

# Ling 120B: Syntax I

Nico(letta) Loccioni

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How do we know that a particular word belongs to a particular category?

We look at their distribution!

## Distributional Definition

Parts of speech are classified by their distribution.

- Morphological distribution: Affixes appear only on certain kinds of words.
- Syntactic distribution: Position relative to other words.

- Words that have the same or strongly overlapping distributions have the same part of speech
- Words whose distribution does not overlap have different parts of speech
- Since distribution is language specific, the criteria for identifying parts of speech and the part of speech categories themselves can be language specific.

# Compositionality I

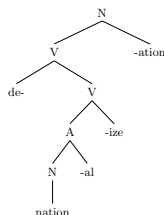
Morphemes combine in a regular way!

## D E N A T I O N A L I Z A T I O N

**Claim:** only one ordering of the five morphemes in de-nation-al-iz-ation produces a English word.

nation → national → nationalize → denationalize → denationalization

Tree structure:



According to what we said so far, the speaker must know:

- how each morpheme is pronounced;
- what kind of morpheme it is (free, prefix, affix..)

## Compositionality II

- c. if an affix, what it combines with (what it c-selects);
- d. if an affix, that the c-selected element must be adjacent to the affix;
- e. if an affix, what kind of things result after c-selection.

The property in (d) is not in the lexical entry! It is not specific to any lexical entry!  
The rest will be encoded in the lexical entry of the morpheme.

## Lexical entries - first version

**Lexical entry** of a morpheme (=the implicit knowledge that a speaker has about it):

-er	c-selects V to form N	kill-er, dry-er ...
-able	c-select V to form A	understand-able, recycl-able
-ize	c-select N or A to form V	apolog-ize, steril-ize

‘c-selection’, stands for ‘category selection’.

The collection of lexical entries = **lexicon**

## Locality of Selection Hypothesis (to be revised):

Selection is local in the sense that an item can only select properties of its sister(s).

### Tree vocabulary

#### Branch

A line connecting two parts of a tree.

#### Node

Each point that is labeled with a word or a category is called a *node*. It is the end of a branch.

#### Label

The name given to a node.

#### Leaf (or terminal node)

The nodes along the bottom of the tree are called *leaves*.

#### Mother

Node A is a mother of B if and only if A is higher up in the tree than B and they are separated by a single branch (no intervening nodes).

#### Sister

Two nodes are sisters if they share the same mother.

## Compounds and the RHHR

Let's leave bound morphemes on the side to look at *compounds*.

babysit

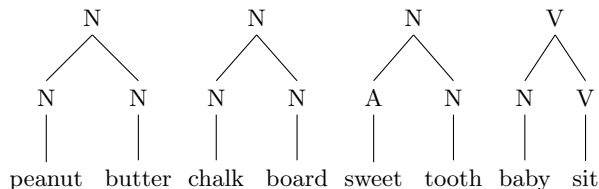
sweet tooth

kitchen cabinet

writer club address list

peanut butter

chalkboard



### The English Right-Hand Head Rule (RHHR):

The rightmost element of a compound is the head of the word.

*What do we mean by 'head'?*

**The head** is the part of a linguistic structure that determines the **distribution**, the **main meaning** and the **syntactic category** of the whole structure.



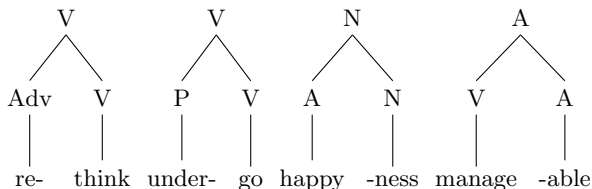
# Affixes and the RHHR I

What about affixes? Does the RHHR apply to them as well?

Yes, and as a result suffixes and prefixes have a different status!

→ Suffixes can change the category of a word

→ Prefixes cannot change the category of the stem they attach to



## Affixes and the RHHR II

We can therefore extend the RHHR to all words:

**The English Right-Hand Head Rule (RHHR):**

The rightmost element of a word is the head of the word.

Also, we can assume that both free and bound morphemes belong to categories. Given the RHHR we can then simplify our lexical entries!

