

# Head-Driven Phrase Structure Grammar An Introduction as Background for Grammar Implementation

## Part III: Unbounded Dependency Constructions

Detmar Meurers  
OSU, LING795K, Spring 2002

1

### A first example: *Wh*-elements

*Wh*-elements can have different functions:

- |        |   |                            |
|--------|---|----------------------------|
| (1) a. | <i>Who did Hobbs see _ ?</i>                  | Object of verb             |
| b.     | <i>Who do you think _ saw the man?</i>        | Subject of verb            |
| c.     | <i>Who did Hobbs give the book to _ ?</i>     | Object of prep             |
| d.     | <i>Who did Hobbs consider _ to be a fool?</i> | Object of obj-control verb |

*Wh*-elements can also occur in subordinate clauses:

- |        |  |
|--------|--|
| (2) a. | <i>I asked who the man saw _ .</i>                     |
| b.     | <i>I asked who the man considered _ to be a fool .</i> |
| c.     | <i>I asked who Hobbs gave the book to _ .</i>          |
| d.     | <i>I asked who you thought _ saw Hobbs.</i>            |

3

### From local to non-local dependencies

- A head generally realizes its arguments locally within its head domain.
- Certain kind of constructions resist this generalization, such as, for example, the *wh*-questions discussed below.
- How can the non-local relation between a head and such arguments be licensed? How can the properties be captured?

2

Different categories can be extracted:

- |        |   |      |
|--------|---|------|
| (3) a. | <i>Which man did you talk to _ ?</i>            | NP   |
| b.     | <i>[To [which man]] did you talk _ ?</i>        | PP   |
| c.     | <i>[How ill] has the man been _ ?</i>           | AdjP |
| d.     | <i>[How frequently] did you see the man _ ?</i> | AdvP |

This sometimes provides multiple options for a constituent:

- |        |                                   |
|--------|-----------------------------------|
| (4) a. | <i>Who does he rely [on _ ]?</i>  |
| b.     | <i>[On whom] does he rely _ ?</i> |

Unboundedness:

- |        |  |
|--------|--|
| (5) a. | <i>Who do you think Hobbs saw _ ?</i>                          |
| b.     | <i>Who do you think Hobbs said he saw _ ?</i>                  |
| c.     | <i>Who do you think Hobbs said he imagined that he saw _ ?</i> |

4

## Unbounded dependency constructions

An unbounded dependency construction

- involves constituents with different functions
- involves constituents of different categories
- is in principle unbounded

Two kind of unbounded dependency constructions (UDCs)

- Strong UDCs
- Weak UDCs

5

## Weak UDCs

No overt constituent in a non-argument position:

Purpose infinitive (*for-to* clauses):

(11) *I bought it<sub>i</sub> for Sandy to eat <sub>-i</sub> .*

*Tough* movement:

(12) *Sandy<sub>i</sub> is hard to love <sub>-i</sub> .*

Relative clause without overt relative pronoun:

(13) *This is [the politician]<sub>i</sub> [Sandy loves <sub>-i</sub> ].*

*It*-clefts without overt relative pronoun:

(14) *It is Kim<sub>i</sub> [Sandy loves <sub>-i</sub> ].*

7

## Strong UDCs

An overt constituent occurs in a non-argument position:

Topicalization:

(6) *Kim<sub>i</sub>, Sandy loves <sub>-i</sub> .*

*Wh*-questions:

(7) *I wonder [who<sub>i</sub> Sandy loves <sub>-i</sub> ].*

*Wh*-relative clauses:

(8) *This is the politician [who<sub>i</sub> Sandy loves <sub>-i</sub> ].*

*It*-clefts:

(9) *It is Kim<sub>i</sub> [who<sub>i</sub> Sandy loves <sub>-i</sub> ].*

Pseudoclefts:

(10) *[What<sub>i</sub> Sandy loves <sub>-i</sub> ] is Kim<sub>i</sub> .*

6

## Some properties of UDC constructions

Link between filler and gap with category information needed:

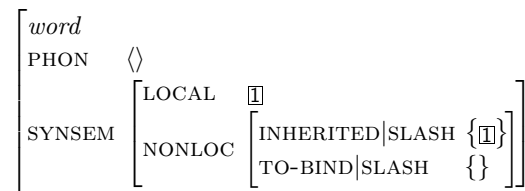
- (15) a. *Kim<sub>i</sub>, Sandy trusts <sub>-i</sub> .*  
b. *[On Kim]<sub>i</sub>, Sandy depends <sub>-i</sub> .*
- (16) a. *\*[On Kim]<sub>i</sub>, Sandy trusts <sub>-i</sub> .*  
b. *\*Kim<sub>i</sub>, Sandy depends <sub>-i</sub> .*

