Lec13: X-bar Theory

HUL 242

7/3

Toy grammar

$CP \rightarrow TP\ (C)$
$TP \rightarrow NP\ VP\ (T)$
$NP \rightarrow (Det)\ (AdjP+)\ N\ (PSP)\ (NP+)$
$VP \rightarrow (NP)\ (NP_{Adj}+)\ (AdvP)\ (NP)\ (AdvP)\ V\ (CP)$
$AdjP \rightarrow (AdvP)\ Adj$
$XP \rightarrow XP\ conj\ XP$

Disambiguate

English

The hunter [killed [the elephant]] [in his pajamas]
The hunter [killed [the elephant [in his pajamas]]

Disambiguate

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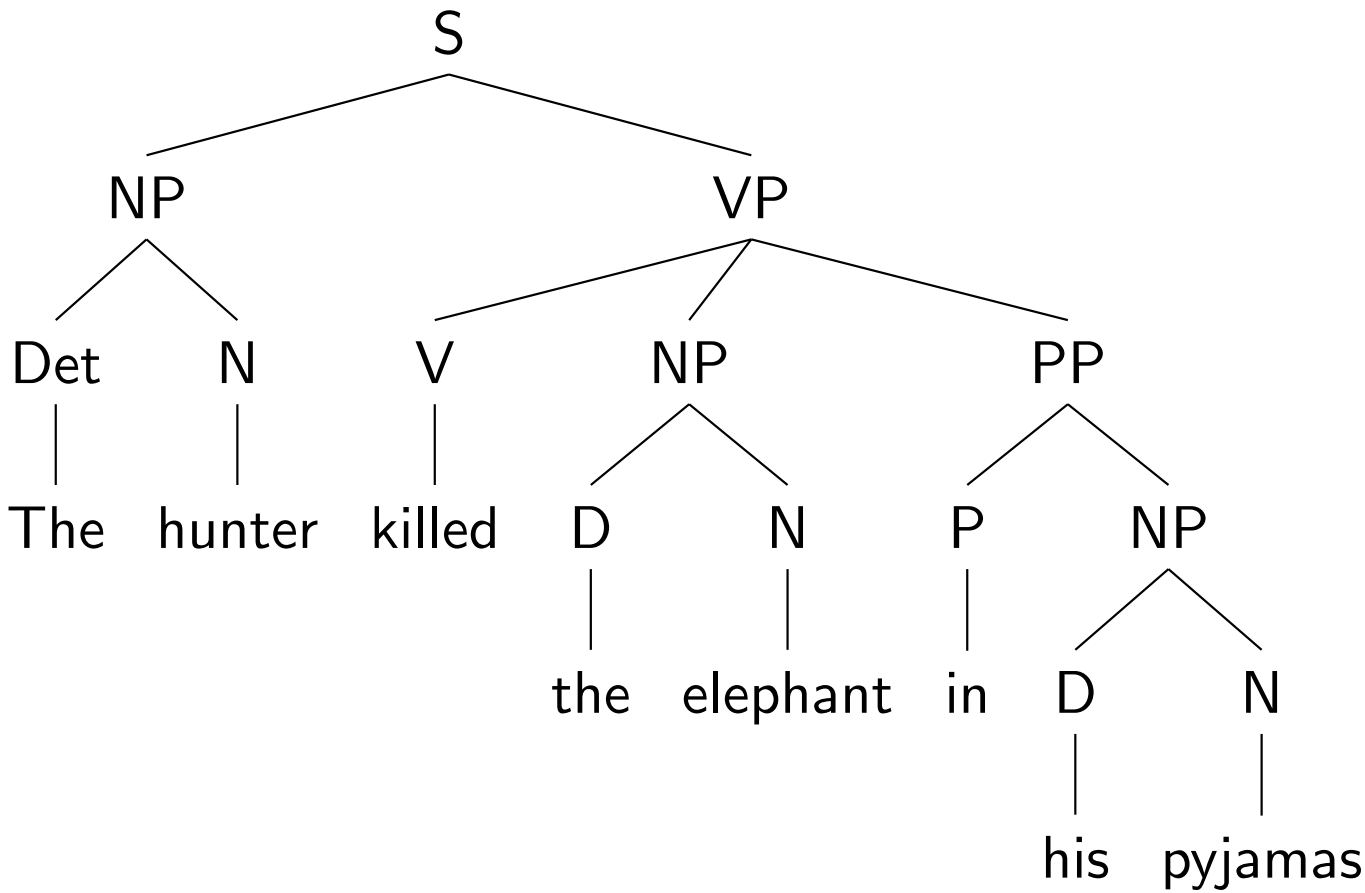
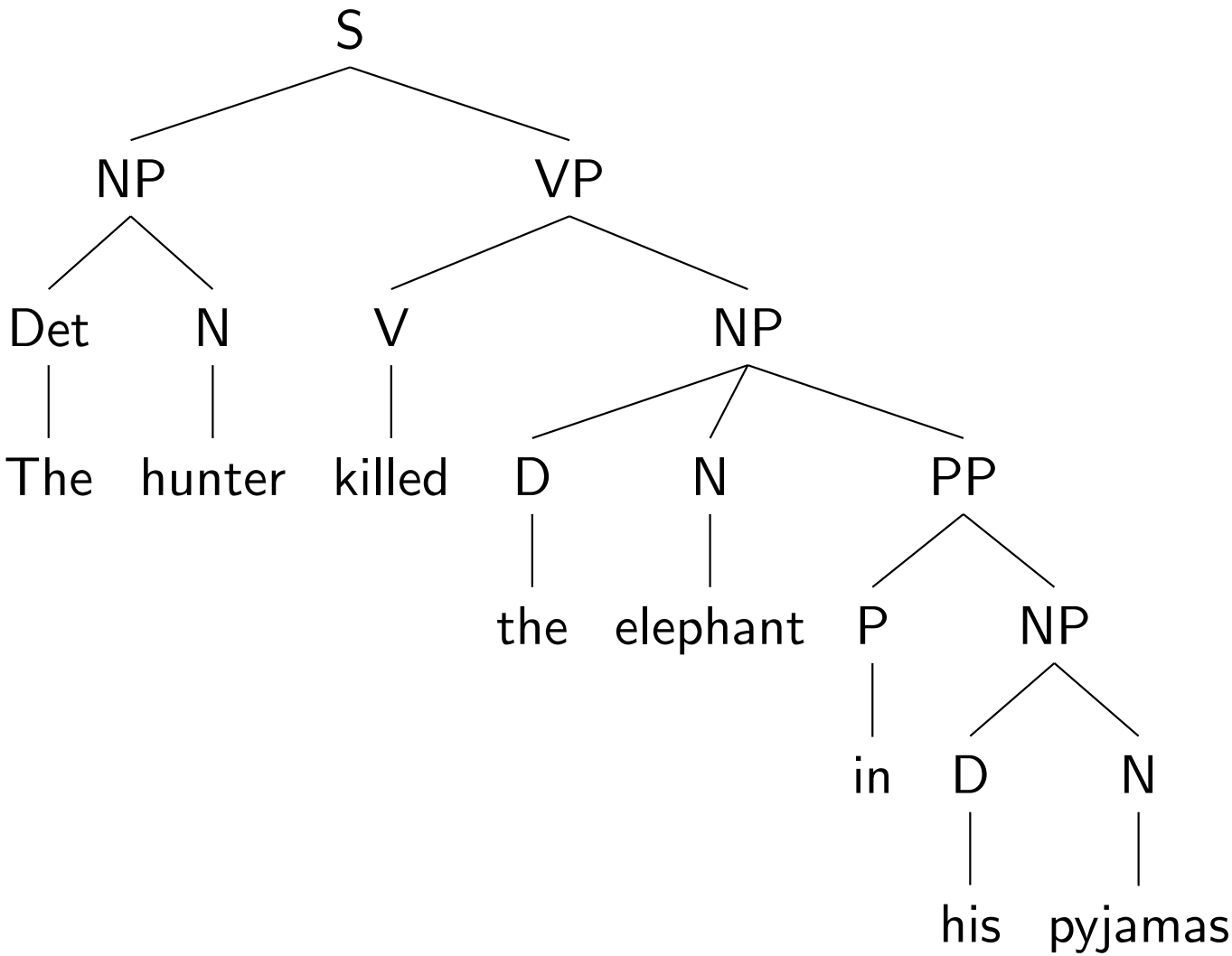


Disambiguate



CFGs

NP $\rightarrow$ (Det) (AdjP+) N (PSP) (NP+)
VP $\rightarrow$ (NP) (NP_{Adj}+) (AdvP) (NP) (AdvP) V (CP)

Parallel structures

1. pulis ne aaropi ko talaashaa
2. pulis ko aaropi ki talaash

Each of these phrases generated by different rules
Different rules, but same meaning ?

