LNGT 0250
Morphology and Syntax

Announcements
• Change in Tuesday’s office hours from the afternoon to 9:15-10:45am.
• Midterm due on Wed by e-mail at 2pm.
• Paper requirement.
• Website: Snippets

Transition from last class
• Jen’s question on precedence: It does hold of nonterminal categories.

Precedence
• Consider this poorly drawn tree

No Crossing Branches Constraint
• If one node X precedes another node Y then X and all nodes dominated by X must precede Y and all nodes dominated by Y.

Transition from last class
• How do tree-geometric relations help us understand human language better?
• First, we sharpen our ‘intuitive’ definitions.
• Constituent.
• Subjects/direct objects/indirect objects/obliques.
Grammatical Relations in tree-geometric terms

- **Subject**: NP/CP daughter of TP
- **Object of a Preposition**: NP daughter of PP
- **Direct Object**:
  - With verbs of type $V[NP \_ NP], V[NP \_ CP]$ and $V[NP \_ NP\_ PP]$, the NP or CP daughter of VP
  - With verbs of type $V[NP \_ NP\_ NP\_ CP\_ ]$, an NP or CP daughter of VP that is preceded by an NP daughter of VP.

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Grammatical Relations

- **Indirect Object**: This is the 1st object indicating the goal of a verb of transfer (a ditransitive) or the PP of the same kind of verb:
  - With verbs of type $V[NP \_ NP\_ PP]$, the PP daughter of VP immediately preceded by an NP daughter of VP.
  - With verbs of type $V[NP \_ NP\_ NP\_ CP\_ ]$, the NP daughter of VP immediately preceded by V (i.e. the first NP daughter of VP)
- **Oblique**: Any other NP/PP in the sentence.

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Grammatical Relations

- **Direct Object**
- **Object of a Preposition**

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Today's agenda

- We destroy our theory of phrase structure grammar and build it again! 😊
- Why would we want to do that?
- Because once we expand the range of our empirical data, we realize the need to revise the theory. **Comprehensiveness** is important.
- And because we’re scientists; we’re always looking to improve the design of our theories. **Elegance** is important.
- And because we’re truth seekers; we are never content.
What are some problems with PSRs?

63) a) CP \rightarrow \langle C \rangle \, TP
   b) TP \rightarrow \langle NP/CP \rangle \, (\langle T \rangle \, VP)
   c) VP \rightarrow (AdvP+) V (\langle NP/CP \rangle) (AdvP+) (\langle PP+ \rangle) (AdvP+)
   d) NP \rightarrow (\langle D \rangle) (\langle AdjP+ \rangle) N (\langle PP+ \rangle) (CP)
   e) PP \rightarrow P (NP)
   f) AdjP \rightarrow (AdvP) Adj
   g) AdvP \rightarrow (AdvP) Adv
   h) XP \rightarrow XP \, conj \, XP
   i) X \rightarrow X \, conj \, X

What are some problems with PSRs?

- Conceptual problems:
  1. Sometimes the head is required (e.g., NP and VP); and sometimes it is not (e.g., CP and TP).
  2. Some rules also look very convoluted (e.g., the VP rule). Simpler is beautiful.
  3. Think child-like!

What are some problems with PSRs?

- Empirical issues:
  - Trees created by these PSRs are not hierarchical enough. They are rather flat. Why is this a problem?
  - Because strings that are shown by constituency tests to be constituents do not appear *exhaustively dominated* by one node in a tree.
  - Let’s look at examples.

Flat Structure

- NP \rightarrow (D) (AdjP+) N (PP+)

Flat Structure

- I saw the tall [student of physics] with red hair not the short [one] with brown hair.

Flat Structure

- I saw the tall [student of physics with red hair] not the short [one].
Introducing N’ levels

• Can we do better?

• Yes. What we need is more ‘intermediate levels’ within NP structure to reflect the one-replacement facts.

• Each intermediate level within NP structure is called N’ (pronounced N-bar).

N’ Structure

N’ rules

• NP \rightarrow (D) N’
• N’ \rightarrow (AdjP) N’ or N’ (PP)
• N’ \rightarrow N (PP)

An iterative (self-recursive) rule: can apply as many times as needed

One-Replacement

Replace an N’ node with [one]

not N, not NP

I saw the tall student of physics with red hair, not
Rich structure within VPs as well

- Similar empirical evidence holds in VPs.
- The [do (so) (too)] test.

Flat Structure in VPs

- John often sings opera loudly at church and Mary [does so too].

- John often sings opera loudly at church and Mary frequently [does so too].