-er	bound	N	c-selects for V	(meaning)
-able	bound	A	c-selects for V	(meaning)

# Practice I

Consider the following words:

- (1) a. undeniability
- b. remagnetize
- c. credit card statement
- d. beach towel rack
- e. peanut allergy warning label

For each of these words:

- (1) what is the category of the whole word?
- (1) give one distributional justification supporting your answer to the previous question.
- (1) Draw the tree structure.  
For (a) and (b) give lexical entries for each morpheme
- (1) How many nodes are there in the tree?
- (1) How many leaves?

See p.24

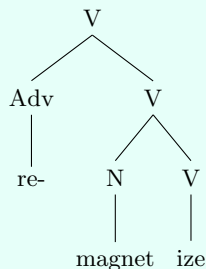
## Practice II

### Example for (1-b)

(a) *The word 'remagnetize' is a verb.*

(b) *It can appear with past tense morphology (-ed)*

(c)



(d) *The lexical entries are:*

magnet      free (N)

-ize      bound      V

re-      bound      Adv

c-selects N

combines with V

(e-f) *The structure above has 8 nodes and 3 leaves*

## Practice III

The word *unzippable* is used in two different ways in the sentences below:

- (2) I got gum stuck in my jacket zipper and now I cannot zip it up! My jacket is unzippable.
- (3) There is no need to tear at that ziplock bag to access its contents! The bag is unzippable.

Paraphrase the two meanings and draw two corresponding structures.

# Constituency

# Constituency and Constituency Tests I

One of the fundamental discoveries about the syntax of natural languages is that languages are *chunky*: words are organized into chunks or blocks of units that ‘rules’ can manipulate as blocks.

→ Languages don’t just consist of strings of words.

They have syntactic structure.

## Constituent:

A group of words that function together as a unit (Carnie: 76)

String that speakers can manipulate as a single chunk (Sportiche et al. (2014)

# Constituency and Constituency Tests II

How do we identify the parts of sentences that form units?

We use *constituency tests*!

- To correctly use a constituency test, we must follow rules
- Constituency tests manipulate a string, and then we check whether the result is:
  - (i) grammatical
  - (ii) consistent in meaning
- Passing the test means: the string is a constituent.
- Not passing the test means: nothing.



## Stand Alone Test

If a group of words can stand alone, for example, as an answer to a question, they form a constituent.

### How it works:

Start with a string that you are interested in

Create a question that can be answered with the kind of string

If you can find a question that can be answered with this string, it is probably a constituent

### Example

(4) John went to Paris last year.

Q: When did John go to Paris?

A: Last year.

Q: Where did John go last year?

A: To Paris.

This shows us that *last year* and *to Paris* are constituents of (4)

**Practice** Use the test to show that the underlined parts of the sentence are constituents. Find a question that can be answered with each underlined string.

(5) Laura put a letter on your desk yesterday.

Laura

---

a letter

---

on your desk

---

yesterday

---

# Substitution

## How it works:

Given a well-formed string S that we are trying to analyze,

1. select a substring SUB
2. replace SUB in 'kind' by (what looks like) a monomorphic word ( a word with no internal structure)
3. if the result R is well formed, we conclude that SUB is a constituent
4. If the result is ill formed, we conclude nothing

- (6) S: This courier<sub>SUB</sub> will deliver that big yellow package on Monday. → R: **He** will deliver that big yellow package on Monday.

S = This courier will deliver that big yellow package on Monday

SUB = This courier

R = He will deliver that big yellow package on Monday.

### Logic of the test:

- The smallest possible constituent consists of a single word
- Any string of words that can be replaced by a single word while maintaining the same meaning is a constituent

### Remember:

- Original string and replacement should be minimal pairs
- S and R have to be very close synonym.

What can we infer from a successful substitution?

- The initial phrase is a constituent
- The initial phrase and its substitution share a distributional property (i.e. they belong to the same category).
- In the tree structure, SUB is a subtree of S.

## ⇒ Replacement by ‘one’

### Example

- (7) This courier will deliver that big yellow package<sub>SUB</sub> on Monday →  
This courier will deliver that big yellow **one** on Monday. ✓

This shows that ‘package’ forms a constituent in (7).

- (8) That big yellow<sub>SUB</sub> package → \*That big **one** package
- (9) That big yellow package arrived<sub>SUB</sub> → \*That big yellow package **one**

What kinds of constituents can ‘one’ replace?

It can replace nominal phrases, NPs.

