CAS LX 522
Syntax I

6

Merge, feature checking
(3.6-4.2)

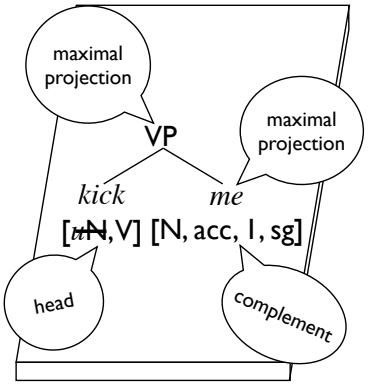
Syntactic operations

- **Merge** is a syntactic operation. It takes two syntactic objects and creates a new one out of them.
- The new syntactic object created by Merge inherits the features of one of the components (the head projects its features).
- Merge cannot "look inside" a syntactic object. Syntactic objects are only combined at the root.
  - **The Extension Condition**: A syntactic derivation can only be continued by applying operations to the root projection of a tree.

Feature checking

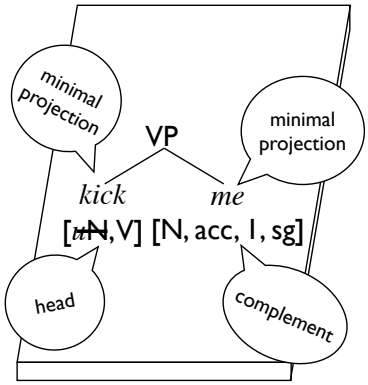
- Syntactic objects have features.
  - Lexical items (syntactic objects) are bundles of features.
- Some features are **interpretable**, others are **uninterpretable**.
- By the time the derivation is finished, there must be no uninterpretable features left (*Full Interpretation*).
- Uninterpretable features are eliminated by **checking** them against matching features. This happens as a result of Merge: Features of sisters can check against one another.
- Merge doesn't just happen. It *has* to happen.

Heads and complements



- When Merge combines two syntactic objects, one projects its features, one does not.
- When a lexical item projects its features to the combined syntactic object, it is generally called the **head**, and the thing it combined with is generally called the **complement**.
- A syntactic object that projects no further is called a **maximal projection**.
  - Where X is the category, this is alternatively called X^{max} or XP.
  - The complement is necessarily a maximal projection.

Heads and complements



- A syntactic object that has not projected at all (that is, a lexical item) is sometimes called a **minimal projection**.
  - Where X is the category, this is alternatively called X^{min} or X.
  - The head is a minimal projection.
    - In traditional terminology, the complement of a verb is generally called the **object** (or "**direct object**").
    - So, often, is the complement of a preposition ("object of the preposition").

Linear order

- Merge takes two syntactic objects and combines them into a new syntactic object.
- Merge does not specify *linear order* (which of the two combined objects comes first in pronunciation).
- In the English VP, heads always precede complements. But languages differ on this.

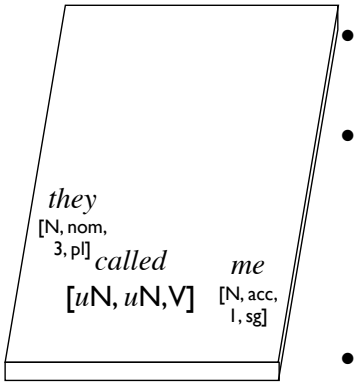
The head parameter

- Languages generally have something like a *basic word order*, an order in which words come in in "neutral" sentences.
- English: SVO
  - Akira ate an apple.
- Japanese: SOV
  - John wa ringo o tabeta.
    John top apple acc ate
    'John ate an apple.'
- In our terms, this amounts to a (generally language-wide choice) as to whether heads are pronounced before complements or vice-versa.
  - English: **head-initial** Japanese: **head-final**

