X-bar Theory

Motivating intermediate projections

Ling 322

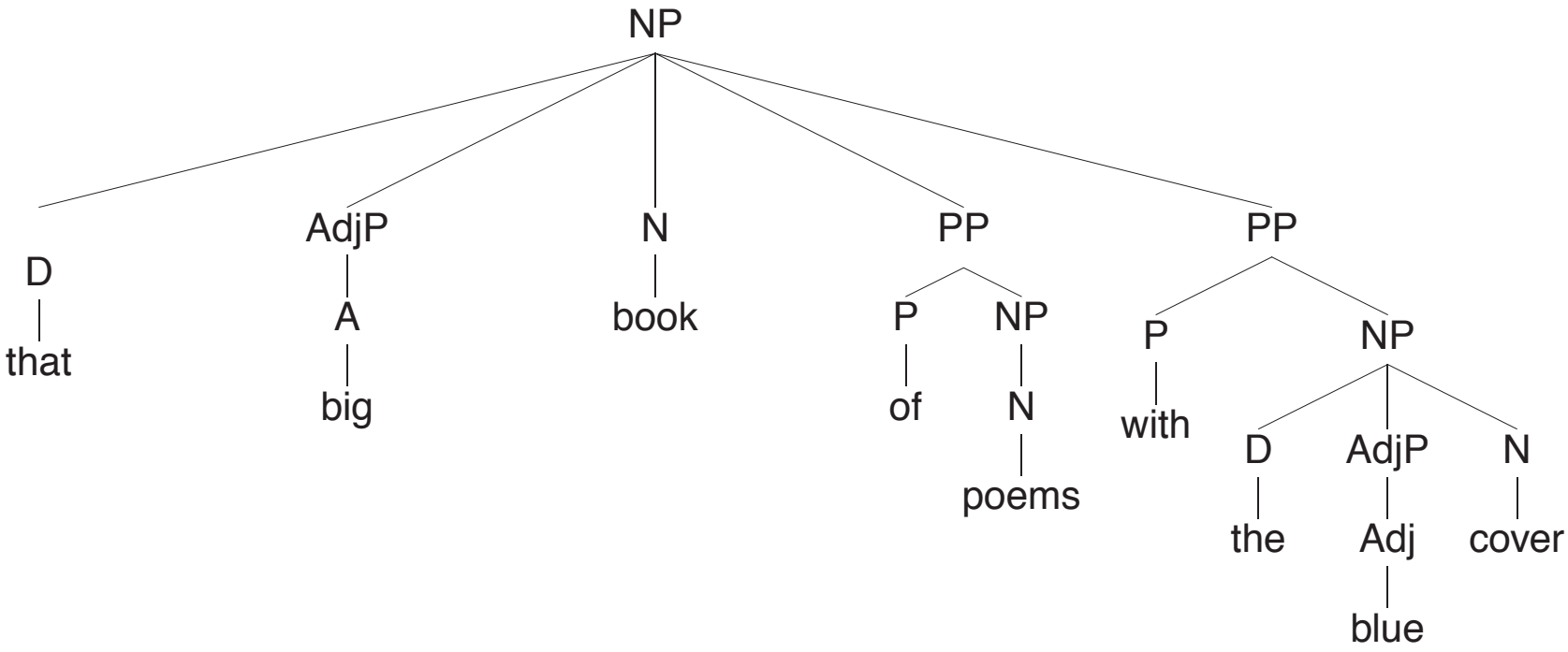
Read *Syntax*, Ch. 6

(Lecture notes based on Andrew Carnie's notes)

Flat NP structure

- NP → (D) (AdjP+) N (PP+)

(1) I bought [that big book of poems with the blue cover].



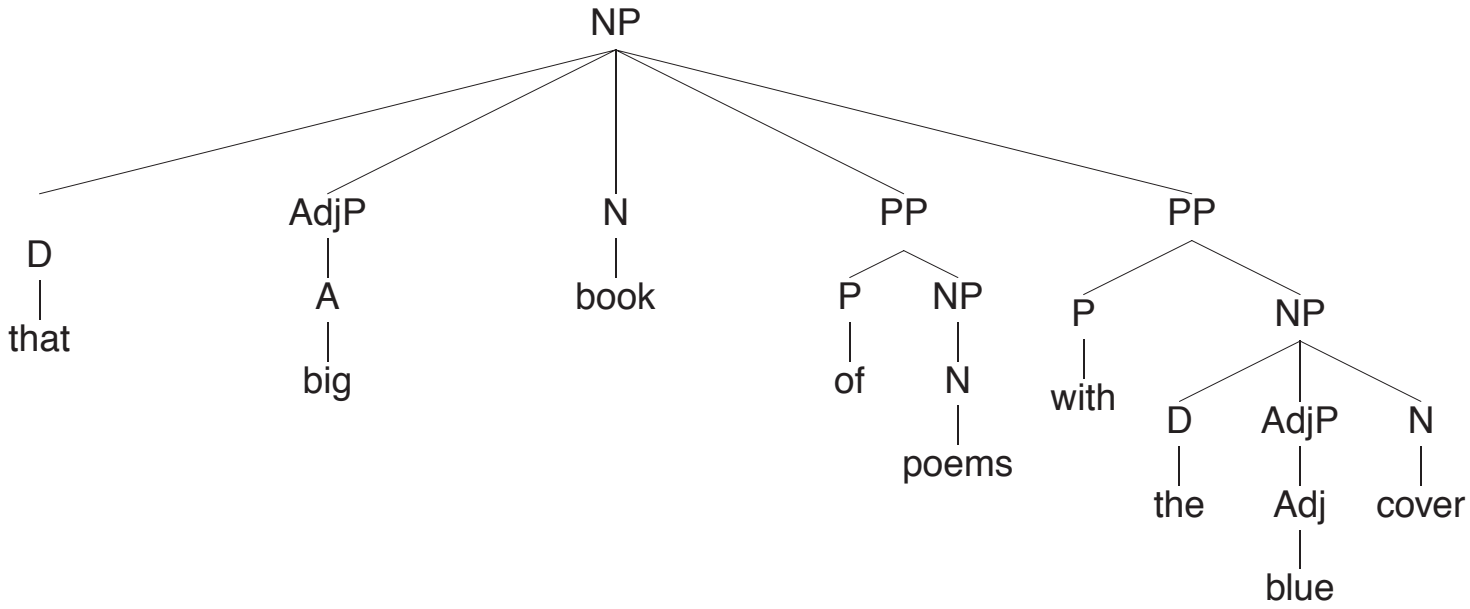
Problem with Flat NP Structure

- *One*-replacement: Only constituents can be replaced with pronouns.

(2) a. I bought that big [book of poems with the blue cover] not the small [one].

b. I bought that big [book of poems] with the blue cover not the small [one] with the red cover.

c. I want that [big book of poems with the blue cover] not this [one].