Structural similarity

It is possible that the noun version is derived from the verbal one-
Nominalize *talaash* and add *-ko* to the subject

Parallelism could also be captured structurally

[[pulis ne] [[aaropi ko] talaasha]]
[[pulis ko] [[aaropi ki] talaash]]

Parallels across syntactic categories

The soldiers destroyed the city
The soldiers' destruction of the city

Commonality in these rules

NP $\rightarrow$ (Det) (AdjP+) (NP+) N (PSP)
VP $\rightarrow$ (NP) (NP Adj) (AdvP) (NP) (AdvP) V (CP)

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NP $\rightarrow$ (Det) (AdjP+) (NP+) N (PSP)
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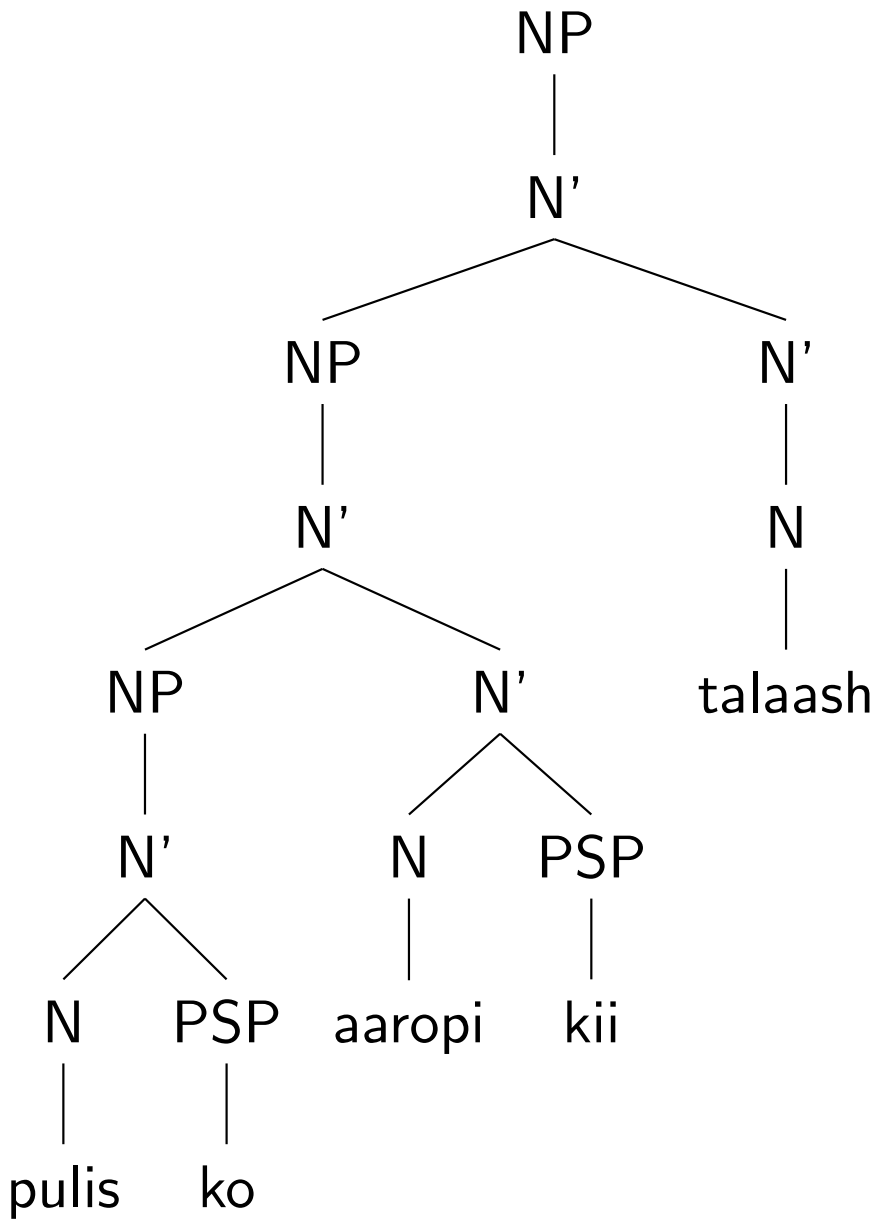
Each has a head N or V (terminal) that is compulsory
Each has several optional non-terminals

