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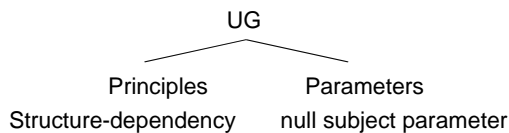
The Unity and Diversity of Human Language

Lecture #6
Feb 25th, 2009

Announcements

- Due to Prof. Stoll's talk on Friday, I'm holding a make-up office hour tomorrow from 1:30 to 2:30pm. I will still be in my office on Friday from 11:15am to 12noon.
- Any questions on homework #1?

What's in UG?



- "Clustering" effect of parameters.

The puzzle of the day

- English and Japanese are so dramatically different in the order of words within sentences. Why?
- How can we explain this in terms of parameters?
- Consider the examples again:

English vs. Japanese

- English:
The child might think that she will show Mary's picture of John to Chris.
- Japanese:
Taroo-ga Hiro-ga Hanako-ni zibun-no
Taroo-SU Hiro-SU Hanako-to self-POSS
syasin-o miseta to omette iru
picture-OB showed that thinking be
"Taro thinks (literally, is thinking) that Hiro showed a picture of himself to Hanako."

English vs. Japanese

Element A	Element B	English	Japanese
Verb	Direct Object	A precedes B	A follows B
Verb	Pre-/post-position phrase	A precedes B	A follows B
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Pre-/post-position	Related Noun Phrase	A precedes B	A follows B
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Auxiliary	Main verb	A precedes B	A follows B

A crash course in syntax

- To understand what's going on here, we have to introduce some basics of SYNTAX first.

A crash course in syntax

- Syntax is the study of how words combine together to form larger units in human language.
- The larger units are typically called phrases and sentences, and the use of these combinatorial rules creates "structure".
- In short, then, syntax is *the study of structure in human language*.
- A key notion in syntax is **constituency**. So, let's discuss this first.

Constituency

- Consider the following sentence:
The linguist has drawn a tree.
- If I ask you to divide the sentence into two units, where would you draw the line?
- Right:
(1) The linguist | has drawn a tree.

Constituency

- Intuitively, we "know" that certain words "hang together" in the sentence to the exclusion of others. We call such strings of words "constituents".
- And we can actually determine constituency by means of "objective" diagnostic tests. Let's consider a couple of these tests.

Substitution test for constituency

- If a string of words can be replaced by one word and the result is a grammatical sentence while preserving the original meaning, then it must be that this string of words comprises a "constituent".

Substitution test for constituency

- (2) a. [The linguist] has drawn a tree.
✓ *He* has drawn a tree..
- b. The [linguist has drawn a tree].
*The ???
- c. [The linguist has] drawn a tree.
*??? drawn a tree.
- d. [The linguist has drawn a] tree.
*??? tree.

Substitution test for constituency

- (3) a. [The tall boy] ate the burrito.
✓ *He* ate the burrito.
- b. The tall boy ate [the burrito].
✓ The linguist ate *it*.
- c. [The tall boy ate] the burrito.
*??? the burrito.
- d. The tall boy [ate the burrito]
✓ The tall boy *did*.
- e. The tall boy ate the burrito [in the classroom]
The tall boy ate the burrito *there*

Fronting test for constituency

- If a string of words can be fronted in a sentence, then this string of words comprises a “constituent”:
- (4) a. I first met him [at the party].
At the party I first met him.
- b. I first met [him at the party].
**Him at the party* I first met.

Fronting test for constituency

- c. I knew he would [eat the whole pizza],
and *eat the whole pizza* he did.
- d. *I knew he [would eat the] whole pizza,
and *would eat the* he did whole pizza.
- e. I read [this book by Chomsky] before.
This book by Chomsky I read before.
- f. I read this book [by Chomsky before].
**By Chomsky before* I read this book.

Heads vs. Complements

- Once we determine that a string of words is a constituent, the next step is to determine its syntactic type, or category.
- For this we make a distinction between a **head** and a **complement**.
- The head is the central word in a string, the one that requires other elements to be there.
- The complement is the part of the string that is there because of the head.
- The head and the complement together form what we call a phrase, and the syntactic category of the phrase is that of the head.

Types of Phrases

- So,
“picture of the boys” is a **noun phrase** (NP), since the head of the string is the N “picture”.

- “ate the sandwich”, by contrast, is a **verb phrase**, since the head of the string is the V “ate”.

- “in the office” is a **prepositional phrase** (PP) since the head of the string is the P “in”.

Phrase structure grammar

- We express this head-complement relationship by means of rewriting rules, which we call **phrase structure rules**, as in the following examples:
VP → V NP
PP → P NP
NP → N PP
etc.

