Psycholinguistics: Syntax II

9.59; 24.905

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Syntax lectures

1. Lecture 1
   1. Parts of speech
   2. Constituent structure
   3. **Argument structure** of words

2. Lecture 2
   1. Argument structure of words (continued)
   2. Cross-linguistic word order differences
   3. Arguments vs. Modifiers: **X-bar theory**
   4. The categories Infl and Comp
   5. Constructions
      1. Yes-no questions
      2. Wh-questions
      3. Topicalization
      4. Relative clauses
      5. Passive

Argument structure:
Word-dependent phrase structure

VP expansion rules depend on the verb involved:

Philip will buy the books.   (buy: VP ➜ V NP)

* Philip will sleep the books. (sleep: VP ➜ V)

* Philip will put the books.   (put: VP ➜ V NP PP)

* Philip will say the books.   (say: VP ➜ V CP)

Rules involving a word-level category (e.g., Verb, Noun, etc.) depend on the word involved.

Categories other than verbs also have argument structures

- Nouns:

  Compare the noun "destruction" with its verbal form "destroy":

  The guitarists destroyed the hotel room.

  the guitarists' destruction of the hotel room

  destroy:
  subject: NP, agent
  complements: NP, patient

  destruction:
  subject: NP, agent (optional)
  complements: PP (of), patient (optional)

Categories other than verbs also have argument structures

- Nouns:

  governor, mayor, president:
  complements: PP (of), theme (optional)

  the governor of California
  the mayor of Boston
  the president of IBM

Categories other than verbs also have argument structures

- Prepositions:

  in, near, beside, …:
  complements: NP, location

  to:
  complements: NP, goal

Categories other than verbs also have argument structures

- Adjectives:

  proud:
  complements: PP (of), theme

  "proud of Mary"

  When adjectives don't have complements, they are often modifiers of noun phrases.

  the proud woman
  the tall man

Categories other than verbs also have argument structures

- Complementizers (Comp):

  that, whether:
  complements: an Infl phrase (IP), no role

  "John thinks that Mary is intelligent."

Modifier : A phrase that is dependent on the head, but is not semantically required by the head. A modifier is category-general, not word-specific.

Two kinds of dependents:

Arguments (In English: leftward: **specifier**; rightward: **complements**)

Modifiers

E.g., temporal and locative phrases are usually optional (not required to make a grammatical sentence), and they can occur with all verbs, and so they are therefore **modifiers**.

Philip will buy the books at the Coop on Tuesday.

"at the Coop" (location) and "on Wednesday" (time) are modifiers.

Differences in complement-head word-order across languages

Languages vary with respect to the order of heads and complements (objects).

(They also can vary with respect to the order of heads and subjects, but subjects usually come before their heads.)

head-first with respect to complements: English, Spanish, French, Chinese etc.

head-final with respect to complements: Japanese, Korean, Turkish, Hindi etc.

One parameter of cross-linguistic variation: Head-first and Head-final complement order rules

Head-first rules:

VP ➤ V NP

VP ➤ V NP PP

VP ➤ V CP

PP ➤ Prep NP

CP ➤ Comp IP

**Head-final rules:**

VP ➤ NP V

VP ➤ PP NP V

VP ➤ CP V

PP ➤ NP Prep

CP ➤ IP Comp

Other parameters of cross-linguistic variation

- Subject-verb word order (IP➜ NP VP vs. IP➜ VP NP)

- Fronted Wh-words or in-situ (non-moved)

- Verb-second (Dutch, Swedish, German)

