

Agenda Week 8

- Paper due on Wednesday
- Midterm reminder: Next Wed., March 7
- Specific Language Impairment: a specific problem with learning functional categories
- What are functional categories?
- How are functional categories acquired by normal children?
- Why do SLI children have difficulty acquiring functional category elements?

1

Paper 1: Evaluation Form

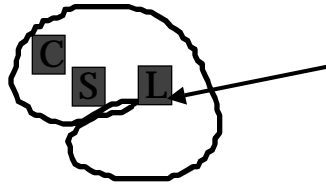
Part 1	weak	satisfactory	good
Hypothesis 1			
Support for the hypothesis:	1	2	3
Clarity of presentation:	1	2	3
Hypothesis 2			
Support for the hypothesis:	1	2	3
Clarity of presentation:	1	2	3
<hr/>			
Part 2			
Rationale			
Support for the hypothesis:	1	2	3
Clarity of presentation:	1	2	3
Hypothesis			
Identification of relevant aspect:	1	2	3
Clarity of presentation:	1	2	3
Experiment			
Ability to test hypothesis:	1	2	3
Clarity of presentation:	1	2	3
<hr/>			
Spelling	6+errors, 4-5 errors, 0-3 errors		
	1	2	3
Grammar	1	2	3

Comments:

Total Score _____

2

Specific Language Impairment



SLI: Slowness in constructing some parts of the language processor -- particularly the functional category component

C: Conceptual Processor
S: Social Processor
L: Language Processor

Autism: defective S
Kanzi: No (human) S or L
SLI: defective L

3

Child with SLI (CA: 5:0)

I want doggie.

What that? What that?

What that kind of book?

him gettin him jamas out.

him going outside.

Look at snowman.

Him lookin out window.

Snowman melt snow.

Sun make it melt.

That horsey broom.

4

Functional vs. Lexical Words

- *The girl tickles the baby.*
- *The girl tickled the baby on the leg.*
- *The girl is tickling the baby on the leg.*
- *I know that the girl has tickled the baby on the leg.*
- *Who can the girl tickle on the leg?*
- *The girl is not tickling the baby on the leg.*

5

Phrase Structure Terms

- **Words (lexical items), such as the N *picture* or the V *know*, are called *heads*.**
- **These heads *project* more complex structural units that contain them.**
- **These higher projections are called *phrases*, such as the NP *picture of Fred* or the VP *know the answer*.**

6

Lexical Categories

- **Open class of words (productive)**
 - **Nouns:** *dog, girl, crime, picture, ...*
 - **Adjectives:** *pretty, intelligent, blue, ...*
 - **Verbs:** *swim, tickle, give, know, ...*
- **Semantically *contentful***
- **Combine into hierachically structured *phrases***

7

Functional Categories

- **Closed class of words (unproductive)**
 - **Needed for nouns:** *the, a, his, ...*
 - **Needed for verbs:** *-ing, -ed, -s, to, will, should, can, ...*
 - **Needed for sentences:** *that, if, ...*
- **Purely *grammatical***
- **Also combine into hierachically structured *phrases***

8

Lexical vs. Functional Categories

Lexical

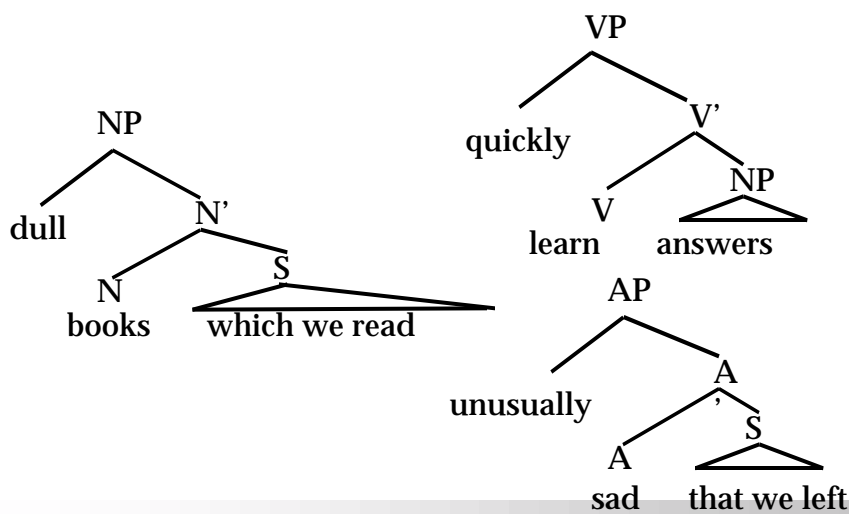
- Major
- Contentful
- Open class
- Usually stressed
- Damaged in Wernicke's aphasia
- Acquired first