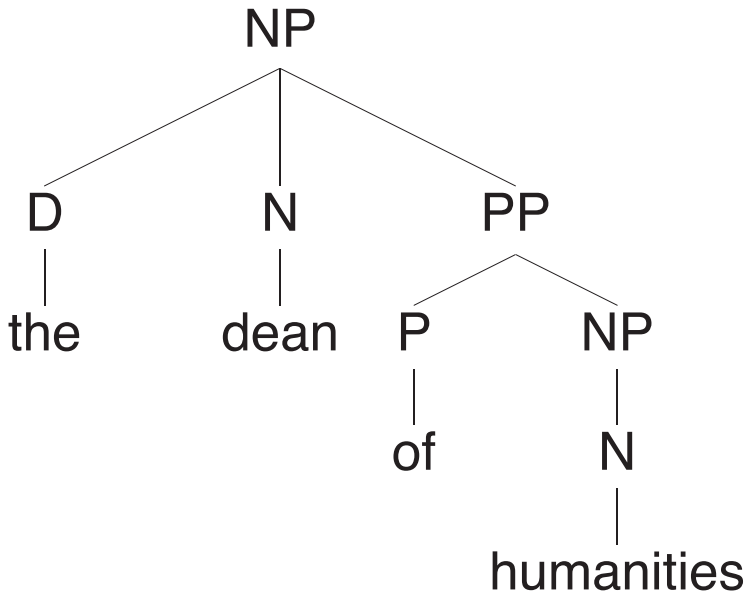


$\Longrightarrow$ Evidence for articulated structure

Problem with Flat NP Structure (cont.)

- Conjunction: Only constituents of the same category can be conjoined.

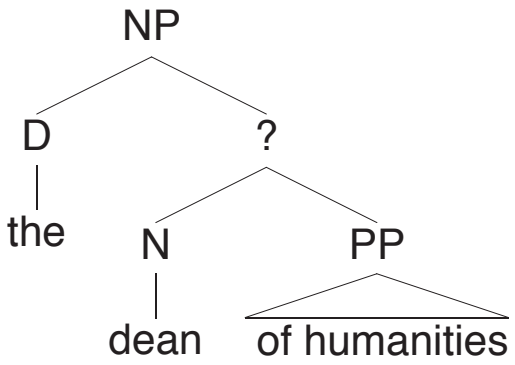
  (3) Calvin is [the [dean of humanities] and [director of social sciences]].



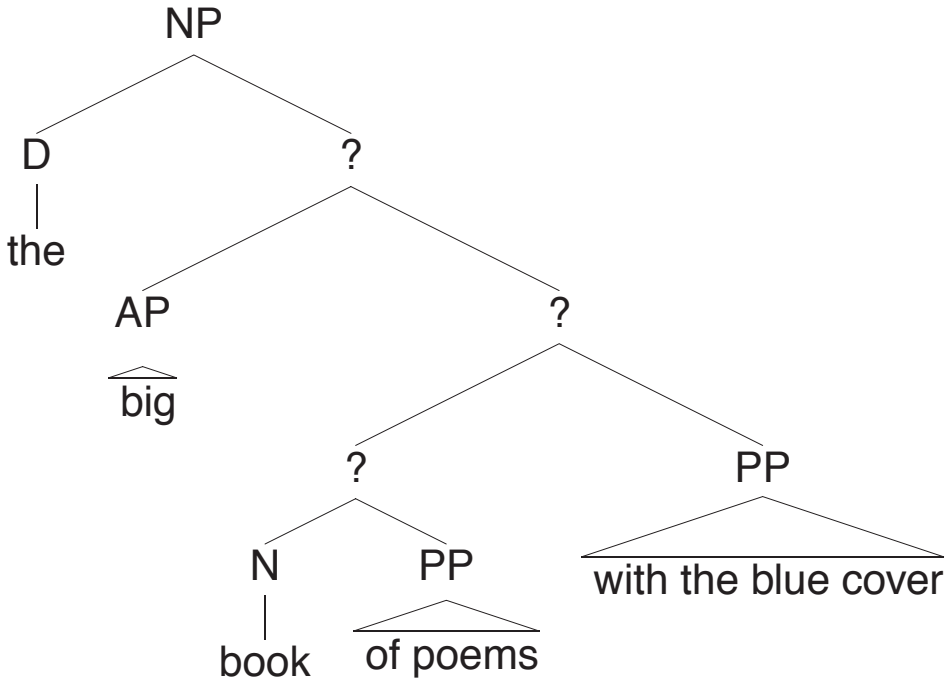
$\Longrightarrow$ Evidence for articulated structure

Articulated NP Structures

- the [dean of humanities]

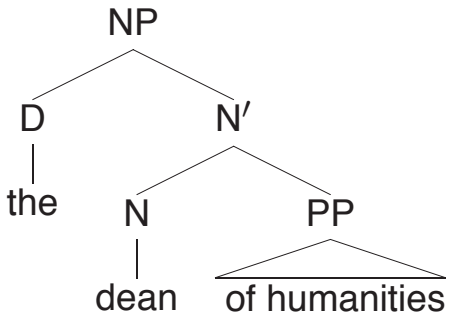


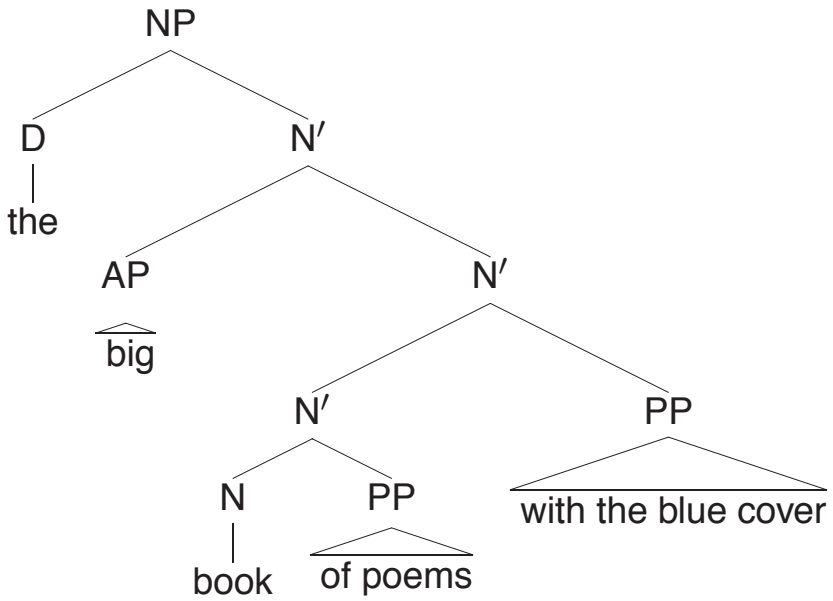
- that [big [[book of poems] with the blue cover]]



