Ling 566
Nov 20, 2014
Catch-up/review
Overview

- Ch 13 examples
- Big picture
- Untangle this...
- If time: Berlin CCS recap
## Some Type Constraints

<table>
<thead>
<tr>
<th>TYPE</th>
<th>FEATURES/CONSTRAINTS</th>
<th>IST</th>
</tr>
</thead>
<tbody>
<tr>
<td>verb-lxm</td>
<td></td>
<td>infl-lxm</td>
</tr>
<tr>
<td></td>
<td>SYN</td>
<td>HEAD</td>
</tr>
<tr>
<td></td>
<td>ARG-ST</td>
<td>⟨[HEAD nominal], ...⟩</td>
</tr>
<tr>
<td></td>
<td>SEM</td>
<td>MODE</td>
</tr>
<tr>
<td>srv-lxm</td>
<td></td>
<td>verb-lxm</td>
</tr>
<tr>
<td></td>
<td>ARG-ST</td>
<td>⟨[SPR 1], [COMPS 1]⟩</td>
</tr>
<tr>
<td>ic-srv-lxm</td>
<td></td>
<td>srv-lxm</td>
</tr>
<tr>
<td></td>
<td>ARG-ST</td>
<td>⟨X, [INF + INDEX s]⟩</td>
</tr>
<tr>
<td></td>
<td>SEM</td>
<td>RESTR</td>
</tr>
<tr>
<td>auxv-lxm</td>
<td>SYN</td>
<td>HEAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AUX +</td>
</tr>
<tr>
<td></td>
<td></td>
<td>srv-lxm</td>
</tr>
</tbody>
</table>

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The ADV$\_{pol}$-Addition Lexical Rule

\[
\begin{align*}
\text{INPUT} & \quad \left\langle X, \begin{bmatrix}
\text{SYN} & \text{HEAD} & \begin{bmatrix} \text{verb} \\
\text{FORM fin} \\
\text{POL } - \\
\text{AUX } + 
\end{bmatrix}
\end{bmatrix}\right
\end{align*}
\]

\[
\begin{align*}
\text{ARG-ST} & \quad \langle 1 \rangle \oplus \langle A \rangle \\
\text{SEM} & \quad \begin{bmatrix} \text{INDEX } s_1 \end{bmatrix}
\end{align*}
\]

\[
\begin{align*}
\text{OUTPUT} & \quad \left\langle Y, \begin{bmatrix}
\text{SYN} & \text{HEAD} & \begin{bmatrix} \text{POL } + \n\end{bmatrix}
\end{bmatrix}\right
\end{align*}
\]

\[
\begin{align*}
\text{ARG-ST} & \quad \langle 1 \rangle \oplus \langle \text{ADV}_\text{pol} \rangle \\
\text{SEM} & \quad \begin{bmatrix} \text{INDEX } s_2 \end{bmatrix}
\end{align*}
\]
Negation and Reaffirmation: A Sample Tree

```
NP
  Leslie

VP
  V
    did

  ADV_{pol}
    so

  VP
    eat the whole pizza
```
The Inversion Lexical Rule

\[ \text{pi-rule} \]

INPUT
\[ \langle W, \ \langle \text{SYN} \ \text{HEAD} \ [\text{verb} \ [\text{FORM} \ \text{fin} \ [\text{AUX} \ +] \ [\text{VAL} \ [\text{SPR} \ \langle \ X \ \rangle]]] \rangle \rangle \]

ARG-ST \[ \langle A \rangle \]

SEM \[ \langle \text{MODE} \ \text{prop} \rangle \]

OUTPUT
\[ \langle Z, \ \langle \text{SYN} \ [\text{HEAD} \ [\text{INV} \ +] \ [\text{VAL} \ [\text{SPR} \ \langle \ \rangle]]] \rangle \rangle \]

ARG-ST \[ \langle A \rangle \]

SEM \[ \langle \text{MODE} \ \text{ques} \rangle \]
Inversion: A Sample Tree

S

V

Did

VP

eat the entire pizza?

NP

Leslie
The Contraction Lexical Rule

\[ pi-rule \]

INPUT \[ \langle 2, \]
\[ \text{ARG-ST } \overline{B} \]
\[ \text{SEM } \]
\[ \text{INDEX } s_1 \]
\[ \text{RESTR } \overline{A} \]
\[ \rangle \]

OUTPUT \[ \langle \text{F}_{\text{NEG}}(2), \]
\[ \text{ARG-ST } \overline{B} \]
\[ \text{INDEX } s_2 \]
\[ \text{RESTR } \]
\[ \langle \text{RELN } \overline{s_2}, \]
\[ \text{SIT } s_2 \]
\[ \text{ARG } s_1 \]
\[ \rangle \oplus \overline{A} \]
Contraction: Sample Tree

S
 /\  
NP VP
 / | 
Leslie V VP
  |   
   wouldn’t eat the entire pizza
The Ellipsis Lexical Rule

\[
\begin{align*}
\text{INPUT} & \quad \left[ \begin{array}{c}
1 \\
\text{auxv-lxm} \\
\text{ARG-ST} \quad \langle 2 \rangle \oplus A
\end{array} \right]
\end{align*}
\]

\[
\begin{align*}
\text{OUTPUT} & \quad \left[ \begin{array}{c}
1 \\
\text{dervv-lxm} \\
\text{ARG-ST} \quad \langle 2 \rangle
\end{array} \right]
\end{align*}
\]

- Note that this is a derivational LR (\textit{d-rule}) -- that is, lexeme-to-lexeme

- This means that SYN and SEM are unchanged, by default
Ellipsis: A Sample Tree

S

NP

Kim

V
could

VP
could have been attending the conference

VP
could have been

VP

could have been

VP

could have been

VP

could have been

VP

could have been

VP

could have been

VP

could have been

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could have been

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could have been

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could have been

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could have been

VP

could have been
Parts of our model

- Type hierarchy (lexical types, other types)
- Phrase structure rules
- Lexical rules
- Lexical entries
- Grammatical principles
- Initial symbol
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Pause for reflection

• What have you learned about the nature of human language?
• What have you learned about how linguists think about language?
• How does this model/type of model differ from CFG (with atomic categories)?
• In what applications might (atomic category) CFG be sufficient?
• What applications might benefit from something linguistically more motivated?
Complicated example #1

• What phenomena are illustrated by this sentence?

• What rules or interesting lexical types are involved in our analysis of it?

• What tree structure does our grammar assign?

*It was explained to me that Kim left.*
It was explained to me that Kim left.
Complicated examples #2

I expect it to continue to surprise Kim that Sandy laughed.
I expect it to continue to surprise Kim that Sandy laughed.
Why not these?

*I expect it to continue to surprise Kim Sandy laughed.

*I expect there to continue to surprise Kim that Sandy laughed.

*I expect that Sandy laughed to Kim be surprised.
Complicated example #4

You all laughed, did you not?

*You all laughed, did not you?

You all laugheded, didn’t you?
you laughed

You did not laugh all.
You all laughed didn't you
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