Functional

- Minor
- Grammatical
- Closed class
- Often reduced
- Damaged in Broca's aphasia
- Acquired later
- Missing in telegraphic speech
- Symptom of SLI

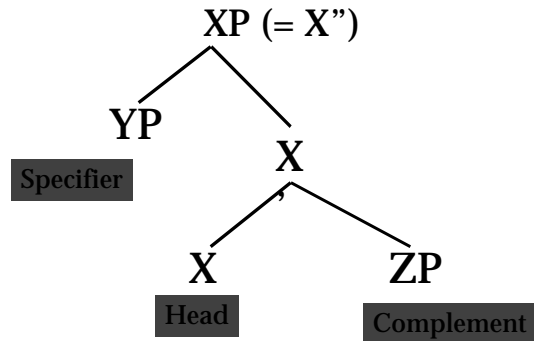
9

Phrases headed by Lexical Categories



10

X-bar Basic Tree Structure



Generalized Rules of Phrase Construction

$XP \rightarrow (YP) X'$ $X' \rightarrow X (ZP)$

“X” means any category, e.g. N, V, A

Universal Phrase Structure

All phrases have the same structure

Words head phrases ----->

➡ Phrases obey X'-syntax ---->

Two types of categories ----->

Lexical and Functional categories

Two levels of phrase structure ---->

Deep structure: before movement

Surface structure: after movement

Two types of phrases: lexical

> Noun Phrase:

- Head *books*
- Comp *which we read*
- Spec *dull*

> Verb Phrase

- Head: *learn*
- Comp: *answers*
- Spec: *quickly*

> Adjective Phrase

- Head *full*
- Comp *that we left*
- Spec: *unusually*

13

Two types of phrases: functional

■ Determiner: articles, possessives

■ Inflection: modals, tense, agreement

■ Complementizer: *that, whether*

> DP: a functional projection of NP

– Head *those* Comp *dull books which we read*

> IP: a functional projection of VP

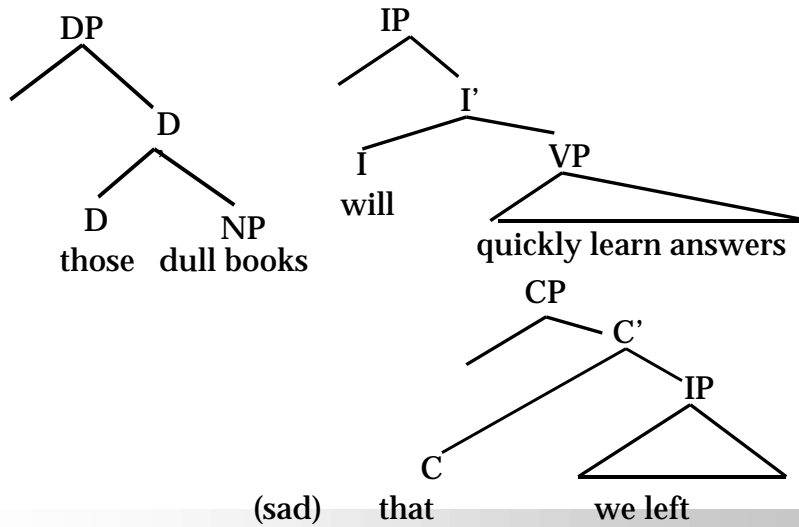
– Head *will* Comp *quickly learn answers*

> CP: a higher functional projection of VP

– Head *that* Comp *we left*

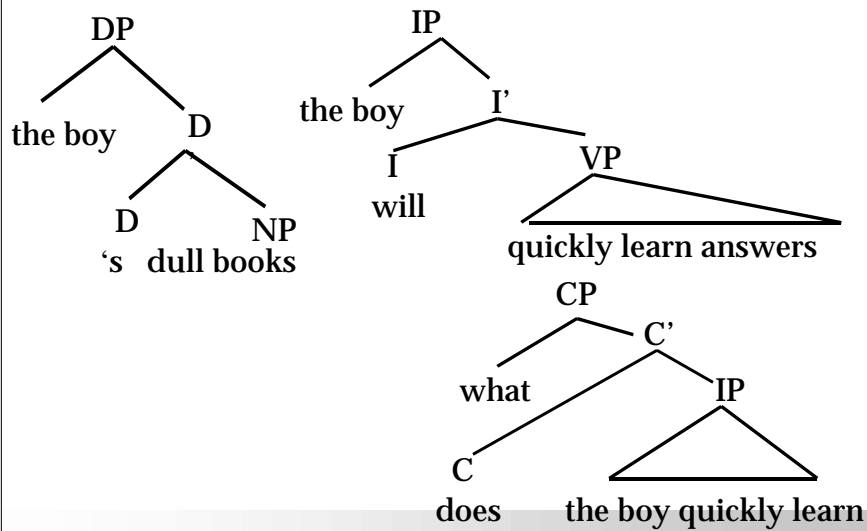
14

Functional Category Phrases



15

Functional categories: Specifiers



16

Motivation for functional categories

- Functional categories express *grammatical* information associated with lexical categories
- Functional categories are needed to allow lexical categories to combine with one another; they are the *glue* which holds sentences together