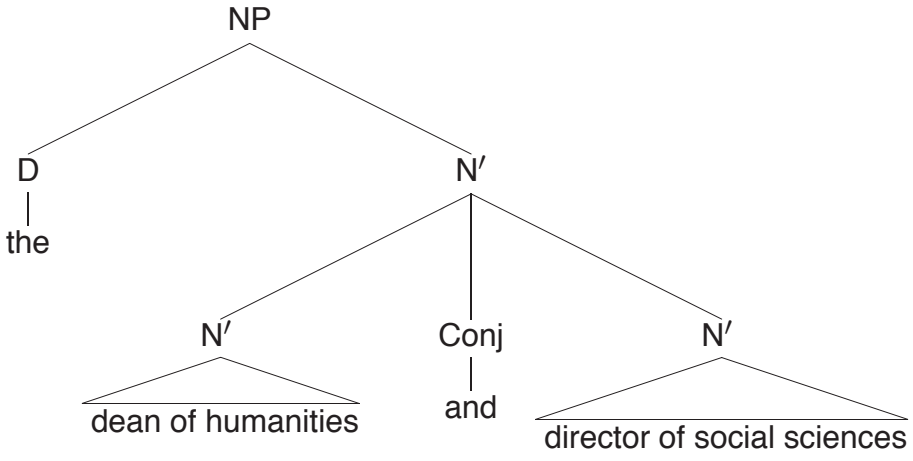
Intermediate Projections in NP

- We will use N′ (N-bar) to refer to the intermediate projections in NP.





- *One*-replacement: Replace an N′ node with *one*.
- N′s can be conjoined.



New NP Rules with Intermediate Projections

(4) a. NP $\rightarrow$ (D) N′
b. N′ $\rightarrow$ (AdjP) N′
c. N′ $\rightarrow$ N′ (PP)
d. N′ $\rightarrow$ N (PP)

QUESTION: Provide parsed trees for the following NPs, using the rules above.

(5) a. owners of big cars without children
b. the big yellow box of cookies with the pink lid
c. the dangers of too much cholesterol

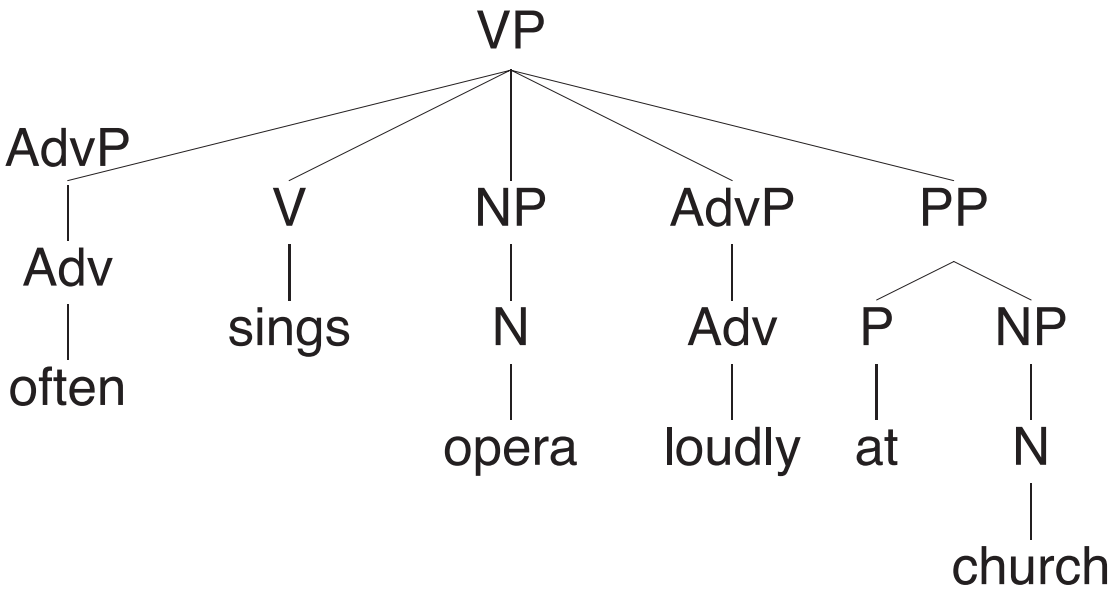
QUESTION: Using the rules in (4), provide the parsed tree for the bracketed NP in (6) to reflect the constituency indicated by the *one*-replacement.

(6) [$_{NP}$ that big book of poems with the blue cover], and not this **one** with the red cover

Flat VP Structure

- VP $\rightarrow$ (AdvP+) V (NP) (AdvP+) (PP+)

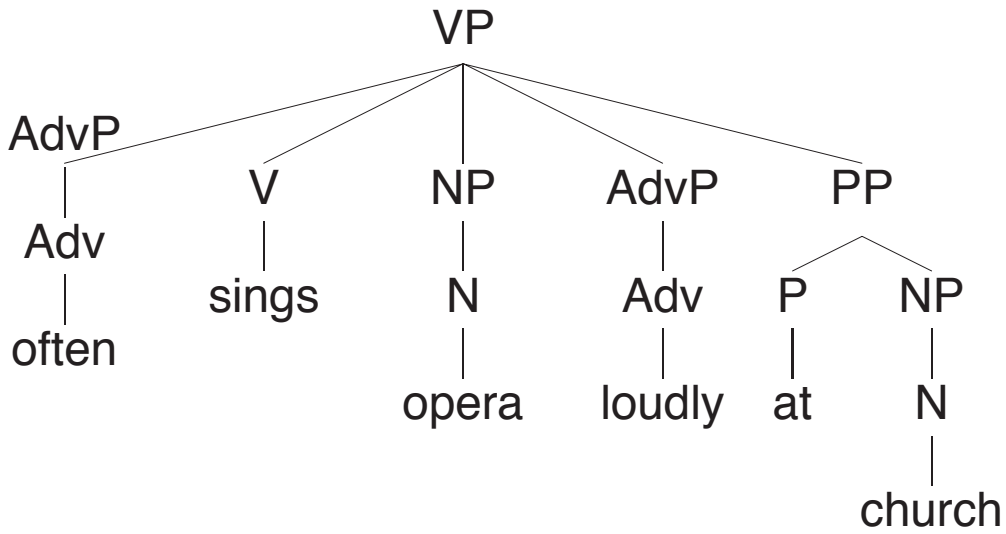
(7) John [often sings opera loudly at church].



Problem with Flat VP Structure

- *Do so* replacement: Only constituents can be replaced with pro-forms.

(8) a. John [often sings opera loudly at church] and Mary [does so] too.
b. John often [sings opera loudly at church] and Mary frequently [does so] too.
c. John often [sings opera loudly] at church but Mary rarely [does so] in the library.
d. John often [sings opera] loudly at church but Mary rarely [does so] quietly in the library.

