

# Chapter 4: Head, Complements, and Modifiers

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# Internal syntax

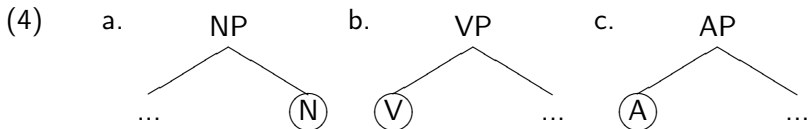
- **Internal syntax** deals with how a given phrase itself is constructed in a well-formed manner.
- Data
  - (1) a. \*John [put his gold].  
b. \*John [put under the bathtub].  
c. \*John [put his gold safe].  
d. \*John [put his gold to be under the bathtub].  
e. John [put his gold under the bathtub].

# External syntax

- concerned with the external environment in which a phrase occurs
- data
  - (2) a. This is the box in which John [put his gold]. (cf. (1a))  
b. This is the gold that John [put under the bathtub]. (cf. (1b))
  - (3) a. \*The king kept [put his gold under the bathtub].  
b. The king kept [putting his gold under the bathtub].

# Head

- one obligatory element in each phrase. That is, each phrase has one essential element as represented in the diagrams



## headedness and complements

- deciding the types of complements
  - (5) a. The defendant denied the accusation.  
b. \*The defendant denied.
  - (6) a. The teacher handed the student a book.  
b. \*The teacher handed the student.
- deciding the properties of the whole phrase
  - (7) a. They [want to leave the meeting].  
b. \*They [eager to leave the meeting].
  - (8) a. The senators [know that the president is telling a lie].  
b. \*The senators [certain that the president is telling a lie].

# Basic rule

- Basic rule
  - (9) English Declarative Sentence Rule:  
Each declarative sentence must contain a finite VP.
- data
  - (10) a. \*They [(to) be eager to leave the meeting].
  - b. \*The senators [(to) be certain that the president is telling a lie].

# modifiers

- data
- (11) a. Tom [<sub>VP</sub> [<sub>VP</sub> offered advice to his students] *in his office*].
- b. Tom [<sub>VP</sub> [<sub>VP</sub> offered advice to his students] *with love*].

## Summary

- (12) a. **Head:** A lexical or phrasal element that is essential in forming a phrase.
- b. **Complement:** A phrasal element that a head must combine with or a head select. These include direct object, indirect object, predicative complement, and oblique complement.
- c. **Modifier:** A phrasal element not selected by the verb functions as a modifier to the head phrase.
- d. **Minimal Phrase:** A minimal phrase is the phrase including this head and all of its complements.
- e. **Maximal Phrase:** A XP (VP/NP/AP) that includes complements as well as modifiers.



# Obligatoriness

- complements are strictly-required phrases whereas modifiers are not.

(13) a. John placed Kim behind the garage.

b. John kept him behind the garage.

c. \*John stayed Kim behind the garage.

(14) a. \*John placed him busy.

b. John kept him busy.

c. \*John stayed him busy.

(15) a. \*John placed behind the counter.

b. \*John kept behind the counter.

c. John stayed behind the counter.

- modifiers are optional.

(16) a. John deposited some money in the bank.

b. John deposited some money in the bank on Friday.

# Iterability

- In general two or more instances of the same modifier type can occur with the same head, but this is impossible for complements.

- (17) a. \*The UN blamed global warming [on humans] [on natural causes].
- b. Kim and Sandy met [in Seoul] [in the lobby of the Lotte Hotel] in March.

## do-so test

- We can use *do the same thing* to avoid repetition of an identical VP expression:
  - (18) a. John deposited some money in the checking account and Mary did the same thing (too).
  - b. John deposited some money in the checking account on Friday and Mary did the same thing (too).
- this VP can replace only the minimal phrase, leaving out the modifier.
  - (19) John deposited some money in the checking account on Friday and Mary did the same thing on Monday.