From the test in (7), we can infer that [<sub>NP</sub> package]

- (10) This courier will deliver that big yellow package<sub>SUB</sub>  
→ This courier will deliver that big **one** ✓

From the test in (10), we can infer [<sub>NP</sub> yellow package]

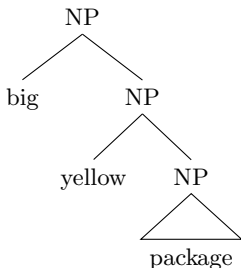
- (11) This courier will deliver that big yellow package<sub>SUB</sub>  
→ This courier will deliver that **one** ✓

From the test in (11), we can infer that [NP big yellow package]

We can therefore infer the following structure:

[NP big [NP yellow [NP package] ] ]

which can be represented as follows:



## ⇒ Replacement by a pronoun

- Subjects (roughly): he, she, it, they...
- Everywhere else: him, her, it, them...

### Examples

(12) Bill<sub>SUB</sub> loves kayaking. → **He** loves kayaking.

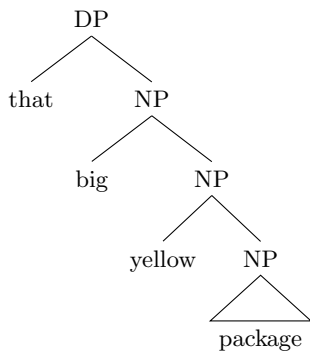
(13) Jim and Susan<sub>SUB</sub> left. → **They** left.

(14) This courier will deliver that big yellow package<sub>SUB</sub> on Monday  
→ This courier will deliver **it** on Monday ✓

- (15) a. That big yellow package<sub>SUB</sub> arrived → \*That **it** arrived  
b. That big yellow package<sub>SUB</sub> arrived → **It** arrived ✓

What kinds of constituents can a pronoun replace?

*It replaces DPs. It can't replace bare nominal phrases, NPs.*





## ⇒ Replacement by ‘there/then’

### Example

- (16) I will put the book on the table<sub>SUB</sub>. → I will put the book **there**.
- (17) The screening will be at the movie theater<sub>SUB</sub>. → The screening will be **there**.
- (18) This courier will deliver that big yellow package on Monday → This courier will deliver that big yellow package **then**.

What kinds of constituents can *there/then* replace?

It can replace PPs.

## Practice

- (19) a. That worker will bring those old heavy bricks<sub>SUB</sub> to the construction site.  
b. That worker will bring those old heavy bricks<sub>SUB</sub> to the construction site.  
c. That worker will bring those old heavy bricks<sub>SUB</sub> to the construction site.  
d. That worker will bring those old heavy bricks<sub>SUB</sub> to the construction site.  
e. That worker<sub>SUB</sub> will bring those old heavy bricks to the construction site.  
f. That worker will bring those old heavy bricks to the construction site<sub>SUB</sub>.

## ⇒ Replacement by ‘do so’

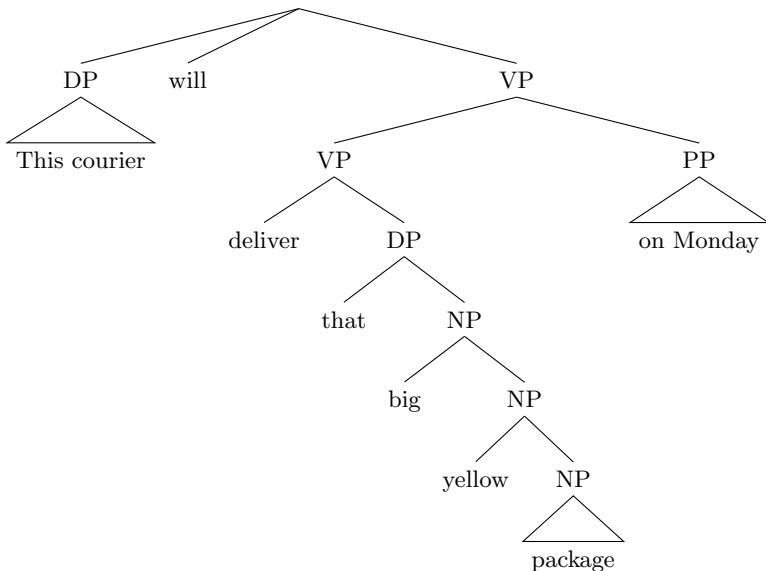
### Example

- (20) This courier will deliver that big yellow package on Monday →  
This courier will do so on Monday.
- (21) This courier will deliver that big yellow package on Monday →  
This courier will do so.
- (22) John usually walks to school<sub>SUB</sub> → John usually **does so**

What kinds of constituents can ‘do so’ replace?