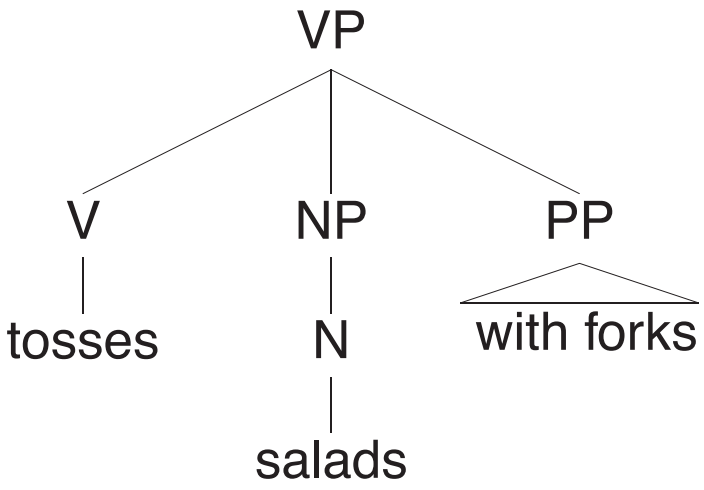


$\Longrightarrow$ Evidence for articulated structure

Problem with Flat VP Structure (cont.)

- Conjunction

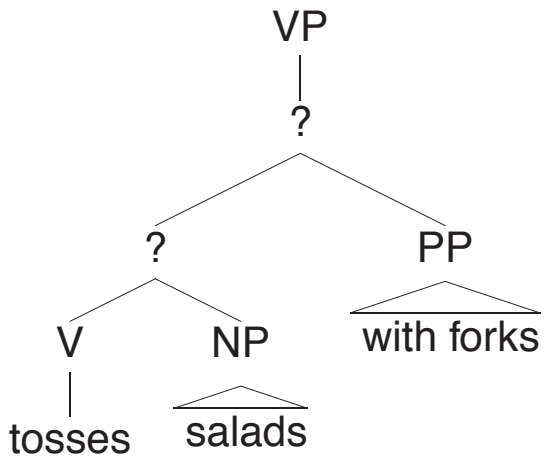
  (9) The chef [eats beans] and [tosses salads] with forks.



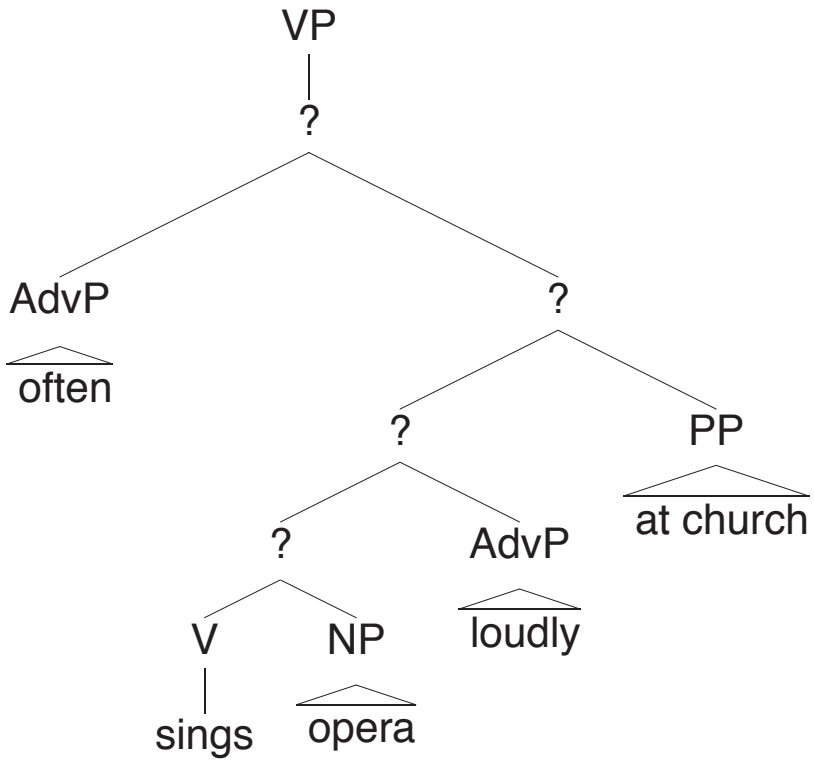
$\Longrightarrow$ Evidence for articulated structure

Articulated VP Structure

- [tosses salads] with forks

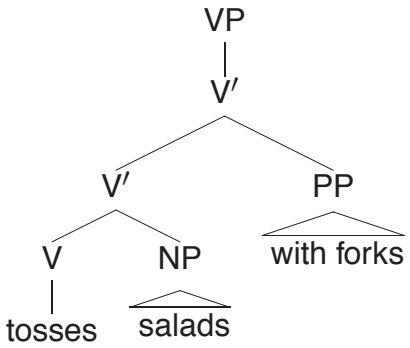


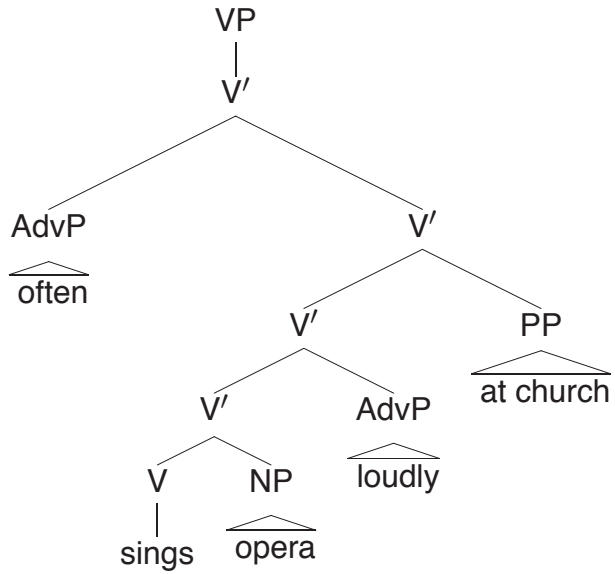
- [often [[[sings opera] loudly] at church]]



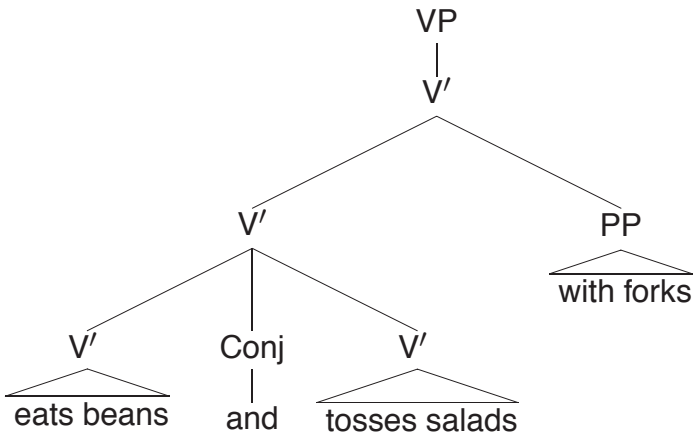
Intermediate Projections in VP

- We will use V′ (V-bar) to refer to the intermediate projections in VP.





- *Do so* replacement: Replace a V′ node with *do so*.
- V′s can be conjoined.