## do-so test

- if something can be replaced by *do the same thing*, then it is either a minimal or a maximal phrase. This in turn means that this 'replacement' VP cannot be understood to leave out any complement(s).
- (20) a. \*John [deposited some money in the checking account] and Mary did the same thing in the savings account.
- b. \*John [gave a present to the student] and Mary did the same thing to the teacher.

## do-so replacement rule

- Rule

- (21) *Do-so Replacement Condition:*  
The phrase *do so* or *do the same thing* can replace a verb phrase which includes at least any complements of the verb.
- (22) a. \*John locked Fido in the garage and Mary did so in the room.  
b. \*John ate a carrot and Mary did so a radish.

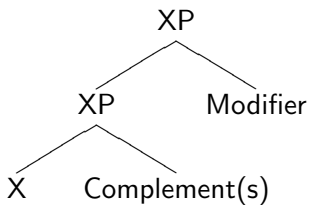
## constance of semantic contribution

- An adjunct can cooccur with a relatively broad range of heads whereas a complement is typically limited in its distribution.
- (23) a. Kim camps/jogs/mediates on the hill.  
b. Kim jogs on the hill/under the hill/over the hill.
- (24) a. Kim depends/relies on Sandy.  
b. Kim depends on Sandy/\*at Sandy/\*for Sandy.

## structural difference

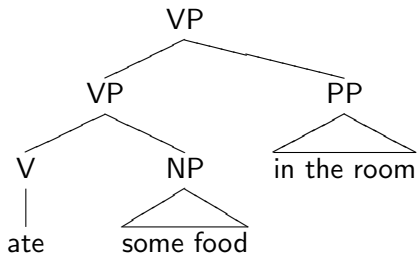
- complements combine with a lexical head (not a phrase) to form a minimal phrase whereas modifiers combine with a phrase to form a maximal phrase.

(25)

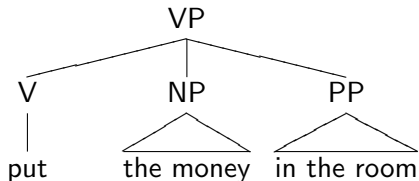


## structural contrast

(26) a.



b.





## ordering difference

- As a complement needs to combine with a lexical head first, modifiers follow complements:

- (27) a. John met [a student] [in the park].  
b. \*John met [in the park] [a student].

A similar contrast can be observed in the following contrast:

- (28) a. the student [of linguistics] [with long hair]  
b. \*the student [with long hair] [of linguistics]

## PS rules

- (29) a.  $S \rightarrow NP VP$   
 b.  $NP \rightarrow Det AdjP^* N$   
 c.  $VP \rightarrow V (NP) (VP)$   
 d.  $VP \rightarrow V NP AP$   
 e.  $VP \rightarrow V NP NP$   
 f.  $VP \rightarrow V S$   
 g.  $AP \rightarrow A VP$   
 h.  $PP \rightarrow P NP$   
 i.  $VP \rightarrow Adv VP$

## Two problems

- endocentricity

(30) a. VP  $\rightarrow$  P NP  
 b. NP  $\rightarrow$  PP S

- redundancy

(31) a. \*The problem disappeared the accusation.  
 b. The problem disappeared.

(32) a. \*The defendant denied.  
 b. The defendant denied the accusation.

(33) a. \*The boy gave the book.  
 b. The boy gave the baby the book.

## more on the redundancy

- (34) a. disappear: IV, \_\_  
 b. deny: TV, \_\_ NP  
 c. give: DTV, \_\_ NP NP
- (35) a. VP → IV  
 b. VP → TV NP  
 c. VP → DTV NP NP

## more on redundancy

- A similar issue of redundancy arises in accounting for subject-verb agreement:

- (36) a. The bird devours the worm.  
 b. The birds devour the worm.

- (37) a.  $S \rightarrow NP_{singular} VP_{singular}$  (for (36)a)  
 b.  $S \rightarrow NP_{plural} VP_{plural}$  (for (36)b)

## intermediate category

- intermediate category

(38) a. Every photo of Max and sketch by his students appeared in the magazine.

b. No photo of Max and sketch by his students appeared in the magazine.