- Scrambling of objects

English phrase structure for "John saw Susan."

```
                    IP
                   /  \
                 NP    VP
                 |    /  \
               Noun Verb  NP
                 |    |    |
               John  saw  Noun
                           |
                         Susan
```
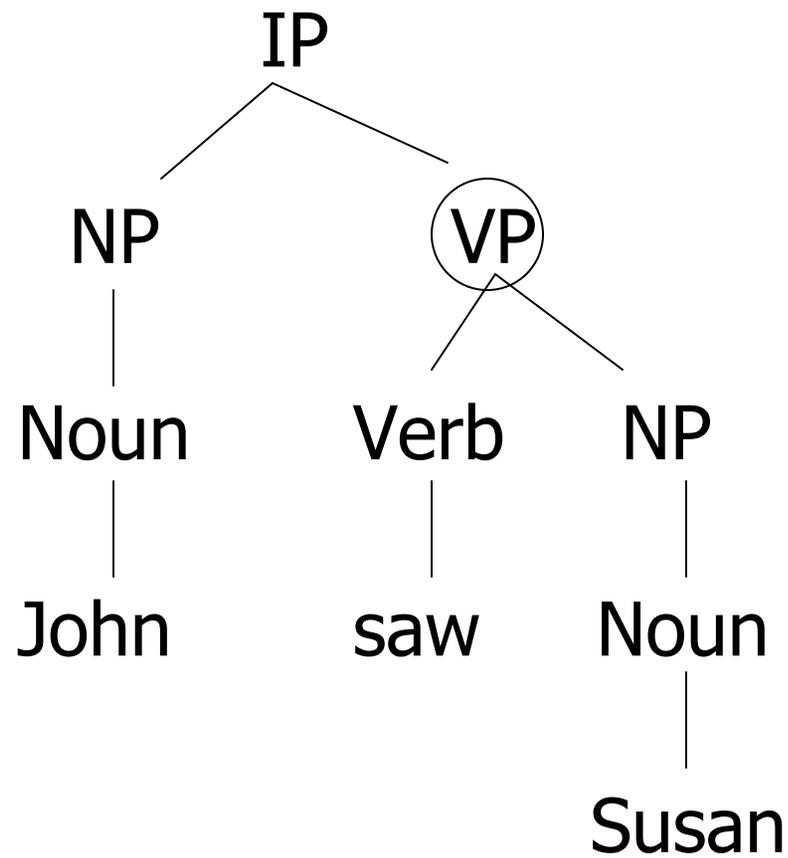
Japanese phrase structure for "John saw Susan."
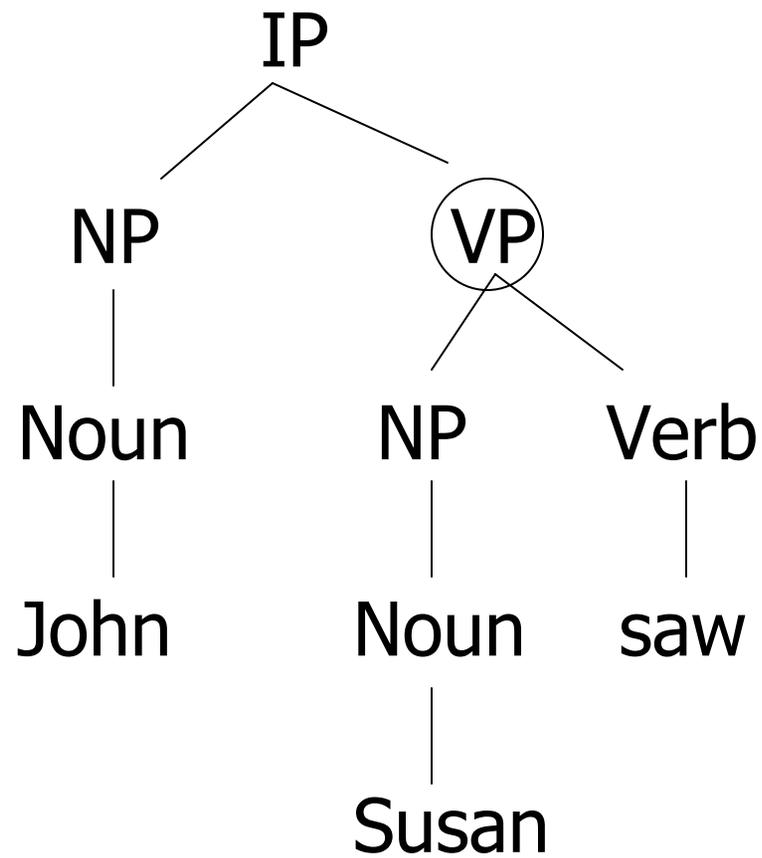
English phrase structure for "John said that Susan gave books to Mary."
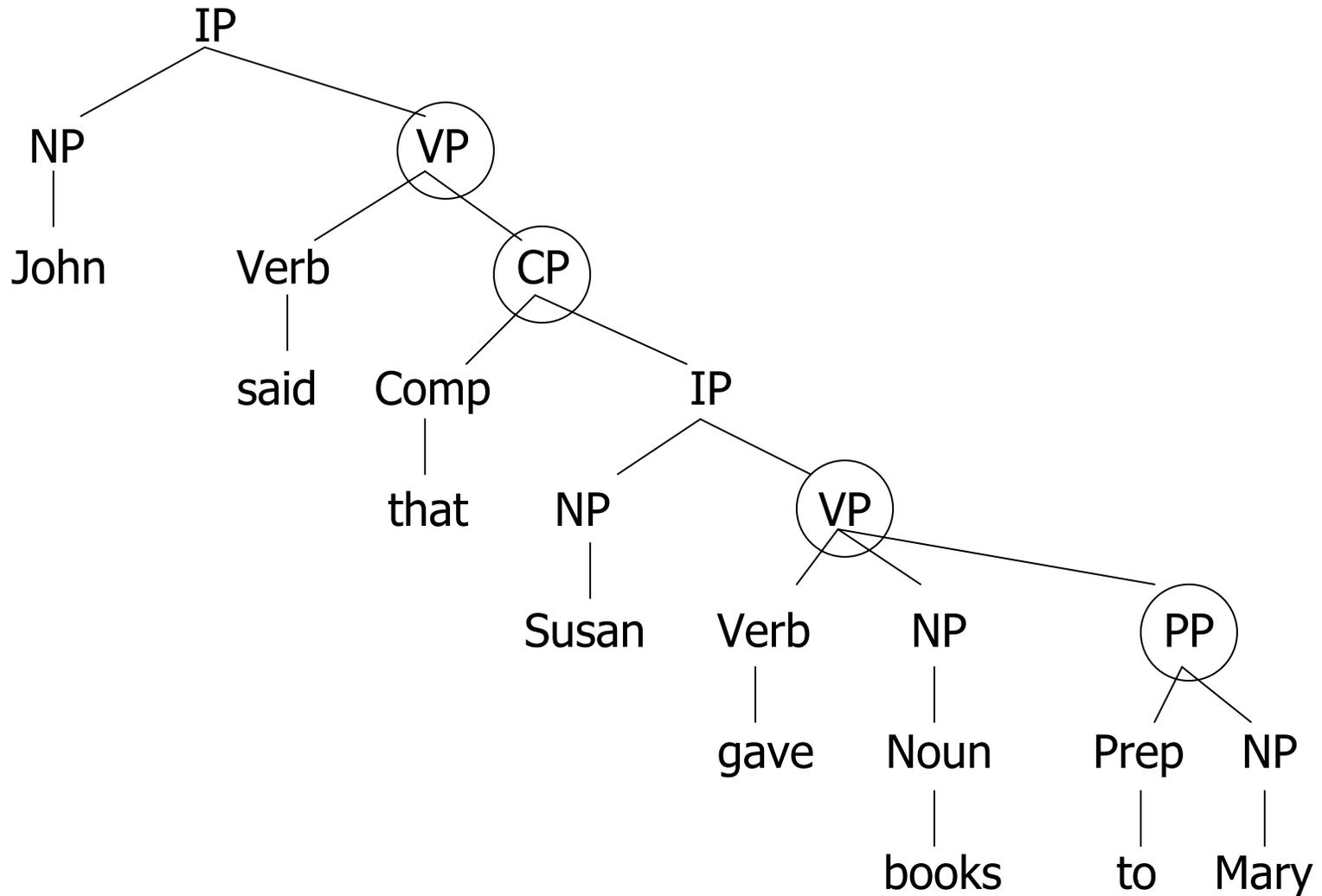
Japanese phrase structure for a sentence with the same meaning