New VP Rules with Intermediate Projections

(10) a. $VP \rightarrow V'$

b. $V' \rightarrow$ (AdvP) V'

c. $V' \rightarrow V'$ ($\{$AdvP/PP$\}$)

d. $V' \rightarrow V$ (NP)

QUESTION: Provide parsed trees for the following VPs, using the rules above.

(11) a. He jumped over.

b. He jumped over the ditch.

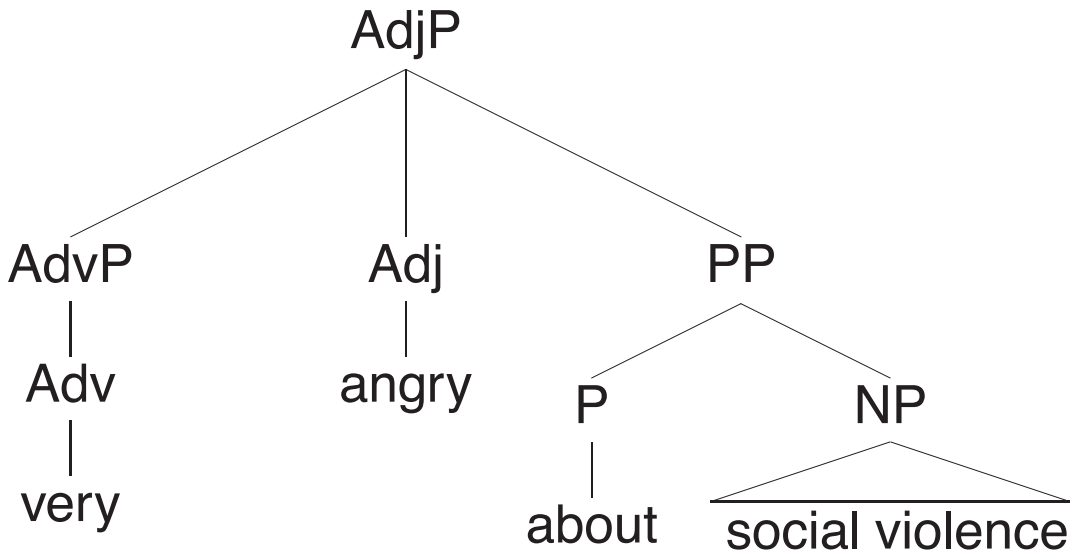
c. Bill frequently got his buckets from the store for a dollar.

d. Holmes cleaned the knife carefully with a handkerchief and washed the dishes with soap.

Flat AdjP Structure

- AdjP $\rightarrow$ (AdvP+) Adj (PP)

(12) Bob is [very angry about social violence].



Problem with Flat AdjP Structure

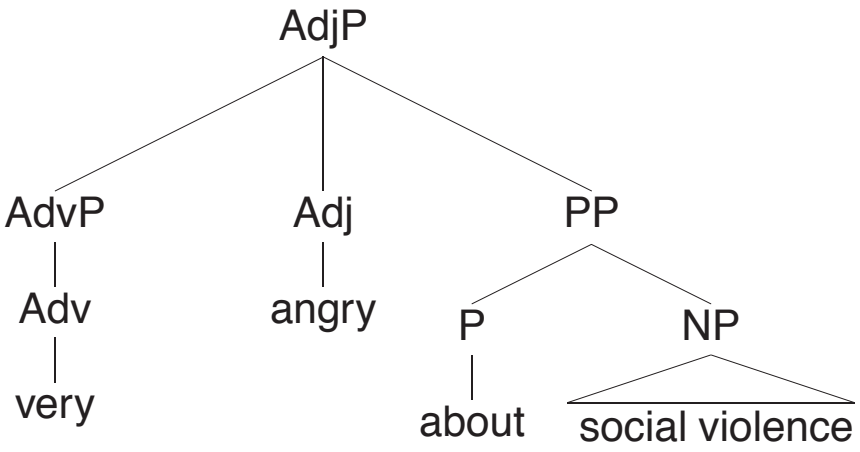
- *So* replacement: Only constituents can be replaced with pro-forms.

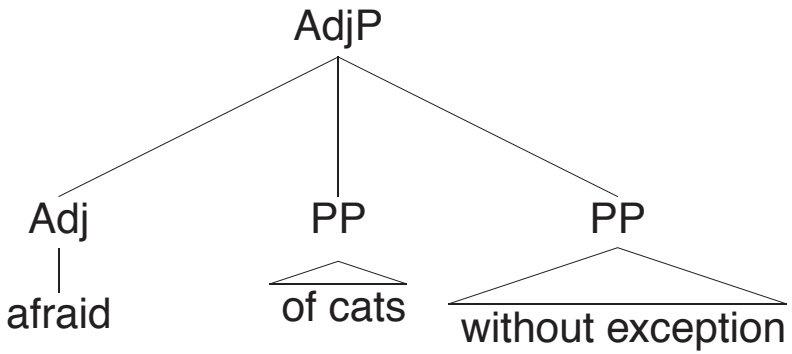
  (13) a. Bob is very [angry about social violence] but less [so] than he used to be.

  b. Bob is very [angry] about social violence but less [so] about gun control.

- Conjunction

  (14) John is [fond of dogs] and [afraid of cats] without exception.

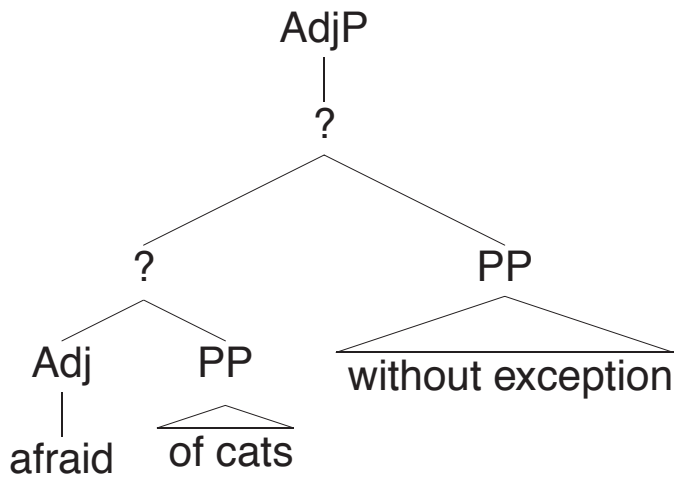




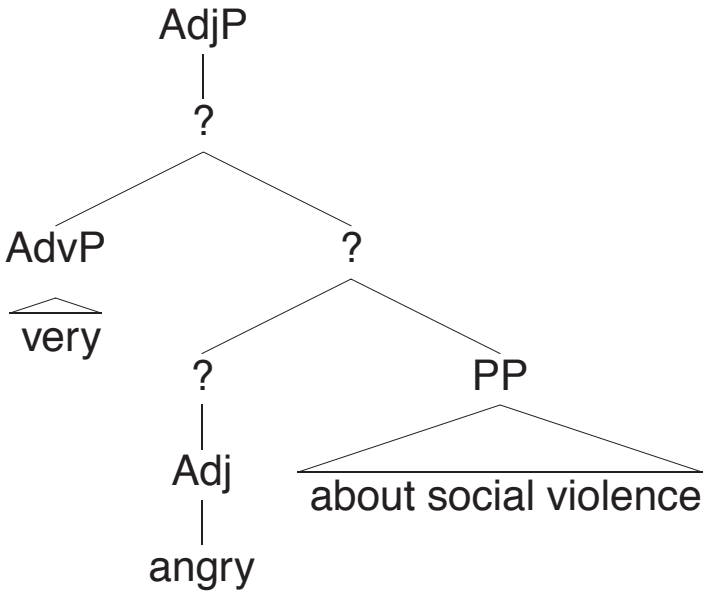
$\Longrightarrow$ Evidence for articulated structure