17

Universal Phrase Structure

All phrases have the same structure

Words head phrases ----->

Phrases obey X'-syntax --->

Two types of categories ----->

Lexical and Functional categories

Two levels of phrase structure --->

➡ Deep structure: before movement
Surface structure: after movement



18

Two Sentences Levels

- Two levels for every one sentence:

- > DS = the level *before* movement
- > SS = the level *after* movement

- Aux movement and *Wh*-movement:

- > the man **will** eat **what** ? 
- > **will** the man (*trace of will*) eat what ? 
- > **what** will the man (*trace*) eat (*trace of what*) ?

19

Movement and Sentence Levels of representation

- Two levels for every one sentence:

- > DS = the level *before* movement
- > SS = the level *after* movement

- Aux movement and *Wh*-movement

- Movement Rules

- > only certain objects can be moved
- > they can move to only certain locations
- > they may not move over certain other objects
- > they may not move too far

20

Movement MUST consider structure

A bad deduction of question formation

1. Is the man __ reading?

First AUX or highest AUX (=main AUX of the sentence)?

NO GOOD 2. *Is the man who __ happy is reading?

➡ 3. Is the man who is happy __ reading?

The rule: Move the structurally highest Aux in S

the man who is happy is the subject Noun Phrase (NP), so the *is* of the relative clause is not accessible. The rule targets not the first AUX, but the highest one, i.e. the one under Sentence (S).

21

Structure Dependency Principle

*Is the man who __ happy is reading?

Is the man who is happy __ reading?

*Have the man will __ eaten?

Will the man __ have eaten?

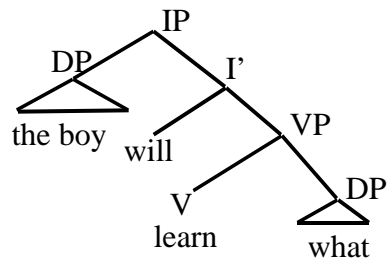
■ The operative rule must move the auxiliary *of the main clause*.

- Rules of grammar necessarily analyze hierarchical structures rather than linear strings.
- This principle is always fixed as such, although the mind could be different.

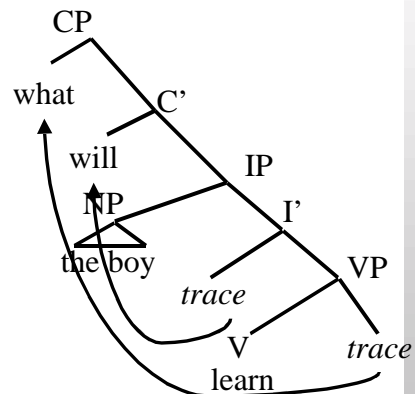
22

Movement in trees

Deep Structure



Surface Structure



23

Conditions on movement

- A head moves to a head position
 - Example: I-to-C in questions
- A phrase moves to a phrase position
 - Example: *Wh*-movement to SpecCP

24

Functional categories: acquisition

- Where do functional categories come from?
- When and how do children acquire them?
- Are they stored, accessed, and processed differently than lexical categories?

25

V-Raising — Auxiliaries (English)

English vs. French

In English, auxiliary verbs (*have*, *be*, and modals) precede adverbs and negation:

1.
 - a. John has always eaten chocolate.
 - b. John is always eating chocolate.
 - c. John should always eat chocolate.
2.
 - a. John has not eaten chocolate.
 - b. John is not eating chocolate.
 - c. John should not eat chocolate.

26

V-Raising — Main Verbs (English)

