

E105

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?

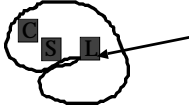
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Paper 1: Evaluation Form

	weak	satisfactory	good
Part 1			
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
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
6- errors, 4-5 errors, 0-3 errors			
Spelling	1	2	3
Grammar	1	2	3
Comments:	Total Score: _____		

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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

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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.

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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.*

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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*.

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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 hierarchically structured phrases**

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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 hierarchically structured phrases**

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Lexical vs. Functional Categories

Lexical	Functional
■ Major	■ Minor
■ Contentful	■ Grammatical
■ Open class	■ Closed class
■ Usually stressed	■ Often reduced
■ Damaged in Wernicke's aphasia	■ Damaged in Broca's aphasia
■ Acquired first	■ Acquired later
	■ Missing in telegraphic speech
	■ Symptom of SLI

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Phrases headed by Lexical Categories

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X-bar Basic Tree Structure

Generalized Rules of Phrase Construction

XP --> (YP) X' X' --> X (ZP)

"X" means any category, e.g. N, V, A

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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

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Two types of phrases: lexical

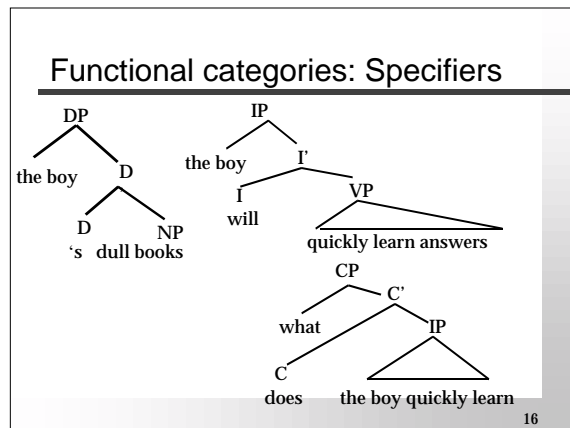
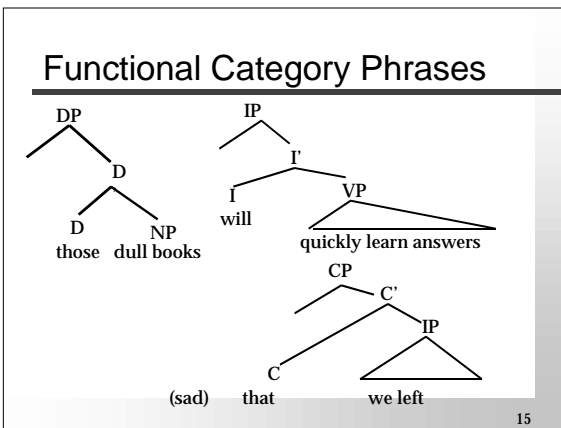
- > Noun Phrase:
 - Head: books
 - Comp: which we read
 - Spec: dull
- > Verb Phrase
 - Head: learn
 - Comp: answers
 - Spec: quickly
- > Adjective Phrase
 - Head: full
 - Comp: that we left
 - Spec: unusually

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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

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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

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Universal Phrase Structure

All phrases have the same structure

- Words head phrases ---->
- Phrases obey X'-syntax --->
- Two types of categories ----->
- Lexical and Functional categories
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- Deep structure: before movement
- Surface structure: after movement

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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*)?

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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

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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).

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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.

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Movement in trees

Deep Structure

A syntax tree for the sentence 'the boy will learn what'. The root is IP, which branches into DP ('the boy') and I'. I' branches into I ('will') and VP. VP branches into V ('learn') and DP ('what').

Surface Structure

A syntax tree for the sentence 'what will the boy learn trace'. The root is CP, which branches into SpecCP ('what') and C'. C' branches into C ('will') and IP. IP branches into NP ('the boy') and I'. I' branches into I ('trace') and VP. VP branches into V ('learn') and SpecVP ('trace'). Arrows indicate the movement of 'what' from the object position to SpecCP and 'will' from the I position to the C position.

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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

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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?

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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.

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V-Raising — Main Verbs (English)

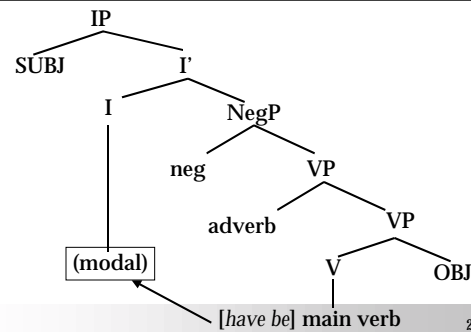
Main verbs, on the other hand, follow adverbs and negation:

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

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Clause Structure (English)



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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

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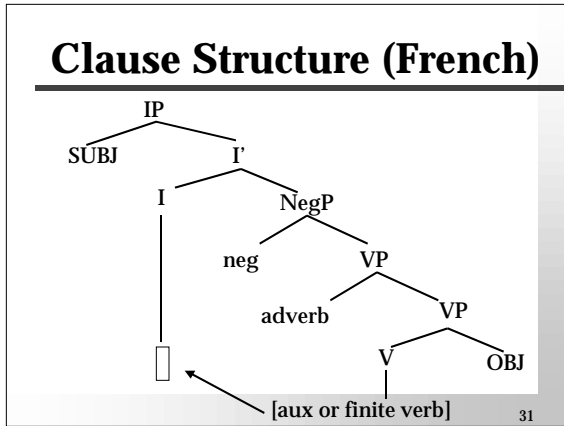
V-Raising — Infinitival Main Verbs (French)

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.

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Child Negation Structures

English vs. French

- No I see truck.
'I don't see the truck.'
- 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.

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V-Raising and Functional Categories

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

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

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V-Raising and Functional Categories

Some even more French child language data

- Veux pas lolo.
want not milk
- Marche pas
works not
- Me plaît pas monsieur là.
me pleases not man there
- Ça tourne pas
that turns not
- Elle roule pas.
it rolls not

WHAT IS GOING ON?

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Neuroanatomic Evidence

SLI Broca's area is physically smaller

Adult lexical Problems

nouns	concepts	verbs
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