IP
- NP
  - John
- VP
  - CP
    - IP
      - NP
        - Susan
      - VP
        - PP
          - NP
            - Mary
          - Prep
            - to
        - NP
          - Noun
            - books
        - Verb
          - gave
    - Comp
      - that
  - Verb
    - said
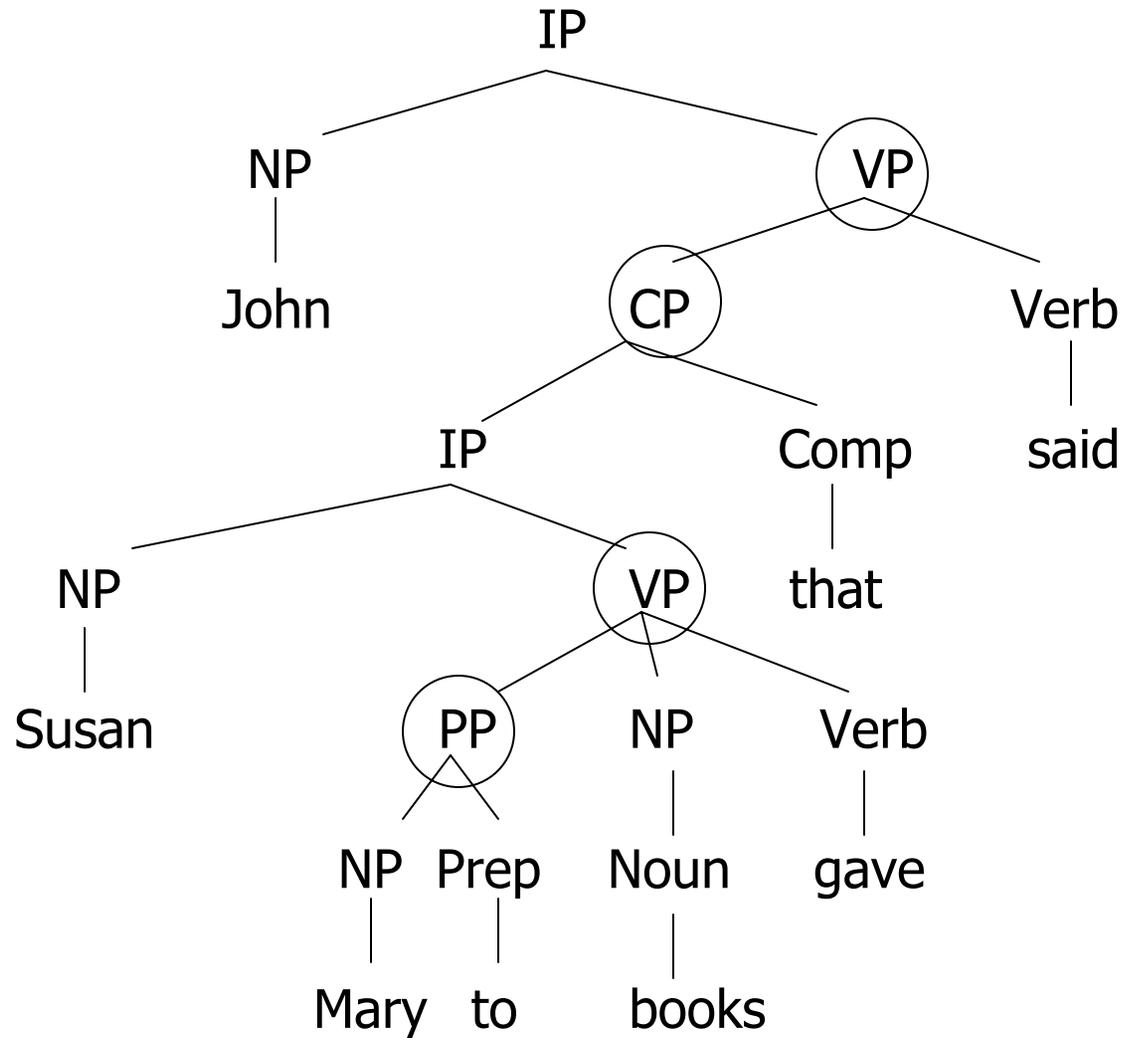
Japanese word order for the English sentence "John said that Susan gave books to Mary."

- "John Susan Mary to books gave that said."

X-bar Theory

X-bar theory is notation for specifiers, complements and modifiers: The category structure for all syntactic categories.

Generalization: all complements come on the same side of the head in a particular language, and usually inside the modifiers.

The specifiers and complements for a word are determined by the particular properties of the word.

The modifier properties are category-general.