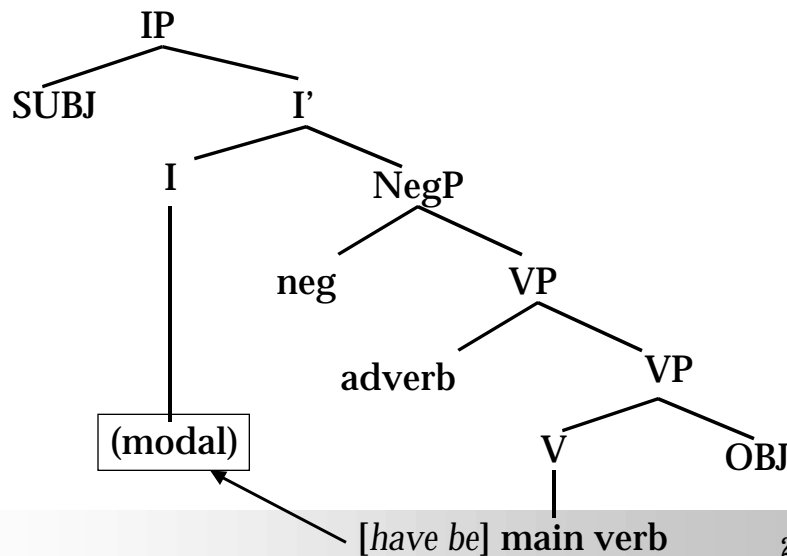
Main verbs, on the other hand, follow adverbs and negation:

3. a. John always eats chocolate.
 a'. *John eats always chocolate.
- b. John does not eat chocolate.
 b. *John eats not chocolate.

CONCLUSION: In English, *have* and *be* raise from V to I, but main verbs stay in V

27

Clause Structure (English)



V-Raising — Both Auxiliaries and Finite Main Verbs (French)

In French, auxiliaries precede adverbs and negation:

1. Jean a toujours mangé du chocolat.
John has always eaten of chocolate
2. Jean n' a pas mangé de chocolat.
John has not eaten of chocolate

Unlike in English, in French main verbs do as well:

3. Jean mange toujours du chocolat.
John eats always of chocolate
4. Jean ne mange pas de chocolat.
John eats not of chocolate

29

V-Raising — Infinitival Main Verbs (French)

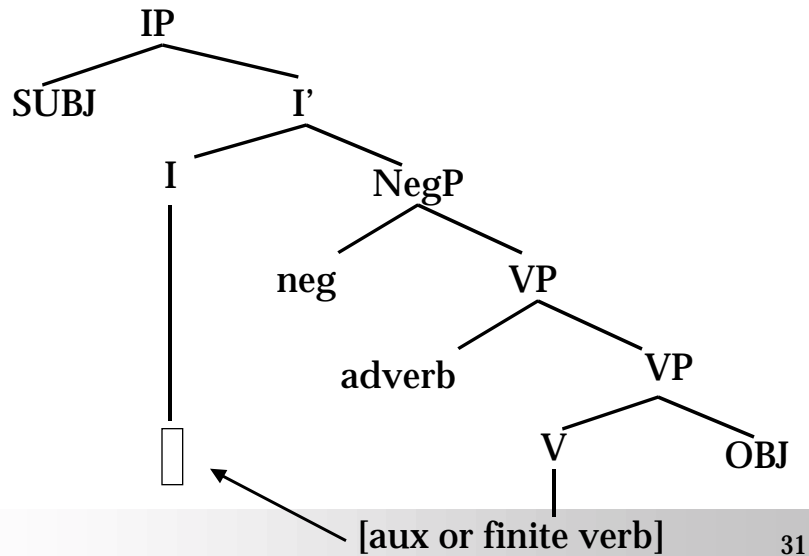
However, infinitival main verbs **follow** adverbs and negation:

5. toujours manger du chocolat.
always to-eat of chocolate
(*manger toujours du chocolat)
6. ne pas manger de chocolat.
not to-eat of chocolate
(*ne manger pas de chocolat)

CONCLUSION: In French, main verbs also raise from V to I, but only when finite.

30

Clause Structure (French)



31

Child Negation Structures

English vs. French

1. No I see truck.
'I don't see the truck.'
2. Pas attraper papillon.
not catch butterfly
'I can't catch the butterfly.'

Tentative conclusion: In both French and English early language, there is no IP. Hence verbs cannot raise from V.

32

V-Raising and Functional Categories

Some more French data (data from Deprez and Pierce, 1993)

3. Pas manger la poupée.
not eat the doll
4. Pas casser.
not break
5. Pas attraper papillon.
not catch butterfly
6. Pas rouler en vélo.
not roll on bike

33

V-Raising and Functional Categories

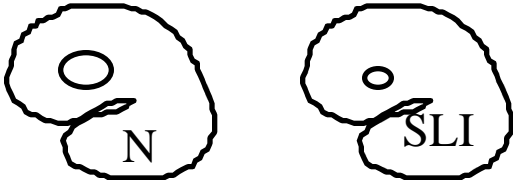
Some even more French child language data

7. Veux pas lolo.
want not milk **WHAT IS GOING ON?**
8. Marche pas
works not
9. Me plaît pas monsieur là.
me pleases not man there
10. Ça tourne pas
that turns not
11. Elle roule pas.
it rolls not

34

Neuroanatomic Evidence

SLI Broca's area is physically smaller



Adult lexical Problems