Articulated AdjP Structure

- [afraid of cats] without exception

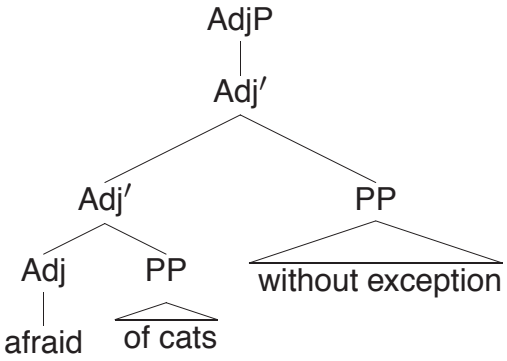


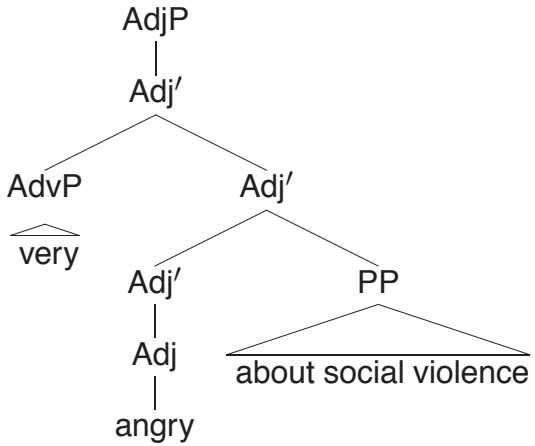
- [very [angry about social violence]]



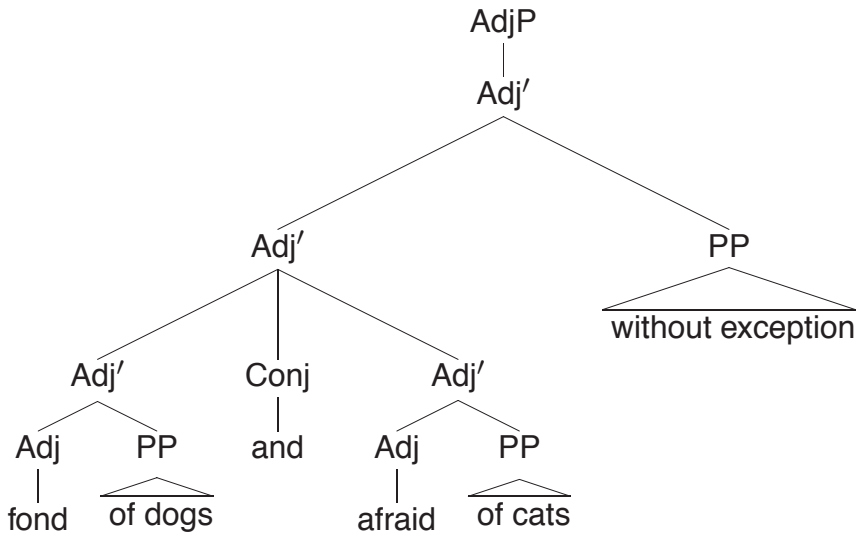
Intermediate Projections in AdjP

- We will use Adj′ (Adj-bar) to refer to the intermediate projections in AdjP.





- *So* replacement: Replace a Adj′ node with *so*.
- Adj′s can be conjoined.



New AdjP Rules with Intermediate Projections

(15) a. AdjP $\rightarrow$ Adj′

b. Adj′ $\rightarrow$ ($\{$AdvP/AdjP$\}$) Adj′

c. Adj′ $\rightarrow$ Adj′ (PP)

d. Adj′ $\rightarrow$ Adj (PP)

QUESTION: Provide parsed trees for the following AdjPs, using the rules above.

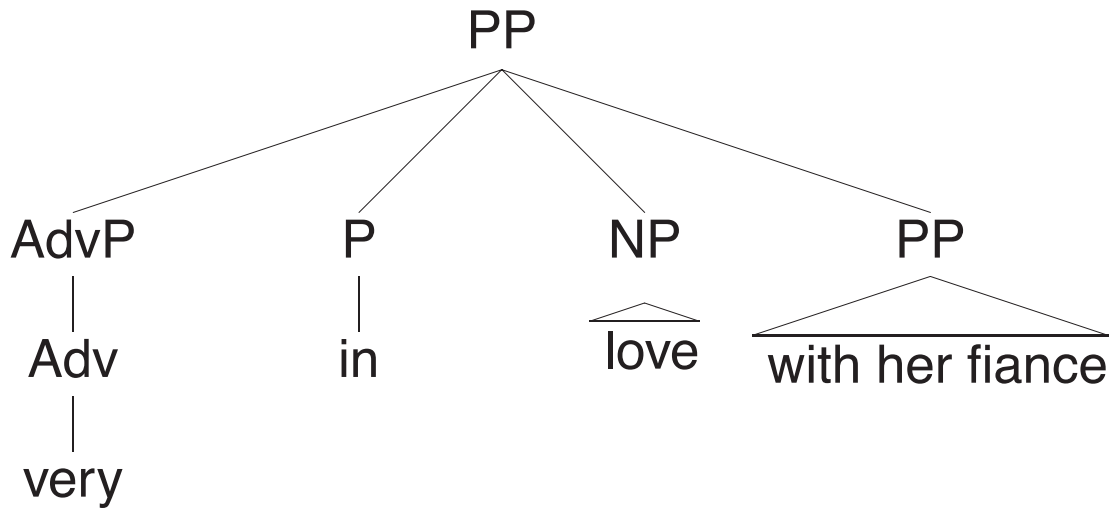
(16) a. Maggie is quite fond of her assistent without doubt.

b. Mary is absolutely happy about the news.

Flat PP Structure

- PP $\rightarrow$ (AdvP) P (NP) (PP)

  (17) Mary is [very in love with her fiance].