Bar nodes

Collapse all the optional non-terminals into an intermediate non-terminal: N' or $\overline{N}$

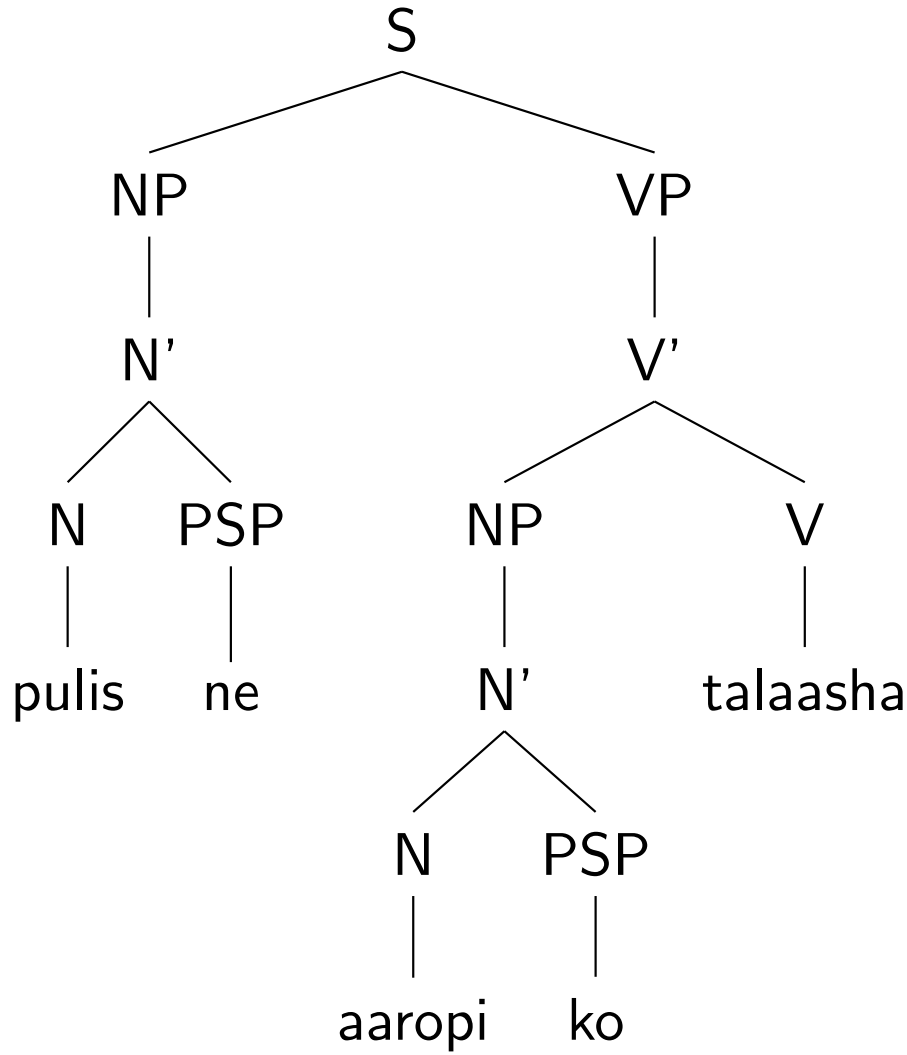
NP $\rightarrow$ (Det) N'
N' $\rightarrow$ (AdjP) N'
N' $\rightarrow$ N (PSP)

Bar nodes



Bar nodes

$VP \rightarrow V'$
$V' \rightarrow (NP)\ V$
$V' \rightarrow (NP_{Adj})\ V'$
$V' \rightarrow (AdvP)\ V'\ (AdvP)$
$V' \rightarrow V'\ (CP)$



Bar nodes

Notation

'Bar' implies the intermediate category

N' sometimes written as $\overline{N}$

The NP is also sometimes written as N''

N'' or $\overline{\overline{N}}$ = phrase level (maximal category)

N' or $\overline{N}$ = intermediate level

N = word level (head)

Evidence for more structure

1. maine neeli cover ki chemistry ki kitaab khariidii, laal cover ki ___ nahi.
2. maine neeli cover ki chemistry ki kitaab khariidii, physics ki ___ nahi.
3. maine neeli cover ki chemistry ki kitaab khariidii, laal cover ki physics ki ___ nahi.
4. *maine neeli cover ki chemistry ki kitaab khariidii, laal cover ki physics ___ nahi.

