CAS LX 522
Syntax I

Week 3b.
Merge, feature checking
(3.6-4.2)

Recap: Feature checking

kick is a verb (has an interpretable V feature) and c-selects a noun (has an uninterpretable N feature).

me is a noun (a pronoun in fact, has an interpretable N feature, and others like accusative case, first person, singular)

kick   *me*
$[u$N,V] [N, acc, 1, sg]
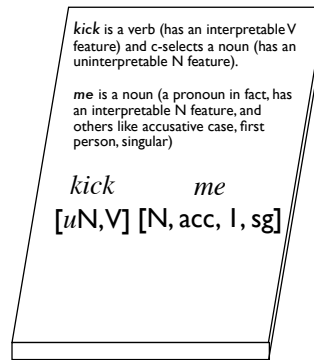
- Full Interpretation: The structure to which the semantic interface rules apply contains no uninterpretable features.

- Checking Requirement: Uninterpretable features must be checked (and once checked, they are deleted)

- Checking (under sisterhood): An uninterpretable feature F on a syntactic object Y is checked when Y is sister to another syntactic object Z which bears a matching feature F.

Recap: Feature checking

V
kick   me
$[u$N,V] [N, acc, 1, sg]
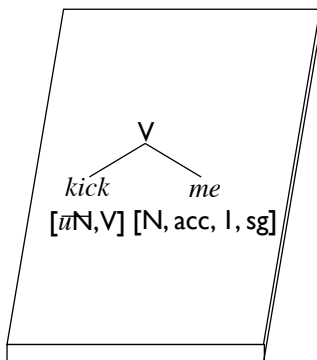
- Merging them will check the uninterpretable feature, and the structure can be interpreted.

- The head is the "needy" one. The one that had the uninterpretable feature that was checked by Merge.

- The combination has the features of the verb *kick* and so its distribution will be like a verb's distribution would be.

The idea

- Sentences are generated *derivationally*, by means of a series of syntactic operations.

  - A sentence that *can* be generated by such a procedure is grammatical. One that cannot is not grammatical.

- Syntactic operations operate on syntactic objects.

- Lexical items are syntactic objects.

- A **derivation** starts off by selecting a number of syntactic objects from the lexicon, and proceeds by performing syntactic operations on them.


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

maximal projection

VP

maximal projection

kick   *me*

[uN, V]   [N, acc, 1, sg]

head   complement
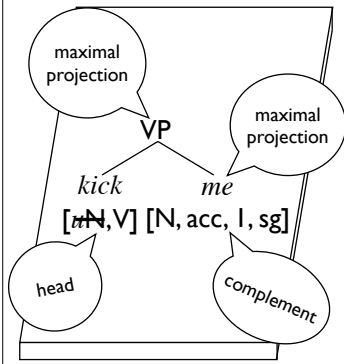
- When Merge combines two syntactic objects, one projects its features, one does not.
- When a lexical item projects its features to the combined syntactic object, it is generally called the **head**, and the thing it combined with is generally called the **complement**.
- A syntactic object that projects 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

minimal projection

VP

minimal projection

kick   *me*

[uN, V]   [N, acc, 1, sg]

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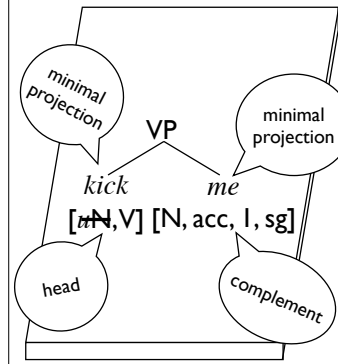
- A syntactic object that has not projected at all (that is, a lexical item) is sometimes called a **minimal projection**.
- Where X is the category, this is alternatively called X^{min} or X.
- The head is a minimal projection.
  - In traditional terminology, the complement of a verb is generally called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