- John often sings opera loudly at church but Mary rarely [does so] in the library.

- John often sings opera loudly at church but Mary rarely [does so] quietly in the library.
• Solution to the puzzle: Introduce V’ levels.

V’ Structure

this may seem mysterious, but we’ll understand why in chapter 8

V’ rules

• VP → V’ (a vacuous rule)
• V’ → (AdvP) V’ or V’ (AdvP) or V’ (PP)
• V’ → V (NP)

An iterative (self-recursive) rule: can apply as many times as needed

Do(so)(too) replacement

replace a V’ node with [did (so) (too)]
not VP, not V

Further Evidence for V’ from coordination

*seldom does so folksongs quietly in the library
Adj’
- Evidence from so-replacement:
- Bob is [very [serious about Mary]], but [less [so]] than Paul.
- AdjP \rightarrow Adj’
- Adj’ \rightarrow (AdvP) Adj’
- Adj’ \rightarrow Adj (PP)

P’
- Similar evidence can be constructed for PPs, leading us to the following rules:
- PP \rightarrow P’
- P’ \rightarrow P’ (PP) or (AdvP) P’
- P’ \rightarrow P (NP)

The rules with bar levels
- NP \rightarrow (D) N’
- N’ \rightarrow (AdjP) N’ or N’ (PP)
- N’ \rightarrow N (PP)
- VP \rightarrow V’
- V’ \rightarrow (AdvP) V’ or V’ (AdvP) or V’ (PP)
- V’ \rightarrow V (NP)
- AdjP \rightarrow Adj’
- Adj’ \rightarrow (AdvP) Adj’
- Adj’ \rightarrow Adj (PP)
- PP \rightarrow P’
- P’ \rightarrow (AdvP) P’ or P’ (PP)
- P’ \rightarrow P (NP)

YIKES! Is there a simpler way?
Are we missing any generalizations here?

Generalization 1: 3 types of rules
- For each major category there are 3 types of rules:
  - A rule that generates the phrase: NP \rightarrow (D) N’
  - A rule that iterates: N’ \rightarrow (AP) N’
  - A rule that introduces the “head” N’ \rightarrow N (PP)

Specifier rule
Adjunct rule
Complement rule

Generalization 2: Headedness
- In each rule the only item that is obligatory is the item that gives its category to the node that dominates it:
  - NP \rightarrow (D) N’
  - N’ \rightarrow (AP) N’
  - N’ \rightarrow N (PP)
- There are no rules of the form NP \rightarrow V AP. (This is called endocentricity of the rule.)

Generalization 3: Optionality
- With the exception of determiners (more on that in chapter 7), all non-head material is both phrasal and optional:
  - NP \rightarrow (D) N’
  - N’ \rightarrow (AP) N’
  - N’ \rightarrow N (PP)
Goals of X-bar theory

- Simplify the system of rules
- Capture intermediate levels of structure
- Capture the cross-categorial generalizations.
- We will use VARIABLES to do this. A variable is a category that can stand for any other category.
- X, Y, W, Z are variables that can stand for any of N, V, A, P.

The X-bar Rules (to be slightly revised)

- Specifier Rule: XP → (YP) X'
- Adjunct Rule: X' → (ZP) X' or X' → X' (ZP)
- Complement Rule: X' → X (WP)

where X can stand for any category (N, V, Adj, Adv, P). X must be consistent through the 3 rules.
Summary

- Constituency tests show us there is intermediate structure in phrases. (evidence varies in strength)
- There are cross-categorial generalizations to be made:
  - 3 rules: Specifier, adjunct, complement
  - Headedness & Endocentricity
  - Optionality of modifiers

Complements vs. Adjuncts

- Let’s put specifiers to the side for now, and focus on complements vs. adjuncts.
- Do we have evidence for the complement vs. adjunct distinction. And how do we differentiate between the two.
- There is empirical evidence indeed that can serve as diagnostics for the distinction.
- We discuss this with regard to NPs and VPs.

X-bar Structures

- AdvP
  YP     Adv’
    Adv’    ZP₁
      Adv’    ZP₂
        Adv    WP

X-bar Structures

- PP
  YP   P’
    P’    ZP₁
      P’    ZP₂
        P    WP

X-bar theory

- Specifier Rule: XP → (YP) X’
- Adjunct Rule: X’ → (ZP) X’ or X’ → X’ (ZP)
- Complement Rule: X’ → X (WP)

Formal Definitions

Specifiers:
XP → (YP) X’

Adjuncts:
X’ → (ZP) X’ or X’ → X’ (ZP)

Complements:
X’ → X (WP)
Quick way to distinguish complements and adjuncts in NPs (doesn’t work for other categories). Complements of N are marked with the preposition ‘of’. All other prepositions mark adjuncts. (This is not fool proof!)