(39) \*Sketch by his students appeared in the magazine.

(40) a. Every [[photo of Max] and [sketch by his students]] appeared in the magazine.

b. No [[photo of Max] and [sketch by his students]] appeared in the magazine.

## specifier

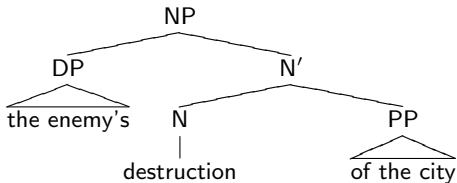
- The complementary notion that we introduce at this point is 'specifier' (SPR), which can include the words just mentioned as well as phrases, as we illustrate in (41):

(41) a. [the enemy's] [<sub>N'</sub> destruction of the city]  
 b. [The enemy] [<sub>VP</sub> destroyed the city].

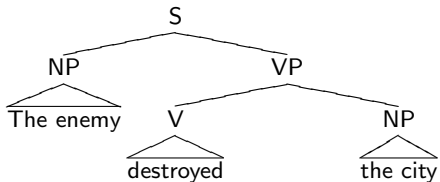
(42) a. *a* little dog, *the* little dogs (indefinite or definite article)  
 b. *this* little dog, *those* little dogs (demonstrative)  
 c. *my* little dogs, *their* little dog (possessive adjective)  
 d. *every* little dog, *each* little dog, *some* little dog, *either* dog, *no* dog (quantifying)  
 e. *my friend's* little dog, *the Queen of England's* little dog (possessive phrase)

## NP vs. S

(43)



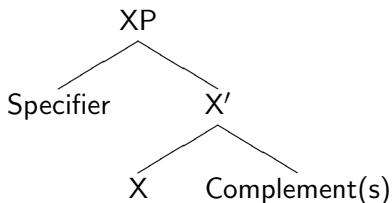
(44)





## X' Schema

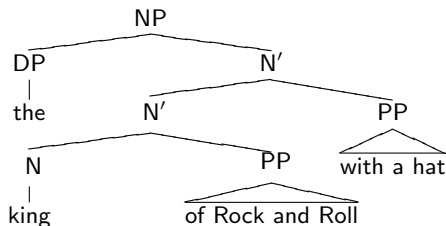
(45)

(46) a.  $XP \rightarrow \text{Specifier}, X'$  (Head-Specifier Rule)b.  $XP \rightarrow X, YP^*$  (Head-Complement Rule)(47)  $XP \rightarrow \text{Modifier}, X'$  (Head-Modifier Rule)

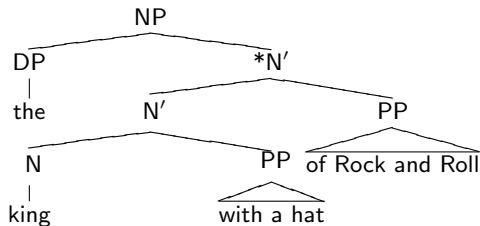
## NP structure

- (48) a. the king [of Rock and Roll] [with a hat]  
 b. \*the king [with a hat] [of Rock and Roll]

(49) a.



b.

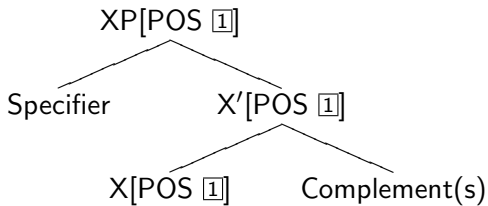


## support for N'

- (50) a. The present king of country music is more popular than the last *one*.
- b. \*The king of Rock and Roll is more popular than the *one* of country music.
- (51) A: Which student were you talking about?
- B: The one with long hair.
- B: \*The one of linguistics with long hair.