X-bar Theory

The structure of an X-bar category for **arguments only** (assuming English word order):

```
                    XP
                 /      \
              YP          X'
           specifier     /|\ \
                        / | \  \
                       X  WP ZP  ...
                      head  complements
```
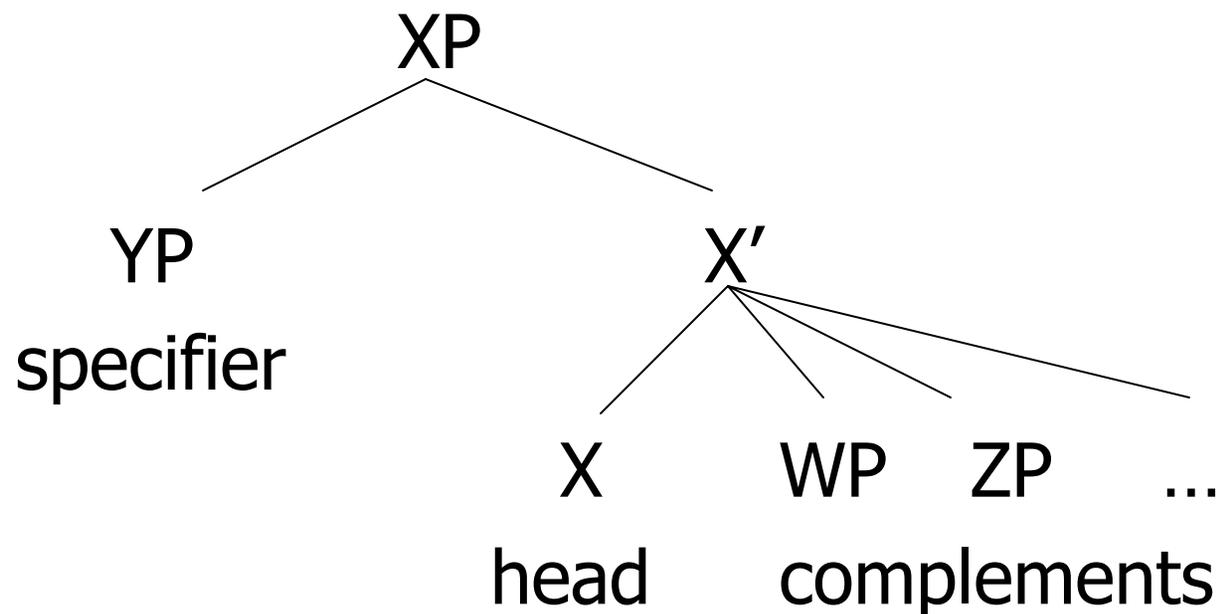
X-bar Theory

There are 3 distinct levels of phrase structure for a category:

1. The head: X or X0

2. The one-bar projection X', below which the complements (if there are any)

3. The phrasal or maximal projection XP, below which the specifier (if there is one) is attached

X-bar Theory

Complement rule:

X' → X ZP*

for each ZP which is a complement of the head X

Examples:

"buy": V' → V NP

"sleep": V' → V

"put": V' → V NP PP

"think": V' → V CP

"in": P' → P NP

X-bar complement structure

```
        V′                              V′
       /  \                             |
      V    NP                           V
      |    /\                           |
     buy  /  \                        sleep
         the book
```

```
              V′
           /  |  \
          /   |    \
         V    NP     CP
         |    |     /\
         |    |    /  \
        tell John that the dog ate the cheese
```