they
[N, nom, 3, pl]
called   *me*
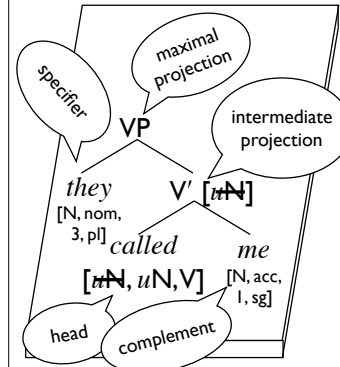[uN, uN, V]   [N, acc, 1, sg]
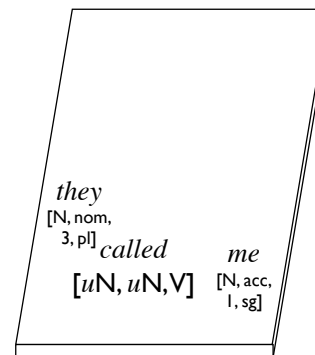
- A transitive verb like *called* needs two arguments (the caller and the callee).
- We encode this knowledge by hypothesizing two selectional features for N.
  - The first selectional feature will be checked by the callee.
  - The second selectional feature will be checked by the caller.
- So, *called* is Merged with *me*.

Heads and complements

they
[N, nom, 3, pl]

VP [*u*N,V]

called
[*u*N, *u*N,V] *(head)*
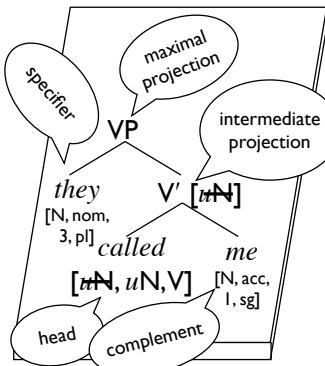
me
[N, acc, 1, sg] *(complement)*
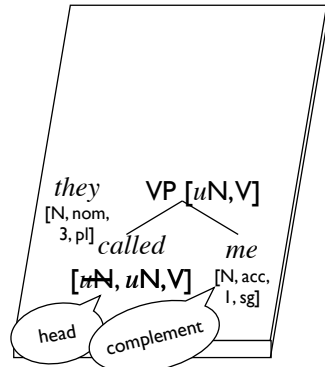
- So, *called* is Merged with *me*.
- One of the selectional features is checked off, the remaining features project to the new object.
- A selectional feature still remains.
- Merge applies again, Merging the new object with *they*.

Specifiers, XP, X-bar

specifier

maximal projection

VP

intermediate projection

they
[N, nom, 3, pl]

V' [*u*N]

called
[*u*N, *u*N,V] *(head)*

me
[N, acc, 1, sg] *(complement)*

- 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.

specifier

maximal projection

VP

intermediate projection

they
[N, nom, 3, pl]

V' [*u*N]

called
[*u*N, *u*N,V] *(head)*

me
[N, acc, 1, sg] *(complement)*

- 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 vehivavy.
   saw   the student   the woman
    'The woman saw the student.'

- In the '70s and '80s, these ideas went by the name "X'-theory":

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.)

XP

maximal projection

intermediate projection

YP
specifier

X'

X
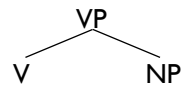*head* *(minimal projection)*

ZP
complement
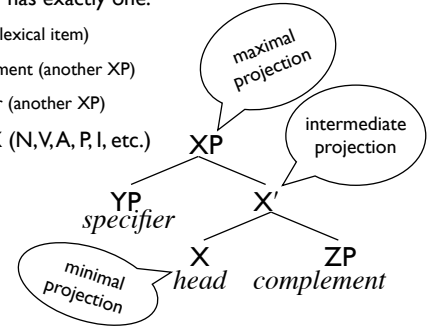
Merge v. X'-theory

- 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.