Phrase structure grammar

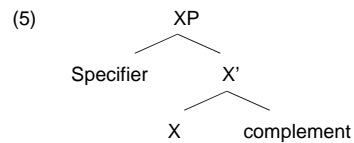
- Notice that while complements may be obligatory (depending on the requirements of the head), a head may also have optional “satellite” elements, e.g.,

John's picture of the boys
quickly ate the sandwich
right into the office

- These optional elements are called **specifiers**.

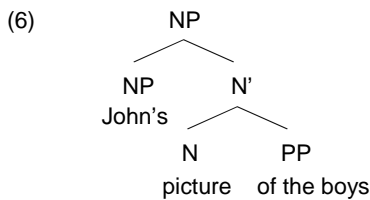
X'-schema for phrase structure

- To generalize, using X as a variable ranging over all heads, every phrase has the internal structure below:

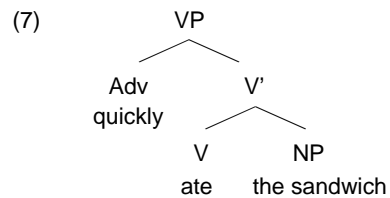


- We can then apply this X'-schema to all heads.

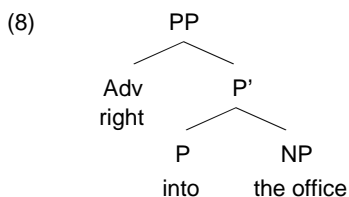
NP



VP



PP

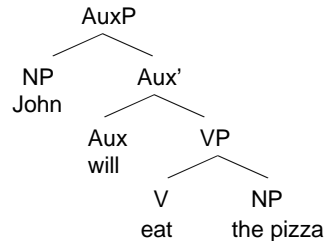


And yet another category

- Consider now sentences such as
 (9) John will eat the pizza.
- Since we know that “John” is a constituent, it must be that “will eat the pizza” is also a constituent. But what kind of constituent is it?
- Suppose we assume that the head here is the auxiliary verb “will”, whose complement is the VP “eat the pizza”, and whose specifier is the subject “John”, as shown in the following diagram:

AuxP

(10)



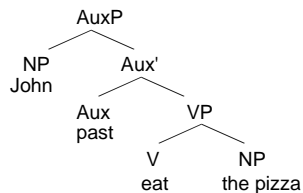
AuxP

- But now consider this sentence:
(11) John ate the pizza.
- Since the subject "John" is still present, we have to assume that there is some Aux element in the sentence, since subjects are specifiers of Aux. But it does not look like there is an auxiliary verb there.
- To solve this problem, let's assume that *Tense* is actually a form of Aux (alternatively, we can assume that Aux is a form of Tense, which has become the standard view now, but this is a labeling issue, hence not important).

AuxP

- The structure of "John ate the pizza" will look like that, then:

(12)



- Question: How does "eat" and "past" become the word "ate"?

One more category

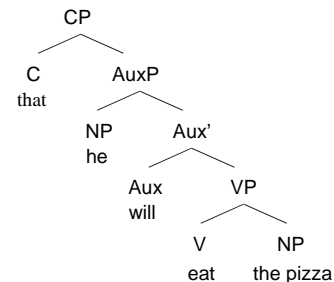
- Consider the embedded clause in
(13) John says [that he will eat the pizza].
- Now, the embedded clause looks identical to the AuxP from a previous slide, except that it has an extra element, that is, the complementizer *that*, which carries the so-called *illocutionary force* of the clause, e.g., whether the clause is declarative or interrogative.

CP

- Using the same X'-schema, this must be a head-complement relation (though no specifier is available here, but remember that specifiers are optional).
- Let's assume then that C also heads a phrase whose complement is AuxP, as shown on the next slide:

CP (embedded)

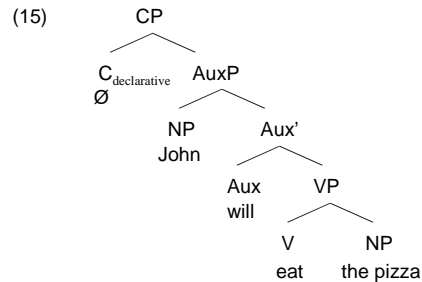
(14)



CP

- Notice, however, that if C determines the illocutionary force of a clause, then it must also be present in main (i.e., non-embedded) clauses, though not pronounced.
- In other words, the structure of “*John will eat the pizza*” is actually as on the next slide, with a null C heading the sentence and indicating that this is a declarative sentence:

CP (main)



A mini-grammar for English phrase structure

- So putting all of this together, here's a mini-grammar for English phrase structure, where bracketing indicates optionality:

(16)

CP → C AuxP
 AuxP → NP Aux'
 Aux' → Aux VP
 VP → V (NP)
 VP → V (PP)
 VP → V (CP)
 NP → N (PP)
 PP → P NP

A mini-grammar for English phrase structure

- In addition, we have to assume a set of rules that insert words under “terminal” nodes in the tree, e.g.,
 - N → {man, dog, justice, ...}
 - V → {love, hit, leave, ...}
 - Aux → {will, must, Past, Future, ...}
 - etc.
- As you should expect, these are called *lexical insertion* rules.