Is the missing element an N' ? Can the missing element be a N ?

Evidence for more structure

Is the missing element an N' ? Can the missing element be a N ?

1. maine [[niile cover ki] [[chemistry ki] [kitaab]]] khariidii, laal cover ki ___ nahi. (N', N)
2. maine niile cover ki chemistry ki kitaab khariidii, physics ki ___ nahi. (N', N)
3. maine niile cover ki chemistry ki kitaab khariidii, laal cover ki physics ki ___ nahi. (N)
4. *maine niile cover ki chemistry ki kitaab khariidii, laal cover ki physics ___ nahi.

Intermediate levels

The fact that N' levels can be conjoined, shows that 'flat' structures miss something
Intermediate levels are recursive
Binary branching $\rightarrow$ deep trees

Bar nodes

Rewriting CFG

NP $\rightarrow$ (Det) N'
N' $\rightarrow$ (AdjP) N'
N' $\rightarrow$ N (PSP)
VP $\rightarrow$ V'
V' $\rightarrow$ (NP) V
V' $\rightarrow$ (NP_{Adj}) V'
V' $\rightarrow$ (AdvP) V' (AdvP)
V' $\rightarrow$ V' (CP)

Common property?

The phrases have heads and they're mandatory (endocentricity)
The following rule is not possible: *NP $\rightarrow$ V AdjP

All the non-head material is optional VP $\rightarrow$ V'
V' $\rightarrow$ (NP) V
V' $\rightarrow$ (NP_{Adj}) V'
V' $\rightarrow$ (AdvP) V' (AdvP)
V' $\rightarrow$ V' (CP)

Three types of rules

-One introduces the maximal projection (NP, VP)
-One takes the bar level and repeats it
-One takes an intermediate projection and spells out the head

Use X to stand for all types of heads (V, N, Adj, Adv)
Use variables W, Y, Z for other non-terminals

✓ Take an intermediate projection and spell out the head

V' $\rightarrow$ (NP) V
N' $\rightarrow$ N (PSP)

X bar rule

X' $\rightarrow$ X (WP) or (WP) X

✓ Take the bar level and repeat it
Collapse the recursive N' rules into a single one.

N' $\rightarrow$ (AdjP) N'
V' $\rightarrow$ (NP_{Adj}) V'
V' $\rightarrow$ (AdvP) V' (AdvP)
V' $\rightarrow$ V' (CP)

X bar rule

X' $\rightarrow$ (ZP) X' or X' (ZP)

✓ Introduce the maximal projection (NP, VP)

NP $\rightarrow$ (Det) N'
VP $\rightarrow$ V'