Problem with Flat PP Structure

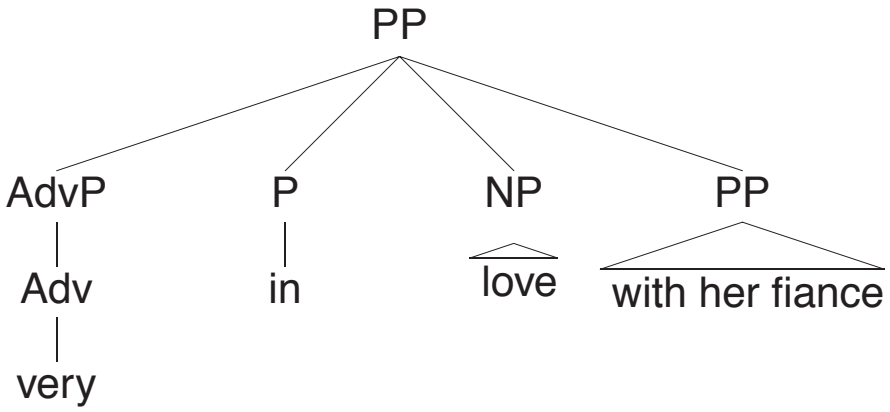
- *So* replacement: Only constituents can be replaced with pro-forms.

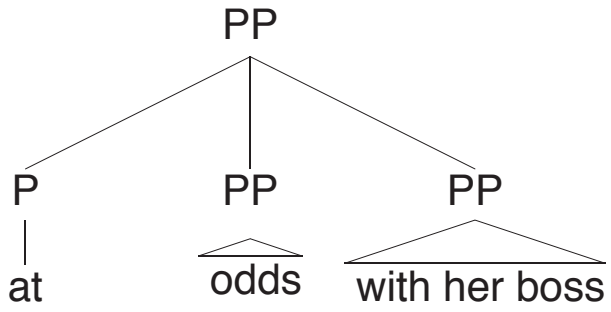
  (18) a. Mary was very [in love with her fiance], but Sue was less [so].

  b. Mary was very [in love] with her fiance, but Sue was less [so] with her husband.

- Conjunction

  (19) Kim was [in love] and [at odds] with her boss.

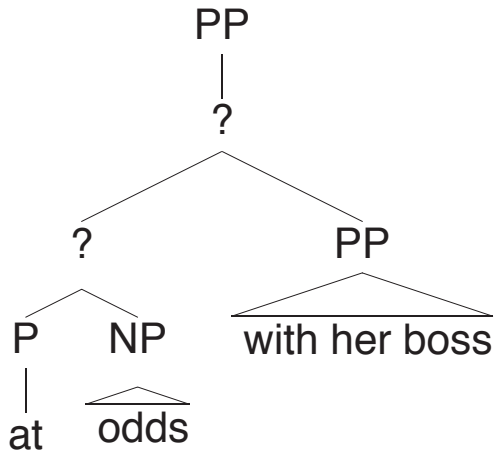




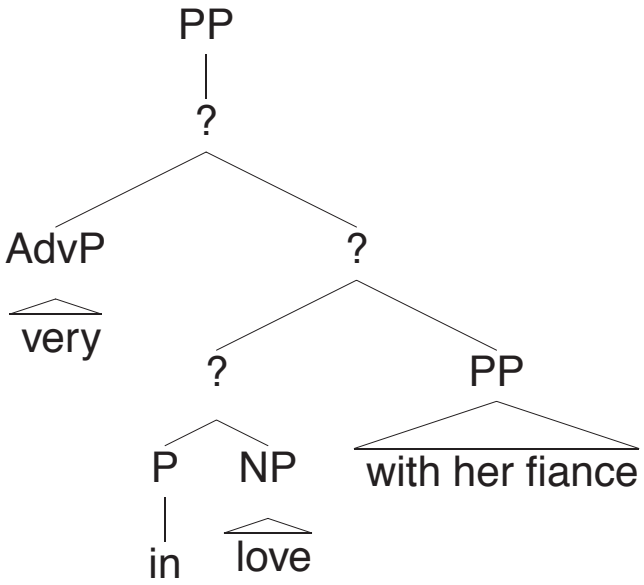
$\Longrightarrow$ Evidence for articulated structure

Articulated PP Structure

- [at odds] with her boss

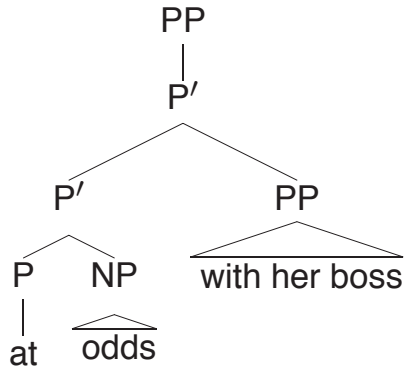


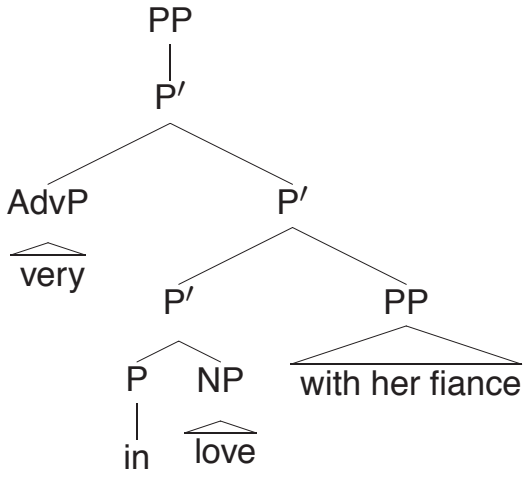
- [very [in love [with her fiance]]]



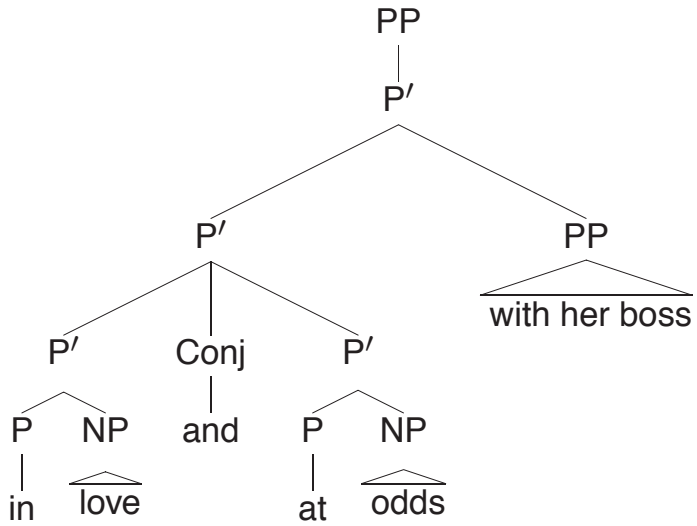
Intermediate Projections in PP

- We will use P′ (P-bar) to refer to the intermediate projections in PP.





- *So* replacement: Replace a P′ node with *so*.
- P′s can be conjoined.



New PP Rules with Intermediate Projections

(20) a. $PP \rightarrow P'$

b. $P' \rightarrow (AdvP)\ P'$

c. $P' \rightarrow P'\ (PP)$

d. $P' \rightarrow P\ (\{NP/PP\})$

QUESTION: Provide parsed trees for the following PPs.