Second Merge

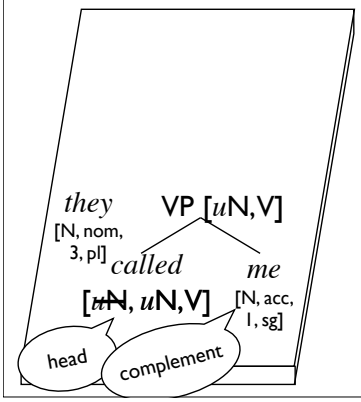
- Merge occurs when there is a selectional feature that needs to be satisfied.
  - If there is more than one such feature, Merge must happen more than once.
- As always, the node that projects is the one whose selectional feature was satisfied by the Merge.
  - The sister of the head (that projects) after the first Merge involving that head is called the **complement** (as above).
  - The nonprojecting sister of a syntactic object that has already projected once from a head is called the **specifier**.

Heads and complements



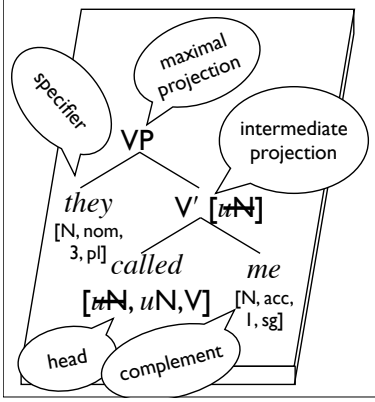
- A transitive verb like *called* needs two arguments (the caller and the callee).
- We encode this knowledge by hypothesizing two selectional features for N.
  - The first selectional feature will be checked by the callee.
  - The second selectional feature will be checked by the caller.
- So, *called* is Merged with *me*.

Heads and complements



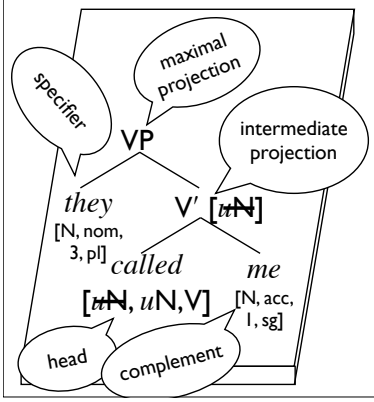
- So, *called* is Merged with *me*.
- One of the selectional features is checked off, the remaining features project to the new object.
- A selectional feature still remains.
- Merge applies again, Merging the new object with *they*.

Specifiers, XP, X-bar



- The second selectional feature has been eliminated.
- The sister to this second Merge is the **specifier**.
- A node that does not project further is a **maximal projection**.
- A node that has been projected and projects further is neither maximal nor minimal and is usually called an **intermediate projection**.

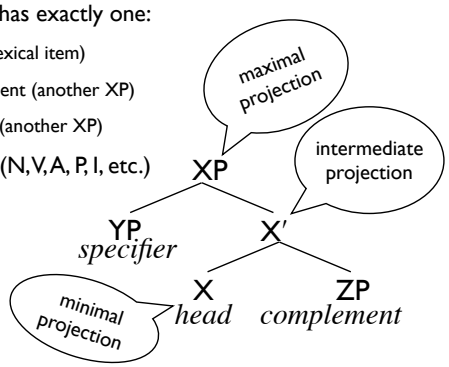
Specifiers, etc.



- In English, specifiers are on the left of the head, unlike complements.
- As with the head-complement order, languages (arguably) also differ in the linear order of their specifiers.
  - However, Spec-initial order is overwhelmingly more common…
  - VOS order (Malagasy)
    Nahita ny mpianatra ny vehivavay.
    saw the student the woman
    'The woman saw the student.'

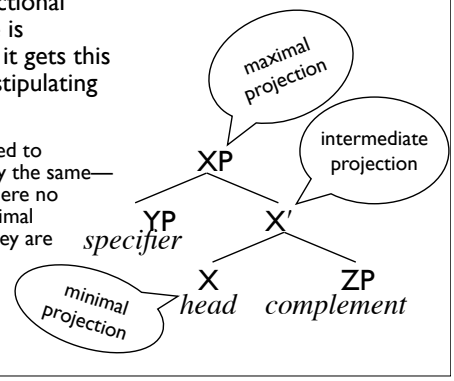
X′-theory

- In the '70s and '80s, these ideas went by the name "X′-theory":
  - Every XP has exactly one:
    - head (a lexical item)
    - complement (another XP)
    - specifier (another XP)
  - for any X (N, V, A, P, I, etc.)



