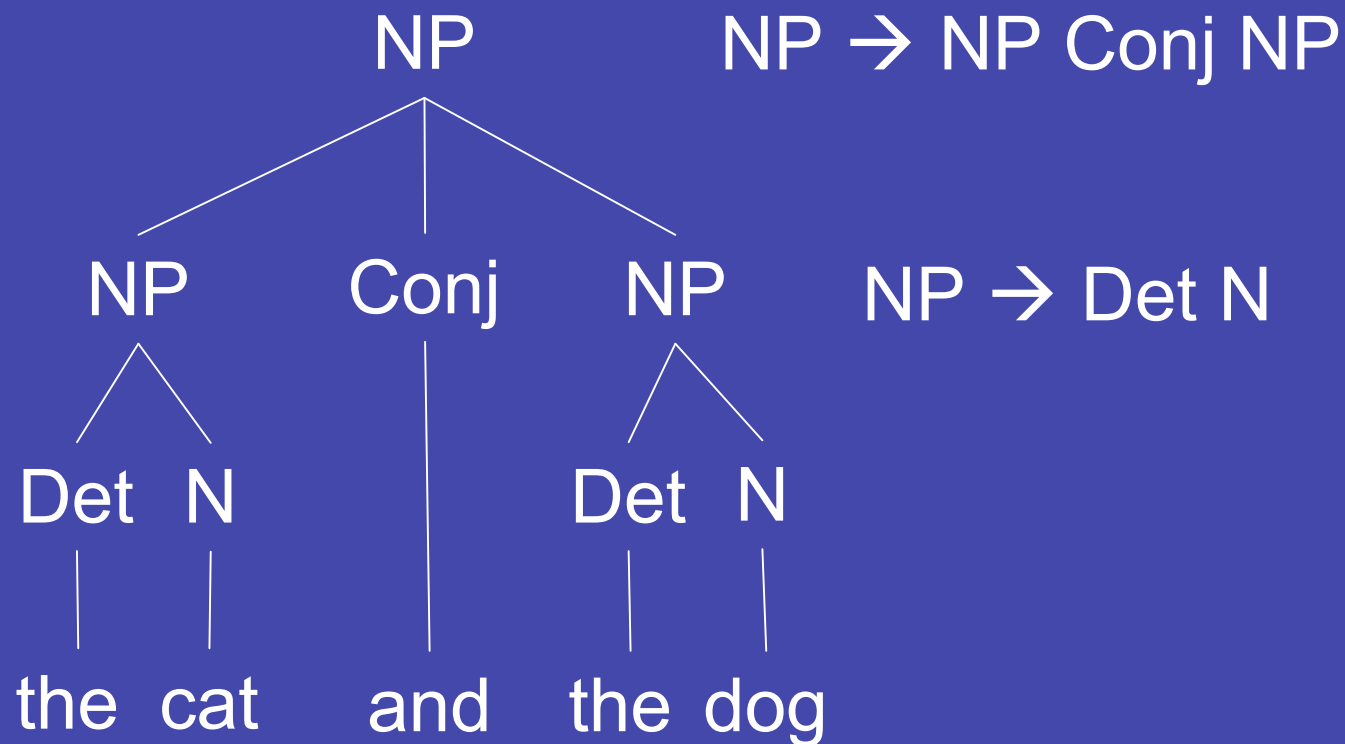
- Words and phrases of the same category can be combined using conjunctions (*and*, *but*, *or*)
 - Cats **and** dogs make good pets.
 - Eat, drink, **or** be merry.
 - You can lead a horse to water **but** you can't make him drink.

NP \rightarrow NP conj NP

VP \rightarrow VP conj VP \rightarrow X \rightarrow X conj X

S \rightarrow S conj S

Conjoined phrases



Conjoined sentences

I bought a book, but I returned it.