# X' Schema with a feature

(52)



(53)

$$XP \rightarrow \text{Specifier}[\text{NUMBER } \boxed{1}], X'[\text{NUMBER } \boxed{1}]$$

# lexical information

- (54) Minimal Lexical Information for *puts*:
- phonological information: <puts>
  - syntactic information: verb, finite, 3rd singular
  - argument information: <agent<sub>*i*</sub>, theme<sub>*j*</sub>, location<sub>*k*</sub>>
  - semantic information:  $put'(i,j,k)$

# feature structure

Each feature structure is an attribute-value matrix (AVM):

$$(55) \quad \begin{bmatrix} \text{Attribute1} & \textit{value1} \\ \text{Attribute2} & \textit{value2} \\ \text{Attribute3} & \textit{value3} \\ \dots & \dots \end{bmatrix}$$

$$(56) \quad \begin{bmatrix} \text{Attribute1} & \textit{atomic} \\ \text{Attribute2} & \langle \quad \rangle \\ \text{Attribute3} & \{ \quad \} \\ \text{Attribute4} & [\dots] \end{bmatrix}$$

## typed feature structure

(57) a.  $\left[ \begin{array}{l} \textit{university} \\ \text{NAME } \textit{kyunghee } \textit{univ.} \\ \text{LOCATION } \textit{seoul} \end{array} \right]$

b. \*  $\left[ \begin{array}{l} \textit{university} \\ \text{NAME } \textit{kyunghee } \textit{univ.} \\ \text{MAJOR } \textit{linguistics} \end{array} \right]$

(58)  $\left[ \begin{array}{l} \textit{author} \\ \text{NAME } \quad \textit{kim} \\ \text{SONS } \quad \langle \textit{Edward}, \textit{Richard} \rangle \\ \text{HOBBIES } \quad \{ \textit{swimming}, \textit{jogging}, \textit{reading}, \dots \} \\ \text{ADVANCED-DEGREE } \quad \left[ \begin{array}{l} \text{FIELD } \textit{linguistics} \\ \text{AREA } \textit{syntax-semantics} \\ \text{YEAR } \textit{1996} \end{array} \right] \end{array} \right]$

# structure sharing

(59)

$$\left[ \begin{array}{l} \textit{individual} \\ \text{NAME} \quad \textit{kim} \\ \text{TEL} \quad \boxed{1} \\ \text{SONS} \quad \left\langle \left[ \begin{array}{l} \textit{individual} \\ \text{NAME} \textit{richard} \\ \text{TEL} \boxed{1} \end{array} \right], \left[ \begin{array}{l} \textit{individual} \\ \text{NAME} \textit{edward} \\ \text{TEL} \boxed{1} \end{array} \right] \right\rangle \end{array} \right]$$



# subsumption

The subsumption relation concerns the relationship between a feature structure with general information and one with more specific information. In such a case, the general one subsumes the specific one.

$$(60) \quad A: \left[ \begin{array}{l} \textit{individual} \\ \text{NAME } \textit{kim} \end{array} \right] \sqsupseteq B: \left[ \begin{array}{l} \textit{individual} \\ \text{NAME } \textit{kim} \\ \text{TEL } \textit{961-0892} \end{array} \right]$$

# unification

Feature unification means that two compatible feature structures are unified, conveying more coherent and rich information.

$$(61) \quad \begin{bmatrix} \textit{individual} \\ \text{NAME } \textit{kim} \end{bmatrix} \sqcup \begin{bmatrix} \textit{individual} \\ \text{TEL } \textit{961-0892} \end{bmatrix} \rightarrow$$

$$\begin{bmatrix} \textit{individual} \\ \text{NAME } \textit{kim} \\ \text{TEL } \textit{961-0892} \end{bmatrix}$$

# incompatible unification

$$(62) \quad \left[ \begin{array}{l} \textit{individual} \\ \text{NAME } \textit{edward} \end{array} \right] \sqcup \left[ \begin{array}{l} \textit{individual} \\ \text{NAME } \textit{richard} \end{array} \right] \not\rightarrow$$

$$* \left[ \begin{array}{l} \textit{individual} \\ \text{NAME } \textit{edward} \\ \text{NAME } \textit{richard} \end{array} \right]$$