(21) a. He fell out of the window.

b. He is very out of touch in some ways.

The New Rules

(22)

a. NP $\rightarrow$ (D) N′
b. N′ $\rightarrow$ (AdjP) N′
c. N′ $\rightarrow$ N′ (PP)
d. N′ $\rightarrow$ N (PP)
e. VP $\rightarrow$ V′
f. V′ $\rightarrow$ (AdvP) V′
g. V′ $\rightarrow$ V′ ($\{$AdvP/PP$\}$)
h. V′ $\rightarrow$ V (NP)
i. AdjP $\rightarrow$ Adj′
j. Adj′ $\rightarrow$ ($\{$AdvP/AdjP$\}$) Adj′
k. Adj′ $\rightarrow$ Adj′ (PP)
l. Adj′ $\rightarrow$ Adj (PP)
m. PP $\rightarrow$ P′
n. P′ $\rightarrow$ (AdvP) P′
o. P′ $\rightarrow$ P′ (PP)
p. P′ $\rightarrow$ P ($\{$NP/PP$\}$)

- Is there a simpler way to state these rules?

- Are we missing any generalizations?

Generalizing the Rules

- Headedness

  In each rule, the only item that is obligatory is the item that gives its category to the node that dominates it.

  Every phrase has a head (endocentricity).

  *NP $\rightarrow$ V AP.

- Optionality

  With the exception of determiners (more on this later), all non-head materials are both phrasal and optional.

  *VP $\rightarrow$ A V

  (23)

  a. NP $\rightarrow$ (D) N′
  b. N′ $\rightarrow$ (AdjP) N′
  c. N′ $\rightarrow$ N′ (PP)
  d. N′ $\rightarrow$ N (PP)
  e. VP $\rightarrow$ V′
  f. V′ $\rightarrow$ (AdvP) V′
  g. V′ $\rightarrow$ V′ ({AdvP/PP})
  h. V′ $\rightarrow$ V (NP)

Generalizing the Rules (cont.)

- For each major category, there are 3 types of rules.

(24) A rule that generates the phrase: XP $\rightarrow$ (YP) X′

a. NP $\rightarrow$ (D) N′
b. VP $\rightarrow$ V′
c. AdjP $\rightarrow$ Adj′
d. PP $\rightarrow$ P′

(25) A rule that iterates: X′ $\rightarrow$ (ZP) X′ *or* X′ $\rightarrow$ X' (ZP)

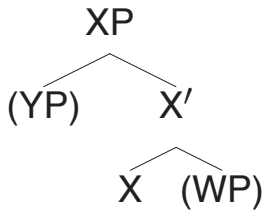
a. N′ $\rightarrow$ (AdjP) N′
b. N′ $\rightarrow$ N′ (PP)
c. V′ $\rightarrow$ (AdvP) V′
d. V′ $\rightarrow$ V′ ($\{$AdvP/PP$\}$)
e. Adj′ $\rightarrow$ ($\{$AdvP/AdjP$\}$) Adj′
f. Adj′ $\rightarrow$ Adj′ (PP)
g. P′ $\rightarrow$ (AdvP) P′
h. P′ $\rightarrow$ P′ (PP)

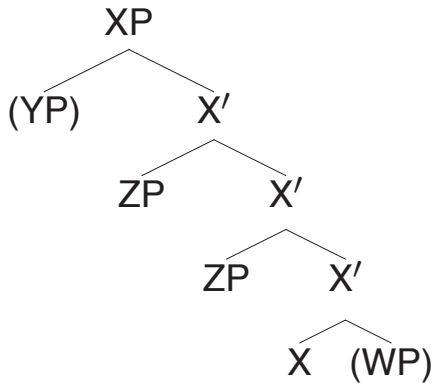
(26) A rule that introduces the head: X′ $\rightarrow$ X (WP)

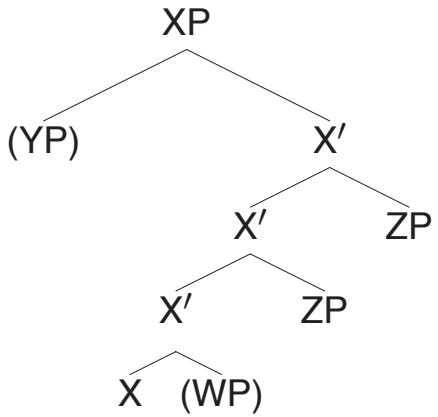
a. N′ $\rightarrow$ N (PP)
b. V′ $\rightarrow$ V (NP)
c. Adj′ $\rightarrow$ Adj (PP)
d. P′ $\rightarrow$ P ($\{$NP/PP$\}$)

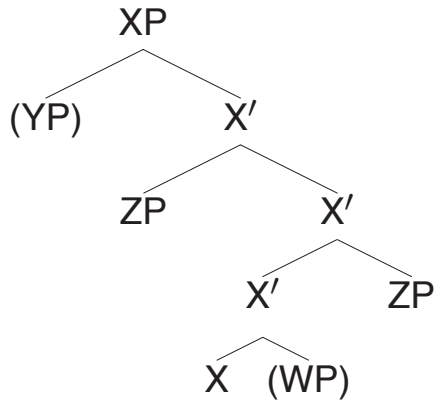
X-bar Theory

- Specifier Rule: XP $\rightarrow$ (YP) X′
- Adjunct Rule: X′ $\rightarrow$ (ZP) X′ *or* X′ (ZP)
- Complement Rule: X′ $\rightarrow$ X (WP)





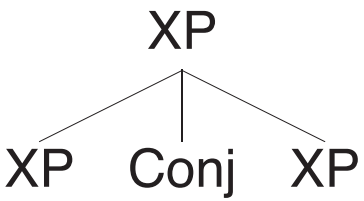


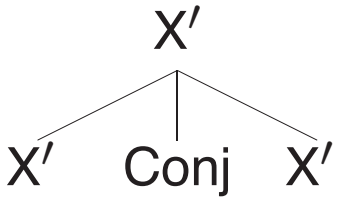


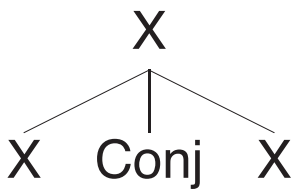
Note: X, Y, Z, W are variables. They can stand for any category (N, V, Adj, Adv, P). The category standing for X, X′, and XP must be consistent through the 3 rules.

Additional Rules for Building Trees

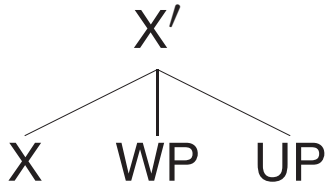
- Conjunction Rule: XP $\rightarrow$ XP Conj XP; X′ $\rightarrow$ X′ Conj X′; X $\rightarrow$ X Conj X







- Ditransitive Rule: X′ $\rightarrow$ X WP UP



(27) a. John gave a book to Mary.

b. John gave Mary a book.