X-bar complement structure

V′
- V
  - put
- NP
  - the book
- PP
  - on the table

V′
- V
  - transfer
- NP
  - the money
- PP
  - from the savings account
- PP
  - to the checking account
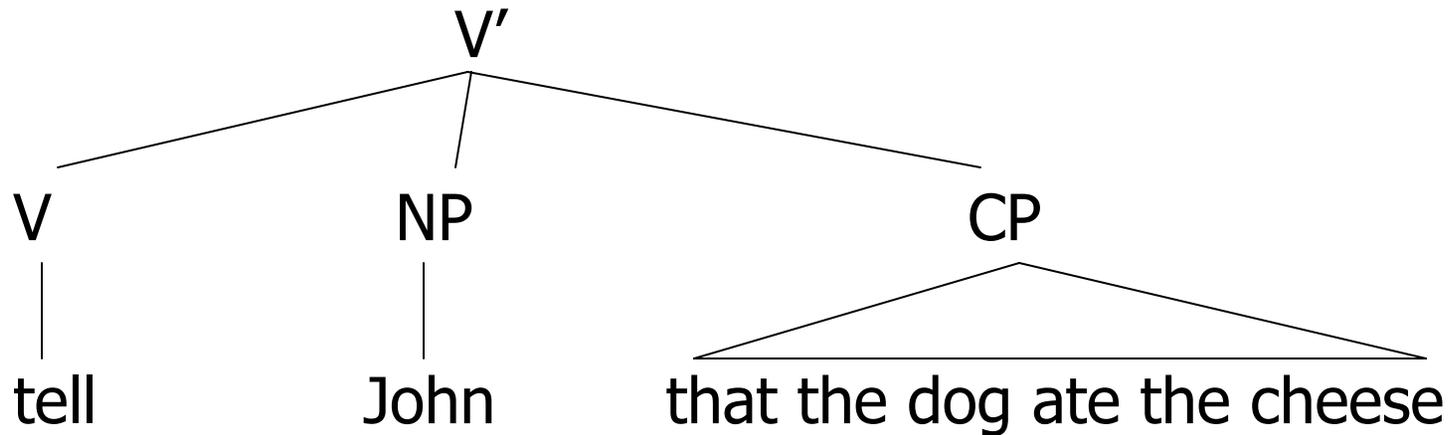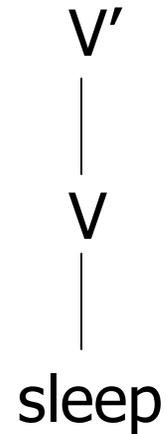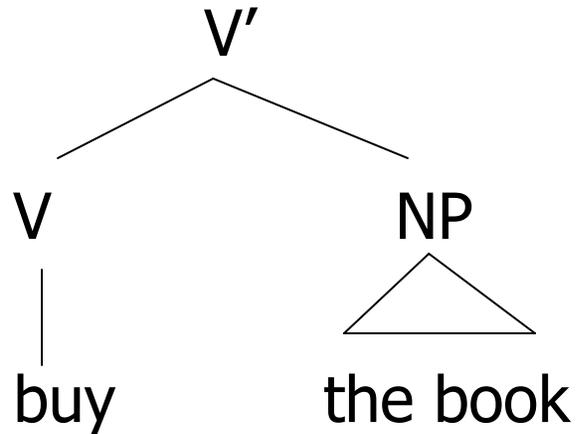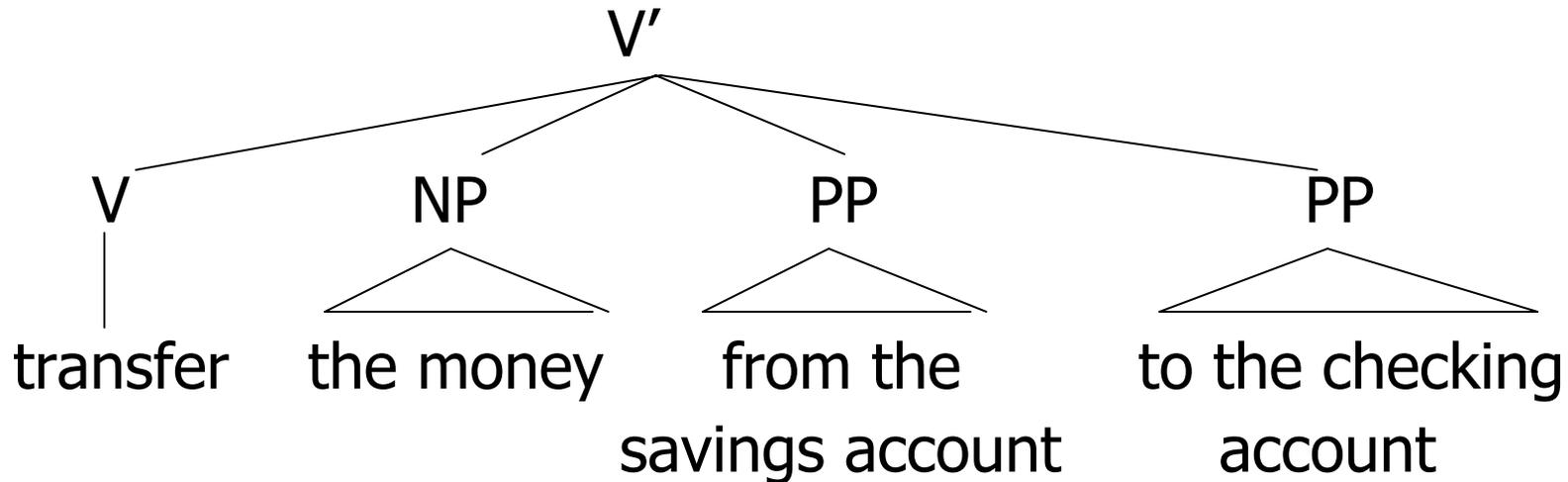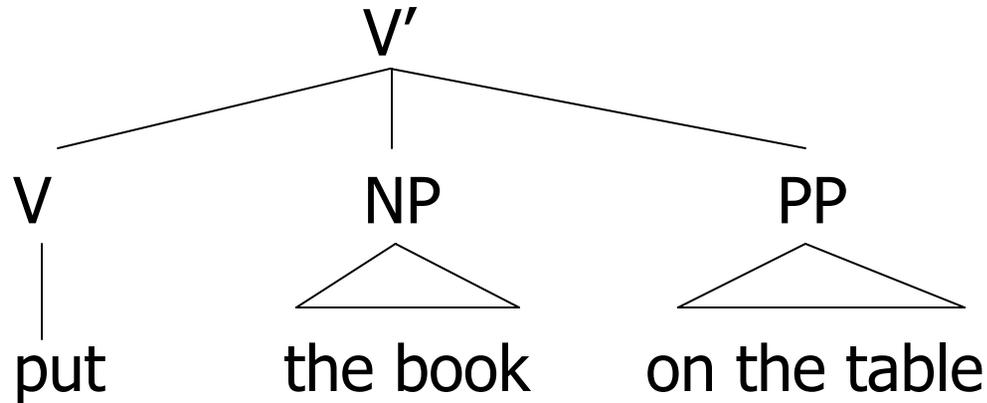
X-bar Theory

Specifier rule:

XP → YP X′

for YP a specifier (subject) of the head X

Examples:

NP → DetP N′

IP → NP I′

CP → NP C′

X-bar Theory: Modifiers

Modifiers: No limit to the number of modifiers of a particular kind.

Modifiers are assumed to **adjoin** to the X' or XP level.