## feature structure of a linguistic expression

(63)

<i>verb</i>									
PHON	⟨ <i>puts</i> ⟩								
SYN	<table style="border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">POS</td> <td style="padding-left: 10px;"><i>verb</i></td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">VFORM</td> <td style="padding-left: 10px;"><i>fin</i></td> </tr> </table>	POS	<i>verb</i>	VFORM	<i>fin</i>				
POS	<i>verb</i>								
VFORM	<i>fin</i>								
ARG-ST	⟨ <i>[agt]<sub>i</sub>, [th]<sub>j</sub>, [loc]<sub>k</sub></i> ⟩								
SEM	<table style="border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">PRED</td> <td style="padding-left: 10px;"><i>put-relation</i></td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">AGENT</td> <td style="padding-left: 10px;"><i>i</i></td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">THEME</td> <td style="padding-left: 10px;"><i>j</i></td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">LOCATION</td> <td style="padding-left: 10px;"><i>k</i></td> </tr> </table>	PRED	<i>put-relation</i>	AGENT	<i>i</i>	THEME	<i>j</i>	LOCATION	<i>k</i>
PRED	<i>put-relation</i>								
AGENT	<i>i</i>								
THEME	<i>j</i>								
LOCATION	<i>k</i>								

## argument structure

- (64) a.  $\left[ \text{ARG-ST} \langle [ \quad ] \rangle \right]$   
 b.  $\left[ \text{ARG-ST} \langle [ \quad ], [ \quad ] \rangle \right]$   
 c.  $\left[ \text{ARG-ST} \langle [ \quad ], [ \quad ], [ \quad ] \rangle \right]$

# Argument structure and argument realization

Each element on the ARG-ST list is realized as SPR (specifier) or COMPS (complements):

- (65)      Argument Realization Constraint (ARC):  
            The first element on the ARG-ST list is realized as SPR, the rest as COMPS in syntax.
- (66) a.    John put the book in the box.  
      b.    \*John put in the box.  
      c.    \*In the box put John the book.  
      d.    #The book put John in the box.

## examples

$$(67) \quad \left[ \begin{array}{l} \text{VAL} \quad \left[ \begin{array}{l} \text{SPR} \quad \langle \boxed{1}\text{NP} \rangle \\ \text{COMPS} \quad \langle \boxed{2}\text{NP}, \boxed{3}\text{PP} \rangle \end{array} \right] \\ \text{ARG-ST} \quad \langle \boxed{1}, \boxed{2}, \boxed{3} \rangle \end{array} \right]$$

$$(68) \quad * \left[ \begin{array}{l} \text{VAL} \quad \left[ \begin{array}{l} \text{SPR} \quad \langle \boxed{3}\text{PP} \rangle \\ \text{COMPS} \quad \langle \boxed{1}\text{NP}, \boxed{2}\text{NP} \rangle \end{array} \right] \\ \text{ARG-ST} \quad \langle \boxed{1}, \boxed{2}, \boxed{3} \rangle \end{array} \right]$$

## different realizations

Notice that the arguments can be realized into different categories, depending on the properties of the given verb:

- (69) a. The election results surprised everybody.  
 b. That he won the election surprised everybody.

- (70) a. 
$$\left[ \begin{array}{l} \text{VAL} \quad \left[ \begin{array}{l} \text{SPR} \langle \boxed{1}\text{NP} \rangle \\ \text{COMPS} \langle \boxed{2}\text{NP} \rangle \end{array} \right] \\ \text{ARG-ST} \quad \langle \boxed{1}, \boxed{2} \rangle \end{array} \right]$$
- b. 
$$\left[ \begin{array}{l} \text{VAL} \quad \left[ \begin{array}{l} \text{SPR} \langle \boxed{1}\text{CP} \rangle \\ \text{COMPS} \langle \boxed{2}\text{NP} \rangle \end{array} \right] \\ \text{ARG-ST} \quad \langle \boxed{1}, \boxed{2} \rangle \end{array} \right]$$



# intransitives

- (71) a. John disappeared.  
 b. \*John disappeared Bill.