XP

maximal projection

intermediate projection

YP
specifier

X'

X
head *(minimal projection)*

ZP
complement
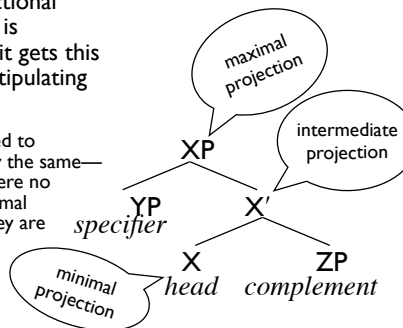
Node labeling conventions

- 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.
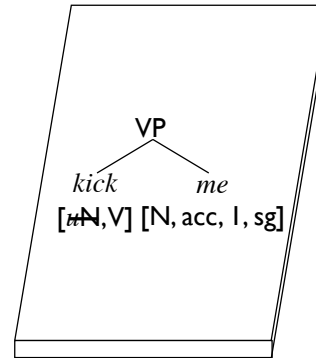- An X° (or X) node comes from the lexicon.

VP

V   NP

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.

```
      XP
     /  \
    X    ZP
```

```
        XP
       /  \
     YP    X'
          /  \
         X    ZP
```
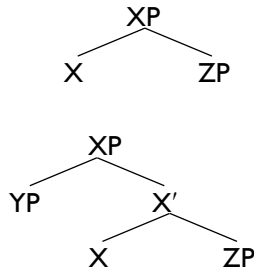
Features and checking

- 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.

```
         VP
        /  \
     kick   me
```
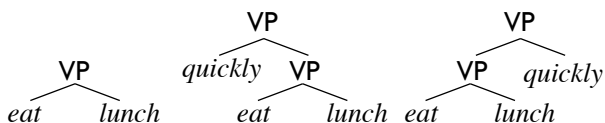[~~#N~~,V] [N, acc, 1, sg]

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.

```
        VP                    VP
       /                     /  \
      VP          quickly  VP        VP    quickly
     /  \                 /  \      /  \
   eat  lunch           eat  lunch eat  lunch
```
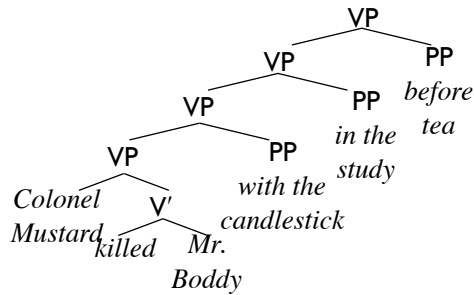
The luxury of adjunction

- 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.
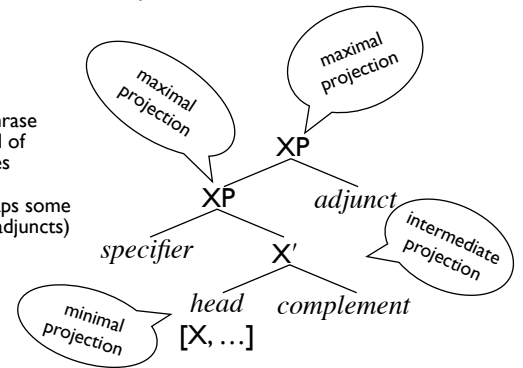
```
          VP
         /  \
       VP    quickly
      /  \
    Pat   V'
         /  \
       ate  lunch
```
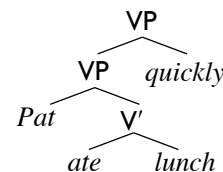
The luxury of adjunction

- 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.

```
                              VP
                        VP         PP
                   VP       PP    before
              VP       PP   in the  tea
       Colonel  V'    with the study
       Mustard killed Mr.  candlestick
                      Boddy
```

A phrase

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

  (plus perhaps some additional adjuncts)

maximal projection

maximal projection

```
              XP
          XP      adjunct
   specifier   X'
          head   complement
          [X, ...]
```

intermediate projection

minimal projection

Complements vs. adjuncts

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