Post-head modifier rules, for a modifier YP:

X' → X' YP

XP → XP YP

Pre-head modifier rules, for a modifier YP :

X' → YP X'

XP → YP XP

X-bar Theory

The structure of an X-bar category, including modifiers:

```
                              XP
                            /    \
                          XP      ModP
                        /    \    post-head modifier
                      YP      X'
                   specifier  /|\\
                             / | \ \
                            X  WP ZP  ...
                          head  complements
```

X-bar Theory

The structure of an X-bar category, including modifiers:
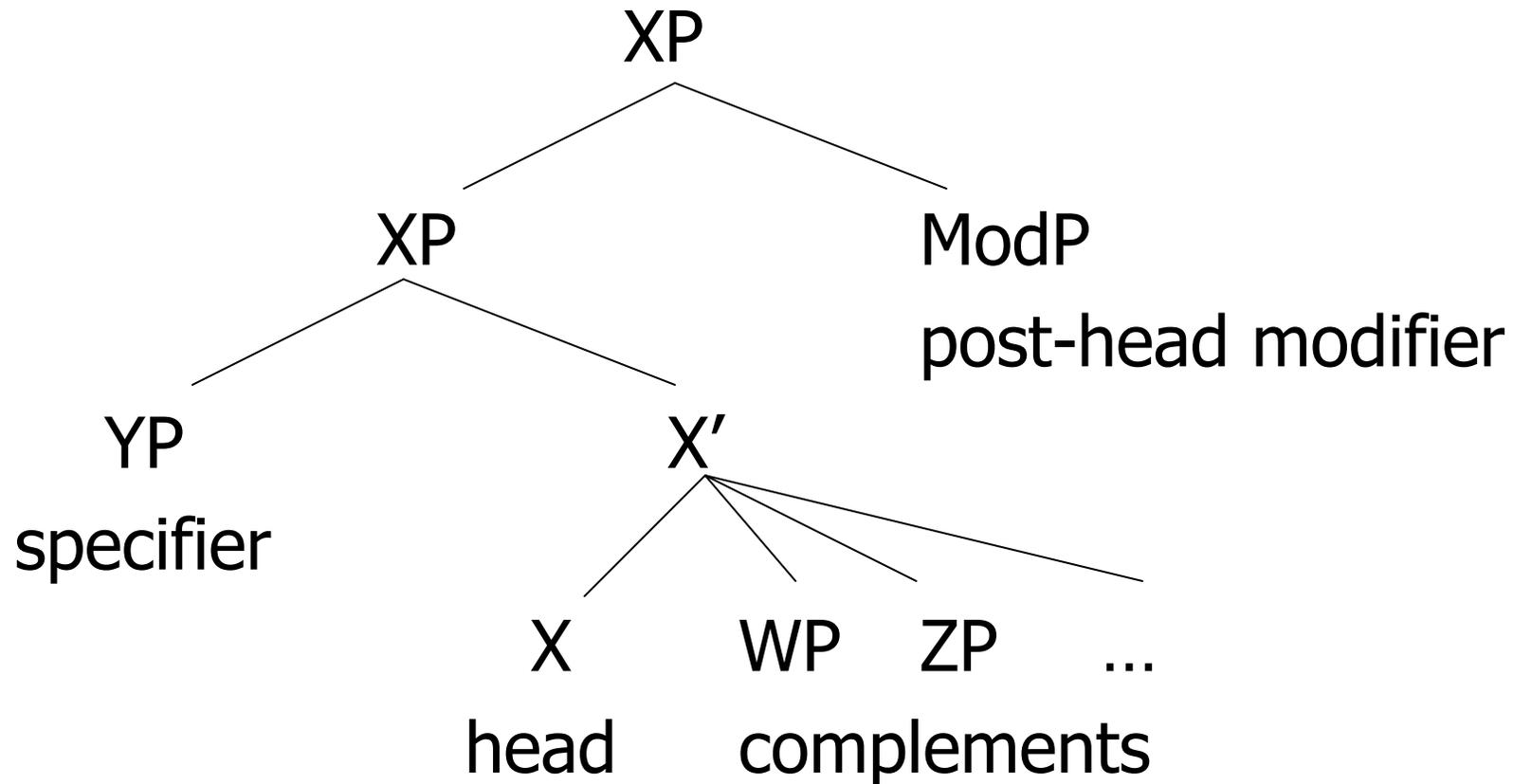
```
              XP
            /    \
         YP        X′
      specifier   /  \
              ModP      X′
                      /|\\ \
                     X  WP ZP  ...
                    head  complements
```
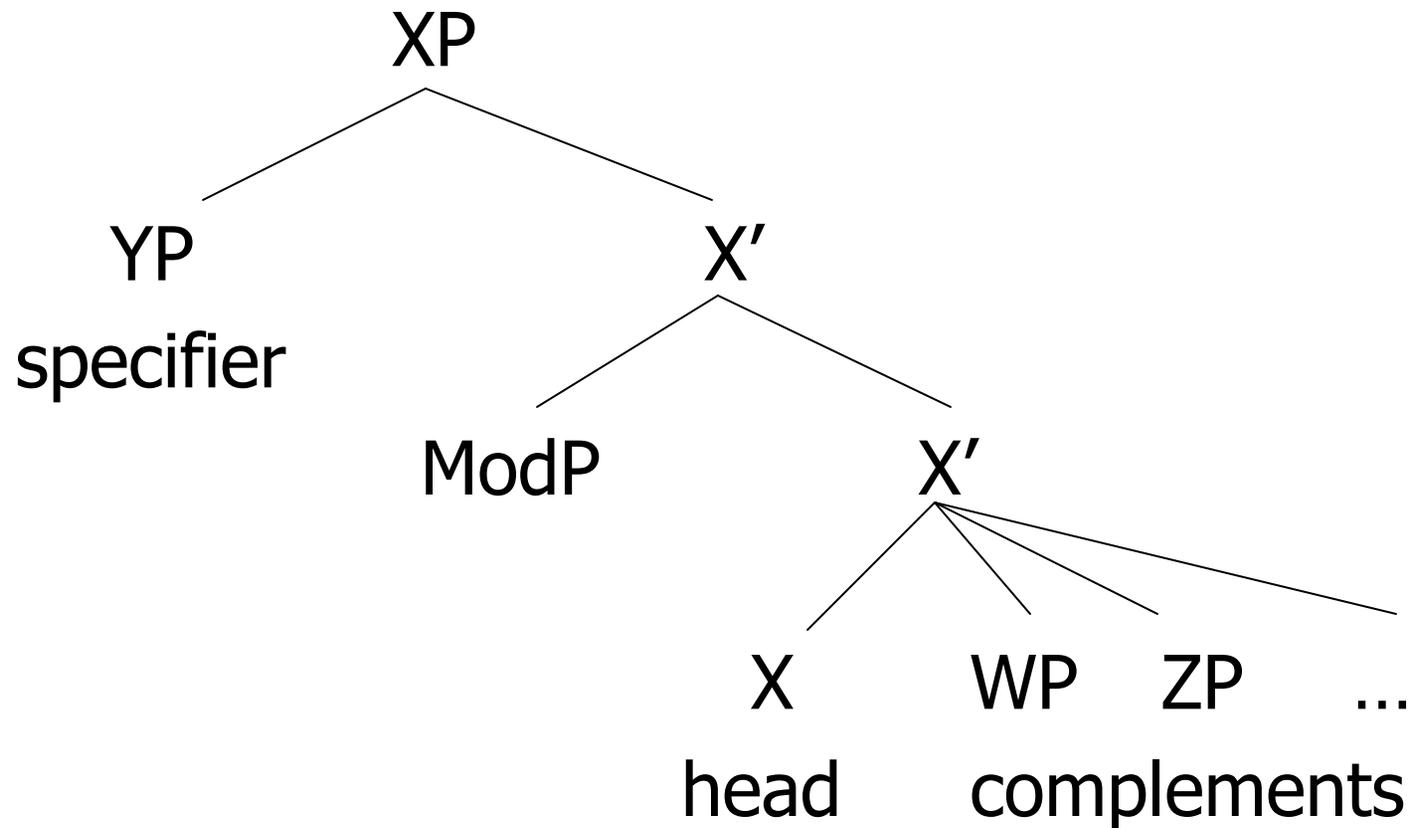
X-bar Theory