**Complements always closest to head**

The student of linguistics from Phoenix

* The student from Phoenix of linguistics

since complements are sisters to the head

Only one complement, multiple adjuncts

- X’ -> (ZP) X’ or X’ -> X’ (ZP)  Iterative
- X’ -> X (WP)  not iterative

the student of linguistics with the red hair from Phoenix in the bath

*the student of linguistics of chemistry from Phoenix

**Adjuncts can be reordered**

The student of linguistics from Phoenix with red hair on the bus.
The student of linguistics with red hair from Phoenix on the bus.
The student of linguistics on the bus with red hair from Phoenix.
The student of linguistics on the bus with red hair. The student of linguistics from Phoenix with red hair. The student of linguistics from Phoenix on the bus with red hair.

*The student from Phoenix of linguistics with red hair on the bus
*The student from Phoenix with red hair of linguistics on the bus
*The student from Phoenix with red hair on the bus of linguistics (etc.)

**Conjunction**

- The conjunction rule: X^n -> X^n Conj X^n
- The red and blue house  *The red and cat
- Complements can be conjoined with complements:
  - The student of linguistics and of philosophy
- Adjuncts can be conjoined with adjuncts
  - The student with red hair and with a tattoo
- Complements cannot be conjoined with adjuncts
  - *The student of linguistics and with red hair
4/6/2015

One replacement

- *One Replacement:* replace N' with one.

```
NP D N' PP
the student from Phoenix
```

- can NOT be replaced by one
- therefore an adjunct can follow 'one' but complements cannot!

The student from Phoenix not the [N'one] from Tucson
- *The student of linguistics not the one of chemistry*

For those of you who find the last sentence grammatical, your rule targets both N and N' and this test won't work for you to distinguish adjuncts from complements.

Telling complements from adjuncts

<table>
<thead>
<tr>
<th>Complements</th>
<th>Adjuncts</th>
</tr>
</thead>
<tbody>
<tr>
<td>only 1</td>
<td>multiple allowed</td>
</tr>
<tr>
<td>closest to head</td>
<td>may be separated from head</td>
</tr>
<tr>
<td>cannot be reordered</td>
<td>can be reordered</td>
</tr>
<tr>
<td>conjoin with complements</td>
<td>conjoin with adjuncts</td>
</tr>
<tr>
<td><em>(one)+complement</em></td>
<td><em>(one)+adjunct</em></td>
</tr>
</tbody>
</table>

An easy mistake to make!

- When you have only one PP modifier or AdjP modifier, be very careful to see if it is a complement or adjunct. If it is an adjunct it must be a sister to the X' level!!!!!!

```
NP D N' AdjP
the big banana
```

- *N' is CRUCIAL!!*

The complement/adjunct distinction in VPs

- John [VP often eats apples with a fork]
  - adjunct head complement adjunct
  - In VPs, the direct object is always the complement. (Almost) everything else is an adjunct.
  - (Exception to the rule: the verbs *give* and *put* take two complements an NP and a PP.)
  - I gave the apple to John (both are complements)
  - I put the book on the table

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I loved the policeman intensely with all my heart
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I gave the apple to John (both are complements)
I put the book on the table

I loved the policeman intensely with all my heart

- AdjP
  - with all my heart
  - the policeman
  - adjuncts
• Only 1 complement
  • *I loved the policeman the fireman
• Closeness to V and reordering
  • I loved the policeman with all my heart intensely
  • *I loved intensely the policeman with all my heart
  • *I loved intensely with all my heart the policeman
• Conjunction
  • I loved the policeman and the fireman
  • I loved the policeman intensely and with all my heart
  • *I loved the policeman and intensely

• Do so replacement
  Susan loved the policemen intensely with all her heart but/and
  • Mary did so with her brain!
  • Mary did so mildly with her brain
  • *Mary did so the fireman

Summary
• Specifier: sister to X', daughter of XP
• Adjunct: sister to X', daughter of X'
• Complement: sister to X, daughter of X'
• X-bar theory predicts differences in behavior between complements and adjuncts
  • only one complement, multiple adjuncts
  • complement must be closest to head
  • adjuncts can be reordered
  • conjunction
  • *One/did so + complement

Next class agenda
• Extending X-bar Theory to functional categories. Read Chapter 7.
• Introducing Theta Theory. Start reading chapter 8.

Acknowledgement
• Most of the slides for this lecture are borrowed from Andrew Carnie’s slides.