It can replace VPs.

The constituency tests we ran gave us evidence for the following tree structure for *The UPS courier will deliver that big yellow package on Monday*:



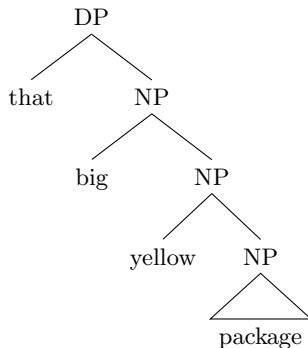
## Summary: Replacement tests

What to remember:

- When carefully used replacement can tell us about the constituency of sentences
- A successful replacement shows that the replaced string is a syntactic unit, i.e. constituent
- In terms of trees:
  - A constituent is a node in the tree
  - Constituency tests reveal the major shape of the tree

## Let's do it again!

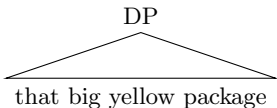
We used constituency tests to detect the structure below:



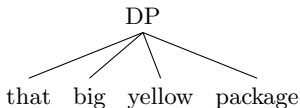
Let's do it again but in the opposite order, going from bigger constituents to smaller constituents.

(23) That big yellow package<sub>SUB</sub> arrived → **It** arrived ✓

What we can infer from (23) is that ‘that big yellow package’ is a constituent. We know it is a DP because it can be replaced by a pronoun but we don’t know anything about the internal structure of that constituent.

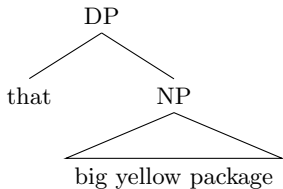


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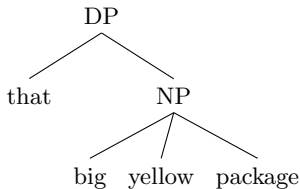


(24) That big yellow package<sub>SUB</sub> arrived → That **one** arrived ✓

What we can infer from (24) is that ‘big yellow package’ is also a constituent. We know it is a NP because it can be replaced by ‘ones’.

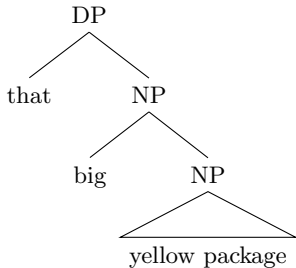


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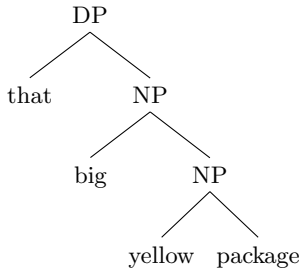


(25) That big yellow package<sub>SUB</sub> arrived → That big **one** arrived ✓

Now, we know that ‘big package’ is also a constituent. We need to add a node to our previous tree structure:



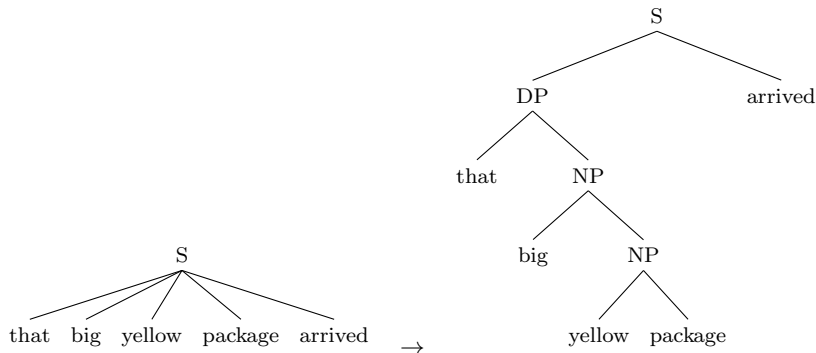
or





So, simply running 3 constituency tests, we were able to go from a flat structure to a more articulated one.

→ each constituency tests made us discover a new constituent (= a new node to add in the tree representation)



**Practice** Draw a tree representation for the following sentence. For each constituent you draw, provide one experiment (constituency test) justifying it.

- (26) That new tall Russian rabbi will light that ancient bronze menorah on Friday night.