Modifier word order: Modifiers usually appear on the same side of the head as complements, but not always.

In English, PP and clausal modifiers come after their N and V heads, but adjectives come before the N head.

V′ → V′ PP
V′ → V′ AdvP
N′ → N′ PP
N′ → AdjP N′

Examples: X-bar structures of NPs

Simple NPs: No argument structure or modifier structure.

Proper names: "John", "Mary"

Pronouns: "He", "she", "I"
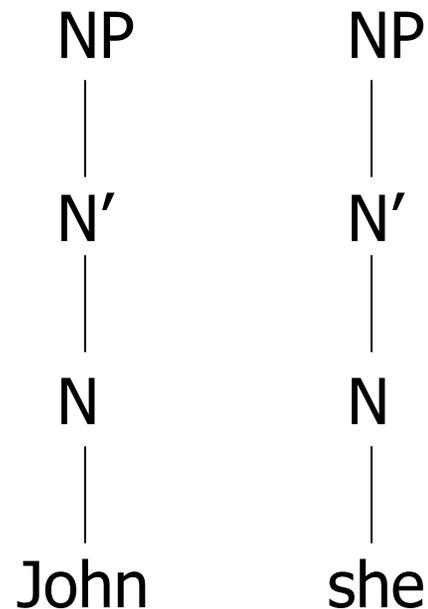
```
NP            NP
 |             |
N'            N'
 |             |
 N             N
 |             |
John          she
```

Examples: X-bar structures of NPs

Simple NPs: NPs with a specifier: "the student"; "John's friend"; "the student's friend"

Examples: X-bar structures of NPs

Simple NPs: NPs with a specifier: "the student"; "John's friend"; "the student's friend"

Examples: X-bar structures of NPs

More complex NPs: "the student of physics"

Examples: X-bar structures of NPs

More complex NPs: "the student of physics"

```
                      NP
                 ╱         ╲
            DetP              N′
             │           ╱         ╲
           Det′     N              PP
             │       │              │
           Det    student          P′
             │                 ╱       ╲
            the               P          NP
                              │           │
                              of          N
                                          │
                                       physics
```
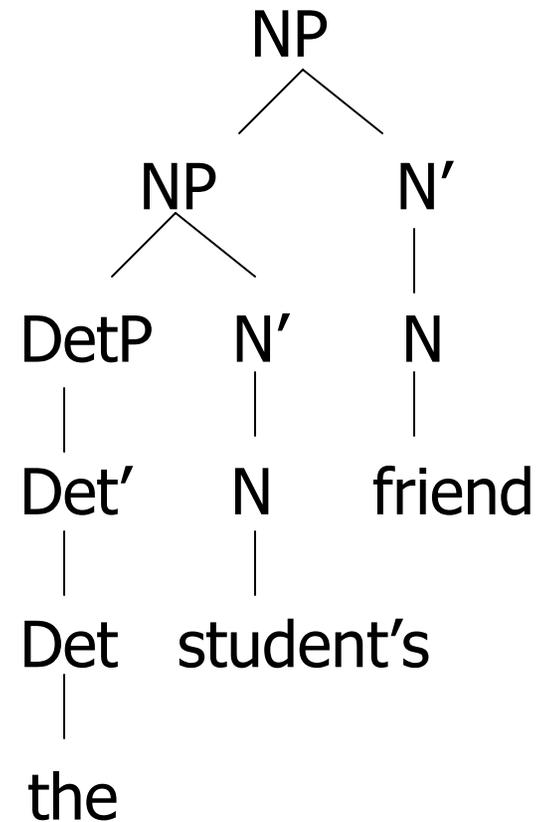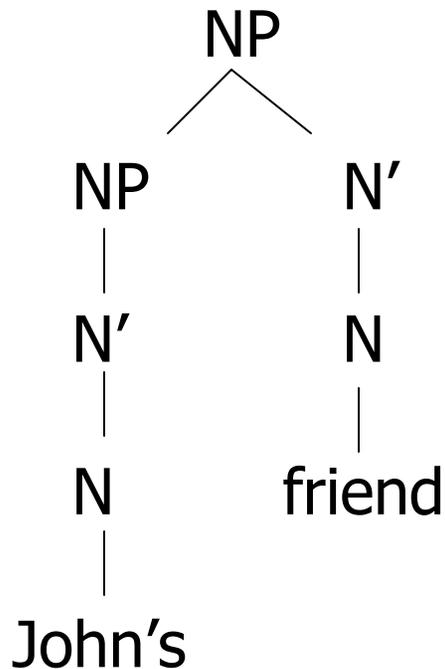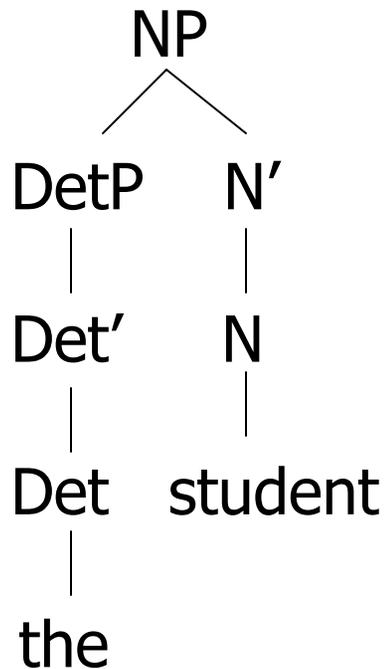
Examples: X-bar structures of NPs