Now back to the puzzle of the day

- Why are English and Japanese so dramatically different in the order of words within sentences.
- How can we explain this in terms of parameters?
- Consider the examples again:

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English vs. Japanese

English	Japanese
VP → V NP	VP → NP V
VP → V PP	VP → PP V
VP → V CP	VP → CP V
PP → P NP	PP → NP P
NP → N PP	NP → PP N
CP → C AuxP	CP → AuxP C
AuxP → Aux VP	AuxP → VP Aux

English vs. Japanese

- Abstracting away from the type of categories involved in the rules, we can express the difference between English and Japanese phrase structure in two simple rules:

$XP \rightarrow X \text{ complement}$ (English)
 $XP \rightarrow \text{complement } X$ (Japanese)

The head directionality parameter

- The difference between English and Japanese thus comes down to the “directionality” of the head within the phrase: heads are initial in English, but final in Japanese.
- This is another instance of parametric variation in human languages, which we can state as follows:
 - Heads occur initially (i.e., before their complements) or finally (i.e., after their complements) within phrase structure.
- And this is the so-called *head directionality (HD) parameter*.

The head directionality parameter

- The head-initial setting of the HD parameter holds in English, Edo, Thai, Khmer, Indonesian, Zapotec and Salish, while the head-final setting holds in Japanese, Lakhota, Turkish, Basque, Navajo, the languages of the Eskimos, and Quechua.

How about subjects?

- Notice that the HD parameter does not say anything about the position of subjects in sentences, since these are not complements (they are specifiers, remember?). Is this good or bad?
- It's actually good, since English and Japanese are both subject-initial. We don't want to parameterize that. Rather in both languages, the subject is the specifier of Aux:
 - $AuxP \rightarrow NP \text{ Aux}'$

So, why do English and Japanese look dramatically different then?

- Now, let's try to make things more interesting and see how and why English and Japanese do really look dramatically different on the surface.
- Let's use a more visually appealing method: a syntactic tree.
- Here are the relevant PSRs for both languages again.

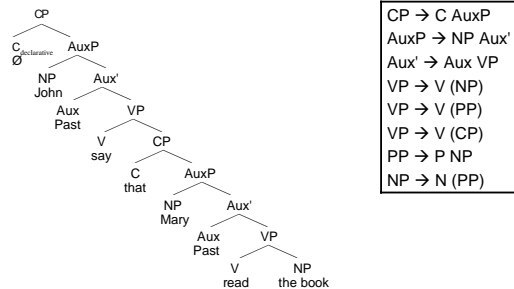
English vs. Japanese

English	Japanese
CP → C AuxP	CP → AuxP C
AuxP → NP Aux'	AuxP → NP Aux'
Aux' → Aux VP	Aux' → VP Aux
VP → V (NP)	VP → (NP) V
VP → V (PP)	VP → (PP) V
VP → V (CP)	VP → (CP) V
PP → P NP	PP → NP P
NP → N (PP)	NP → PP N

So, why do English and Japanese look dramatically different then?

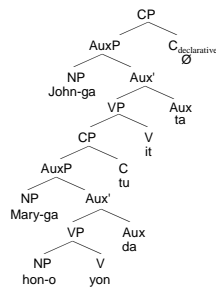
- Compare English and Japanese again:
John said that Mary read the book.
- John-ga Mary-ga hon-o yon-da-tu it-ta
John-SU Mary-OB book-OB read-past-comp say-past
- Given the PSRs for both English and Japanese, the structural trees will look as follows:

First: English



Second: Japanese

CP → AuxP C
AuxP → NP Aux'
Aux' → VP Aux
VP → (NP) V
VP → (PP) V
VP → (CP) V
PP → NP P
NP → PP N



So, ...

- The principles and parameters approach accounts for word order correlates in SVO and SOV languages in a straightforward manner.
- Notice also how a simple difference in head directionality leads to a dramatic variation on the surface, due to its cumulative effect on all heads and complements in a language.

And ...

- In addition, since the HD parameter does not apply to specifiers, it follows that both English and Japanese will behave the same with regard to the position of subjects in sentences.
- Finally, since the HD parameter has two settings only, it predicts two types of languages, SOV and SVO, which is exactly what we find in language samples: these two orders represent about 90% of human languages.

But ...

- We still want to explain why other language types do exist: VSO, VOS, OVS, and OSV.
- And this is exactly what we do on Monday.
- See you then!

Next class agenda

- VSO languages: Welsh vs. English.
- Verb position: French vs. English; also German vs. English.
- VOS/OVS/OSV languages: Malagasy/Hixkarayana/Nadëb
- Read Baker Chapter 5: Alloys and Compounds.