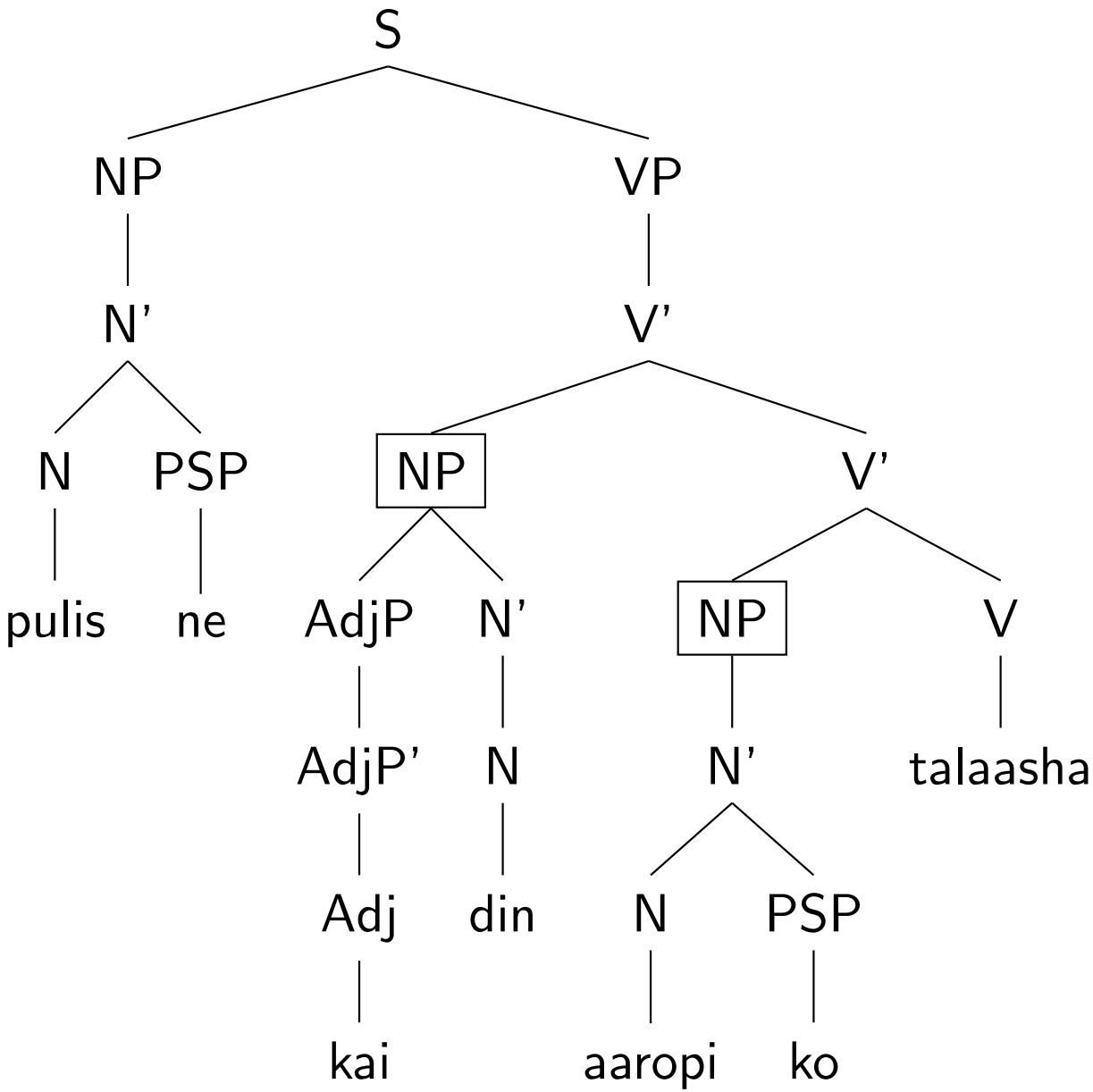
X bar rule

XP $\rightarrow$ (Y) X'