More complex NPs: "the tall student of physics"

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More complex NPs: "the tall student of physics"
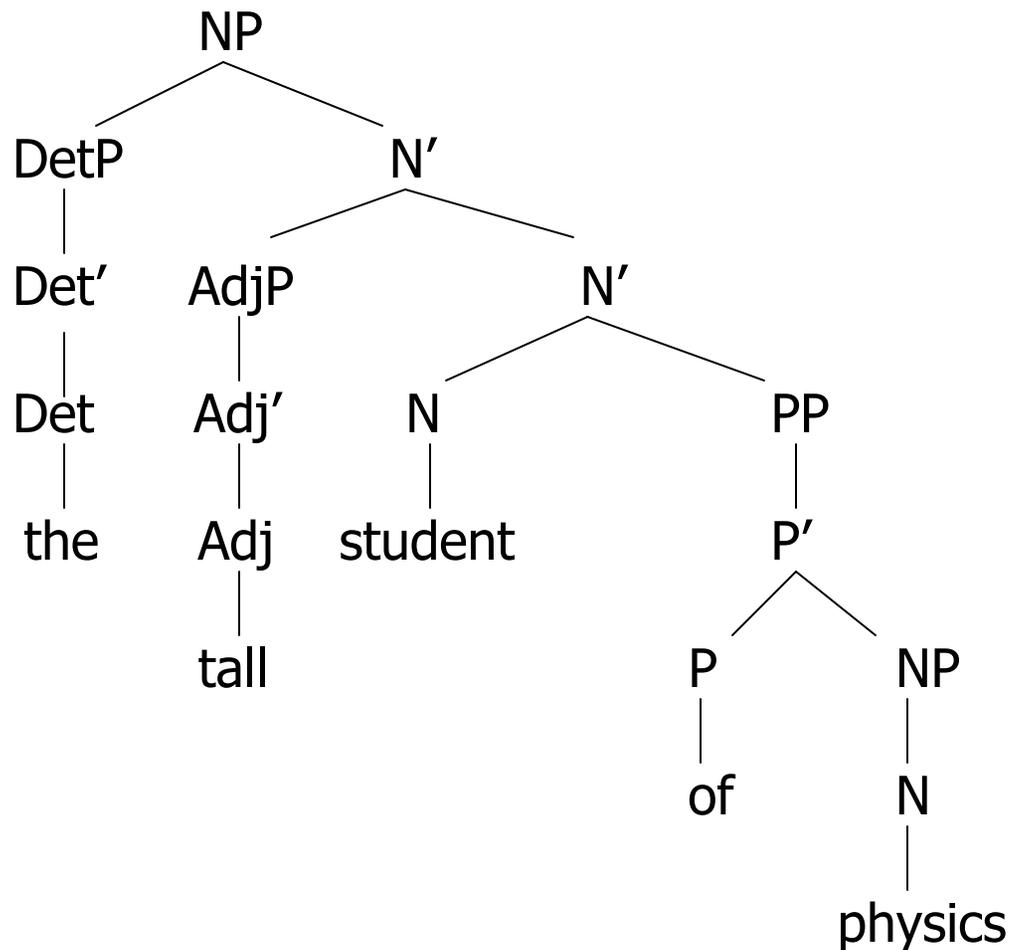
More complex NPs: "the tall student of physics with red hair"

```
                                    NP
                   ┌─────────────────┴──────────────────┐
                  NP                                     PP
          ┌────────┴────────┐                      ┌──────┴──────┐
        DetP               N'                      P'            NP
          │           ┌─────┴─────┐                │             │
        Det'        AdjP          N'               P             N'
          │           │      ┌─────┴─────┐         │        ┌─────┴─────┐
        Det         Adj'     N           PP       with    AdjP         N'
          │           │      │           │                 │       ┌───┴───┐
         the        Adj   student        P'               Adj'   Adj'      N
          │                             ┌─┴──┐              │      │       │
         tall                           P    NP            Adj    Adj'   hair
                                        │    │              │
                                        of   N             red
                                             │
                                          physics
```