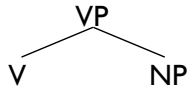
Merge v. X′-theory

- The system of selectional features and Merge is preferable because it gets this structure without stipulating the template.
  - The structure assigned to sentences is generally the same—except that for us, there no intermediate or maximal projections unless they are needed.



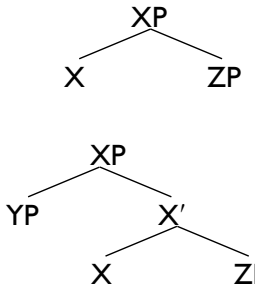
Node labeling conventions

- When we Merge two objects, the features of one of them projects to become the features of the new object.
- The label for new node comes in two pieces:
  - The category (projected from the head)
  - The projection "level":
    - P = maximal projection
    - ° or nothing = minimal projection
    - ′ = intermediate projection
- An XP is any node that does not project its features up.
- An X° (or X) node comes from the lexicon.

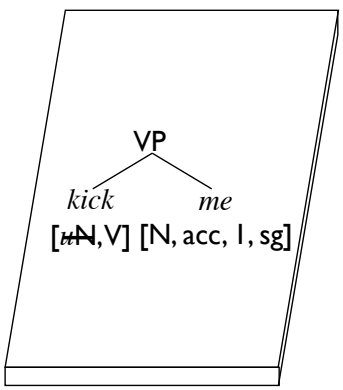


Maximal v. Minimal v. Intermediate

- Notice that whenever you Merge two things, the result is going to be a maximal projection. An "XP".
- But if in the next step if projects when you Merge it with something, that same node is now an intermediate projection.



Features and checking



- When we combine two things with Merge and check an uninterpretable feature, we cross it out.
- For simplicity, we can simply write the features under the head, and cross them out there.
  - This is as opposed to copying all but the checked feature and into a feature specification of the VP node.
  - This is just about how we write it down, it is the same system either way.

Adjuncts

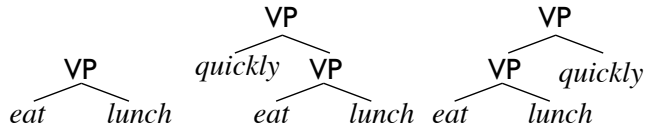
- *Pat put the book.
- Pat put the book on the shelf.
- Pat put the book on the shelf dramatically.
- Pat put the book on the shelf dramatically on Tuesday.
- Pat put the book on the shelf dramatically on Tuesday before several witnesses.
- Some things are required. Some things are not.
  - **Arguments** get θ-roles and are **required**.
  - **Adjuncts** are modificational and are **optional**.

Adjuncts and distribution

- Adjuncts are relatively "transparent"— having an adjunct does not seem to change the distributional characteristics.
  - Pat wants to eat lunch (quickly).
  - Pat wants to dine.
  - *I like to draw eat lunch (quickly).
  - I like to draw (happy) elephants.
  - *Pat wants to (happy) elephants.
- Idea: A verb (phrase) with an adjunct is still a verb (phrase), just as if it didn't have an adjunct.

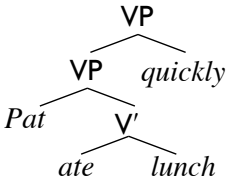
Adjoin

- The operations Merge and Adjoin are two different ways to combine two objects from the workbench.
- Merge takes two objects and creates a new object (with the label/features inherited from one of them).
- Adjoin attaches one object to the top of another one.
  - The linear order of adjuncts does not appear to be set parametrically, so they can either before or after the object they attach to.