Cross-categorial X' schema

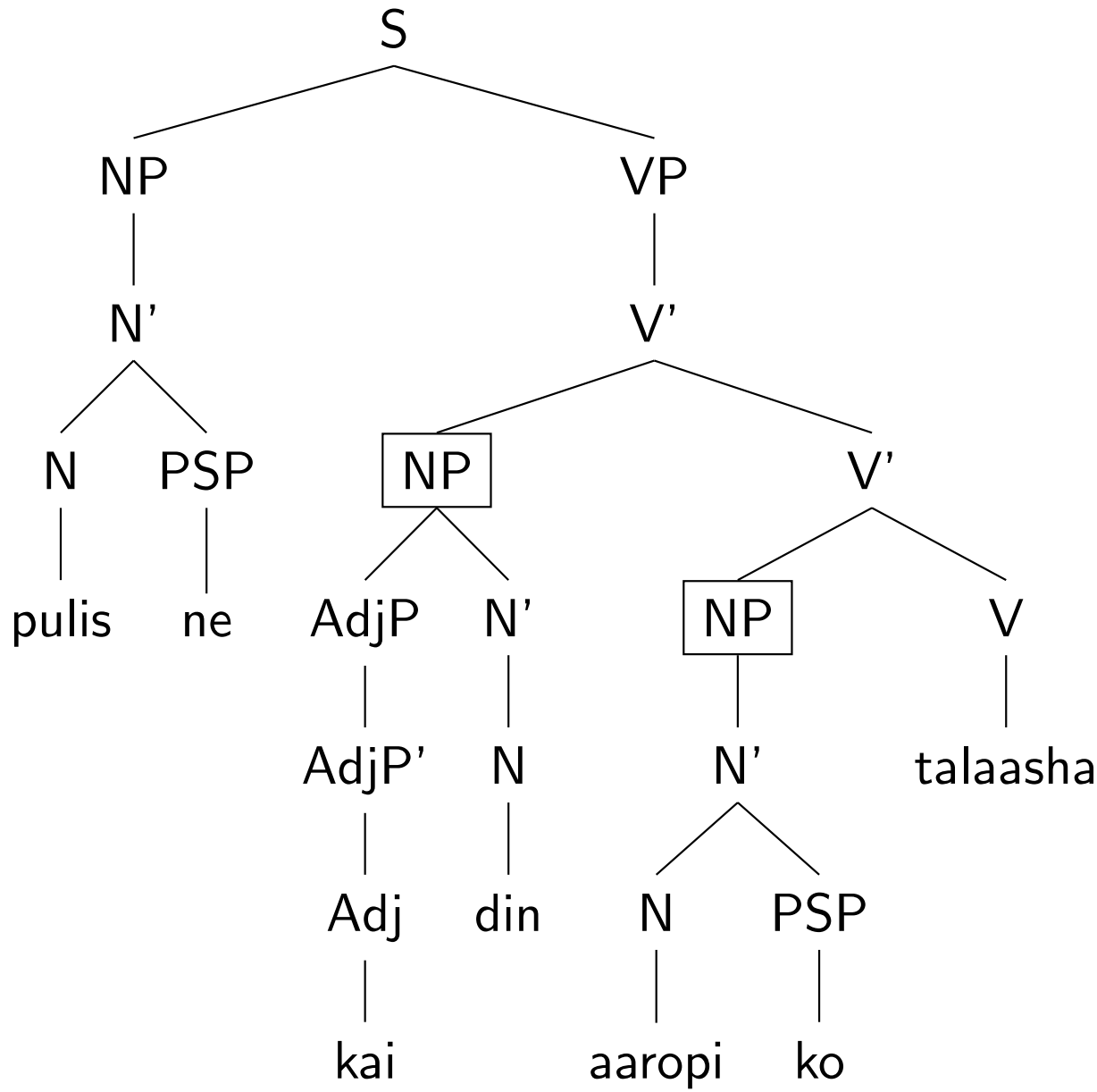
XP $\rightarrow$ (Y) X'
X' $\rightarrow$ (ZP) X' or X' (ZP)
X' $\rightarrow$ X (WP) or (WP) X