- (72) a. John sneezed.  
 b. \*John sneezed the money.

- (73) 
$$\left[ \begin{array}{ll} \langle \textit{disappear} \rangle & \\ \text{SPR} & \langle \boxed{1} \text{NP} \rangle \\ \text{COMPS} & \langle \quad \rangle \\ \text{ARG-ST} & \langle \boxed{1} \rangle \end{array} \right]$$

## linking verbs

- (74) a. The president looked [weary].  
 b. The teacher became [tired of the students].  
 c. The lasagna tasted [scrumptious].  
 d. John remained [somewhat calm].  
 e. The jury seemed [ready to leave].
- (75) a. John became a success.  
 b. John seemed a fool.  
 c. John remained a student.

(76)

[	⟨	<i>become</i>	⟩	]
	SPR	⟨	[1]NP	⟩
	COMPS	⟨	[2]XP[PRD +]	⟩
	ARG-ST	⟨	[1], [2]	⟩

## transitive

- (77) a. John saw Fred.  
 b. Alice typed the letter.  
 c. Clinton supported the health care bill.  
 d. Raccoons destroyed the garden.

(78) 
$$\left[ \begin{array}{l} \langle \textit{destroy} \rangle \\ \text{SPR} \quad \langle \boxed{1} \text{NP} \rangle \\ \text{COMPS} \quad \langle \boxed{2} \text{NP} \rangle \\ \text{ARG-ST} \quad \langle \boxed{1}, \boxed{2} \rangle \end{array} \right]$$

## ditransitive

- (79) a. The school board leader asked a question of the students.  
 b. The parents bought non-fiction novels for the children.  
 c. John taught English Syntax to new students.

- (80) 
$$\left[ \begin{array}{ll} \langle \textit{teach} \rangle & \\ \text{SPR} & \langle \boxed{1}\text{NP} \rangle \\ \text{COMPS} & \langle \boxed{2}\text{NP}, \boxed{3}\text{PP} \rangle \\ \text{ARG-ST} & \langle \boxed{1}, \boxed{2}[\textit{theme}], \boxed{3}[\textit{goal}] \rangle \end{array} \right]$$

## related constructions

(81) 
$$\left[ \begin{array}{ll} \langle \textit{teach} \rangle & \\ \text{SPR} & \langle \boxed{1}\text{NP} \rangle \\ \text{COMPS} & \langle \boxed{3}\text{NP}, \boxed{2}\text{NP} \rangle \\ \text{ARG-ST} & \langle \boxed{1}, \boxed{2}[\textit{theme}], \boxed{3}[\textit{goal}] \rangle \end{array} \right]$$

- (82) a. The school board leader asked the students a question.  
 b. The parents bought the children non-fiction novels.  
 c. John taught new students English Syntax.

# complex transitive

- (83) a. John regards Bill as a good friend.  
 b. The sexual revolution makes some people uncomfortable.  
 c. Ad agencies call young people Generation X-ers.  
 d. Historians believe FDR to be our most effective president.

- (84) 
$$\left[ \begin{array}{ll} \langle \textit{call} \rangle & \\ \text{SPR} & \langle \boxed{1}\text{NP} \rangle \\ \text{COMPS} & \langle \boxed{2}\text{NP}, \boxed{3}\text{XP} \rangle \\ \text{ARG-ST} & \langle \boxed{1}, \boxed{2}, \boxed{3}[\text{PRD } +] \rangle \end{array} \right]$$

## other types

- (85) a. \*John carried to the door.  
 b. \*John carried her.  
 c. John carried her on his back.

(86)

<i>carry</i>	
SPR	⟨ <b>1</b> NP⟩
COMPS	⟨ <b>2</b> NP, <b>3</b> PP⟩
ARG-ST	⟨ <b>1</b> [ <i>agt</i> ], <b>2</b> [ <i>th</i> ], <b>3</b> [ <i>loc</i> ]⟩