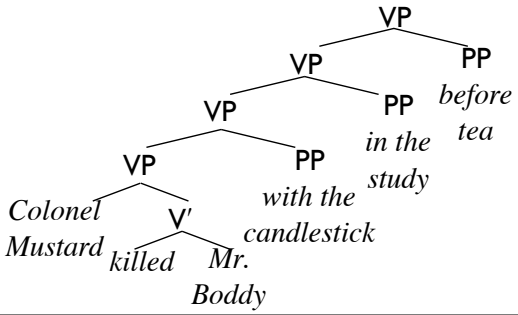
The luxury of adjunction

- We will also assume that Adjoin only applies to maximal projections.
- That is: If a syntactic object still has a selectional feature, Adjoin cannot attach something to it. Merge must happen first. Once all of the things that *need* to happen are taken care of, *then* you have the luxury of adjunction.



The luxury of adjunction

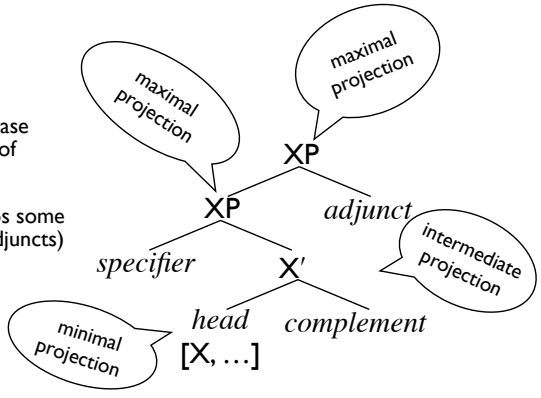
- Any number of adjuncts can be added, generally in any order. Adjuncts come in many different categories— "adjunct" is not a category, but rather a structural description.



A phrase

- So, a full phrase can have all of these pieces

  (plus perhaps some additional adjuncts)



Complements vs. adjuncts

- PPs seem to be freely reorderable— when adjuncts.
  - I ate lunch on Tuesday at Subway with Pat
  - I ate lunch on Tuesday with Pat at Subway
  - I ate lunch with Pat on Tuesday at Subway
  - I ate lunch on Tuesday with Pat at Subway
- But consider *glance at Chris*.
  - I glanced at Chris on Tuesday
  - *I glanced on Tuesday at Chris
- Ok: Why?

Mary saw him

- A pronoun like *him* refers to somebody in (our mental model of) the world.
- A pronoun refers to somebody or something that's been part of the conversation, or that you are pointing at.
- When you hear a pronoun and want to interpret it, you have to resolve its reference.

John arrived. Mary saw him.

- Here, *him* is likely to refer to John.
- Though we could be pointing at Bill, in which case *him* refers to Bill.
- The person who *hears* this has to figure it out.
- The person who *says* this knows who they meant.
- And had the grammar that generated the sentence.

Indices

- To describe what the speaker intended (that is, which sentence the speaker actually used), we use an *index* on each referent.

  1) John_i arrived. Mary_j saw him_i.

  2) John_i arrived. Mary_j saw him_k.
- The index represents what you are "pointing at" (perhaps just mentally).
- Two noun phrases that share an index *necessarily* share the same reference. They are coreferential.

Seeing him in the mirror

- Regard: Ike_i, Jim_j, Kristin_k.

  1) There's Ike_i. Kristin_k saw him_j in the mirror.

  2) There's Jim_j. Kristin_k saw him_j in the mirror.

  3) There's Ike_i. Jim_j saw him_i in the mirror.

  4) There's Jim_j. *Jim_j saw him_j in the mirror.
- What's wrong with that last one?

Seeing himself in the mirror

- Right, ok. Jim_j saw $\textit{himself}_j$ in the mirror.
- For some reason, when *Jim* is the subject and *him* is an object, *him* can't refer to *Jim*. Furthermore:

  1) Jim_j's father_k saw $\text{him}_{i/j/*k}$ in the mirror.

  2) Jim_j's father_k saw $\text{himself}_{k/*j/*i}$ in the mirror.

  3) Jim_j's father_k said that Mary_m saw $\text{him}_{i/j/k}$ in the mirror.

  4) Mary_m introduced Jim_j to $\text{him}_{i/*j}$.