pulis ne kai din aaropi ko talaasha



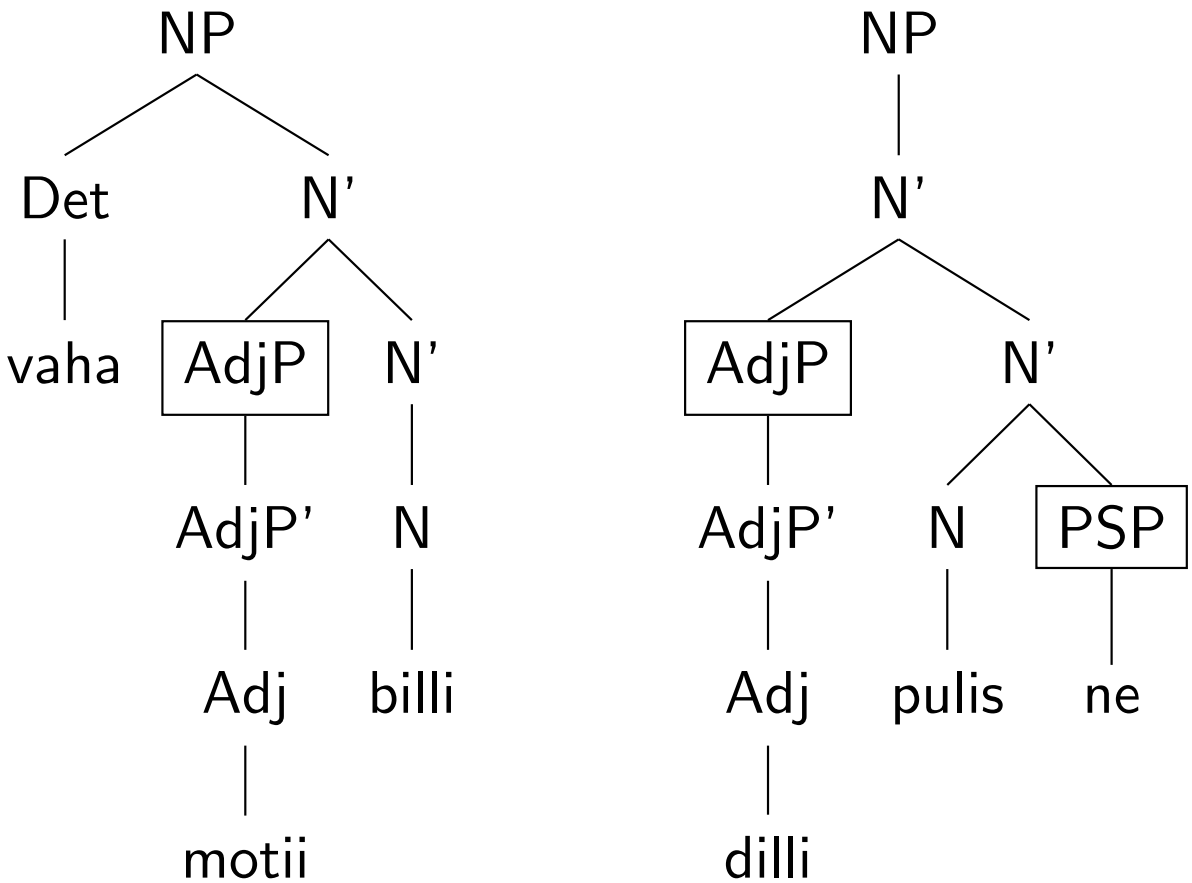
Structural relations

Sister to a bar level are adjuncts
Sister to a head are complements (arguments)



Structural relations

Similar relations may be found among noun phrases



Sister to a bar level: X' $\rightarrow$ (ZP) X' | X' (ZP)
Sisters to bar levels are adjuncts

sister to a head: X' $\rightarrow$ X (WP)
Sisters to a head are complements or arguments

Adjuncts capture some optional information
Complements capture mandatory information
However, the relations are now defined **structurally** (not just meaning)

Exercise

Identify the complement and adjunct

two books of poems with red covers
She hit the policeman several times
I have a fear of cats
I fear cats

Complements and adjuncts

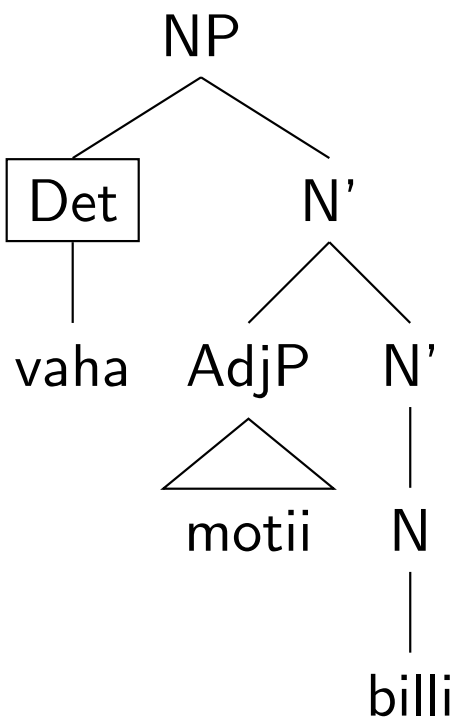
Complements usually adjacent to the head
I have a fear of cats
*I have a fear irrational of cats
I have an irrational fear of cats
I have a deep irrational fear of cats
I have an irrational, deep fear of cats
I have an irrational, deep fear of cats from childhood
*I have a deep fear of cats and from childhood
*I have a deep, irrational fear and of cats

Structurally,complements are closer to the head, adjuncts are farther away

Specifier position

NP $\rightarrow$ (Det) N'
VP $\rightarrow$ V'
The Specifier rule: XP $\rightarrow$ (Y) X'
Sometimes written as XP $\rightarrow$ (YP) X'

Specifier is a daughter of XP, and sister to X'



Specifier position

Usually at the top of the structure (and likely the leftmost element)

Cannot reorder specifiers and adjuncts

*moti vaha billi

Cannot conjoin specifiers and non-specifiers

*vaha aur moti billi

ek ya do kitabe