  5) Mary_m introduced Jim_j's father_k to $\text{him}_{i/j/*k}$.

Binding Theory

- **Binding Theory** consists of three Principles that govern the allowed distribution of NPs.

- Pronouns: *he*, *her*, *it*, *she*, ...
- Anaphors: *himself, herself, itself, ...*
- R-expressions: *Pat, the student, ...*

R-expressions and anaphors

- R-expressions are NPs like *Pat*, or *the professor*, or *an unlucky farmer*, which get their meaning by referring to something in the world. Most NPs are like this.
- An anaphor does *not* get its meaning from something in the world—it depends on something else in the sentence.

1) John saw himself in the mirror.

2) Mary bought herself a sandwich.

Pronouns

- A pronoun is similar to an anaphor in that it doesn't refer to something in the world but gets its reference from somewhere else.

1) John told Mary that he likes pizza.

2) Mary wondered if she agreed.

- …but it doesn't *need* to be something in the sentence.

1) Mary concluded that he was crazy.

Constraints on coreference

1) John$_i$ saw himself$_i$.

2) *Himself$_i$ saw John$_i$.

3) *John$_i$'s mother saw himself$_i$.

- It is impossible to assign the same referent to *John* and *himself* in the (2) and (3). What is different between the good and bad sentences?

John's mother

- *John's mother* is an NP.

1) [John's mother]$_i$ saw herself$_i$.

2) She saw John.

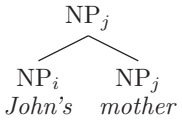
- But it's an NP that is made up of smaller pieces (*John's* and *mother*).
- So what is the internal structure of the NP *John's mother*?

[$_{NP}$ John's mother]

- Remember that pronouns come in three distinguishable forms (in English):
  - *I*, *he*, *she* nominative
  - *Me*, *him*, *her* accusative
  - *My*, *his*, *her* genitive
- The genitive case forms seem to have pretty much the same kind of "possessive" meaning that *John's* does.
- So, let's suppose that *John's* is the genitive case form of *John*.

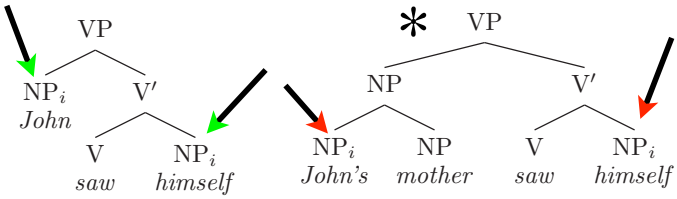
[$_{NP}$ John's mother]

- Another point about *John's mother* is that it seems that the head should be *mother*.
- *John's* sort of modifies *mother*.
- Sort of like an adjective does… sort of like an adverb does for a verb…
- Let's suppose that *John's* is just adjoined to the NP *mother*.
  - Only for now! To be revised in ch. 7.
  - This is kind of hard to draw clearly.



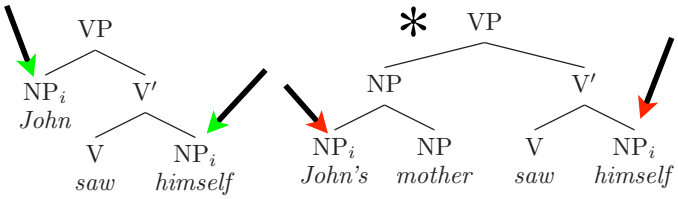
Command domains

- What is the difference between the relationship between *John* and *himself* in the first case and in the second case?

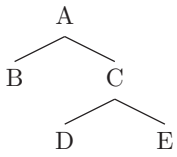


Command domains

- We think of the position that *John* occupies in in the first tree as being a position from which it "commands" the rest of the tree. It is hierarchically superior in a particular way. (Really, "non-inferior")



Tree relations



- A node X c-commands its sisters and the nodes dominated by its sisters.
  - B c-commands C, D, E.
  - D c-commands E.
  - E c-commands D.
  - C c-commands B.
  - A c-commands nothing.