8

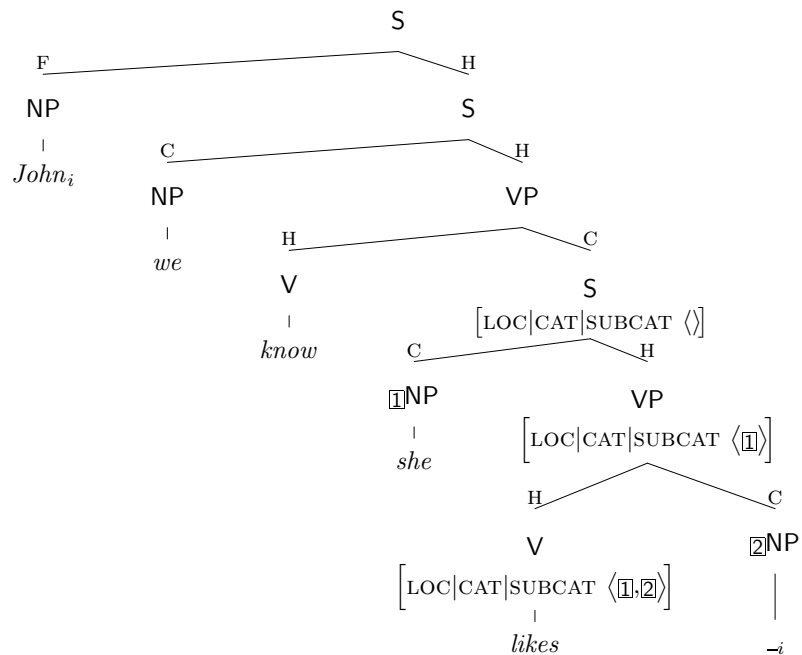
And this link has to be established for an unbounded length:

- (17) a. *Kim<sub>i</sub>, Chris knows Sandy trusts <sub>-i</sub>.*  
 b. *[On Kim]<sub>i</sub>, Chris knows Sandy depends <sub>-i</sub>.*
- (18) a. \**[On Kim]<sub>i</sub>, Chris knows Sandy trusts <sub>-i</sub>.*  
 b. \**Kim<sub>i</sub>, Chris knows Sandy depends <sub>-i</sub>.*
- (19) a. *Kim<sub>i</sub>, Dana believes Chris knows Sandy trusts <sub>-i</sub>.*  
 b. *[On Kim]<sub>i</sub>, Dana believes Chris knows Sandy depends <sub>-i</sub>.*
- (20) a. \**[On Kim]<sub>i</sub>, Dana believes Chris knows Sandy trusts <sub>-i</sub>.*  
 b. \**Kim<sub>i</sub>, Dana believes Chris knows Sandy depends <sub>-i</sub>.*

### The bottom of a UDC: Traces

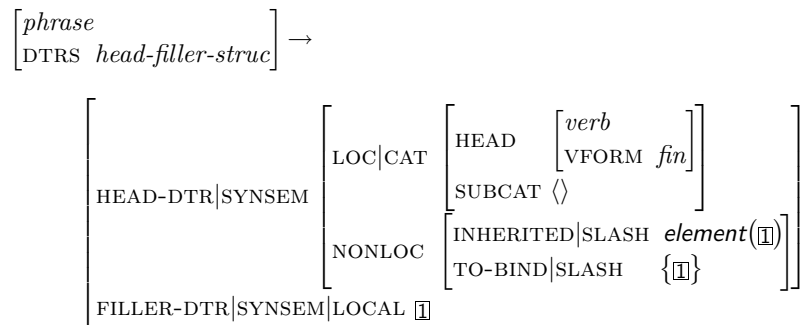


### An example for a strong UDC

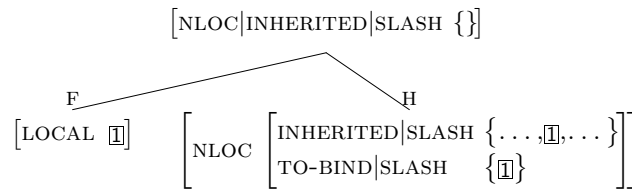


### The top of a UDC: Filler-head structures

Filler-head schema

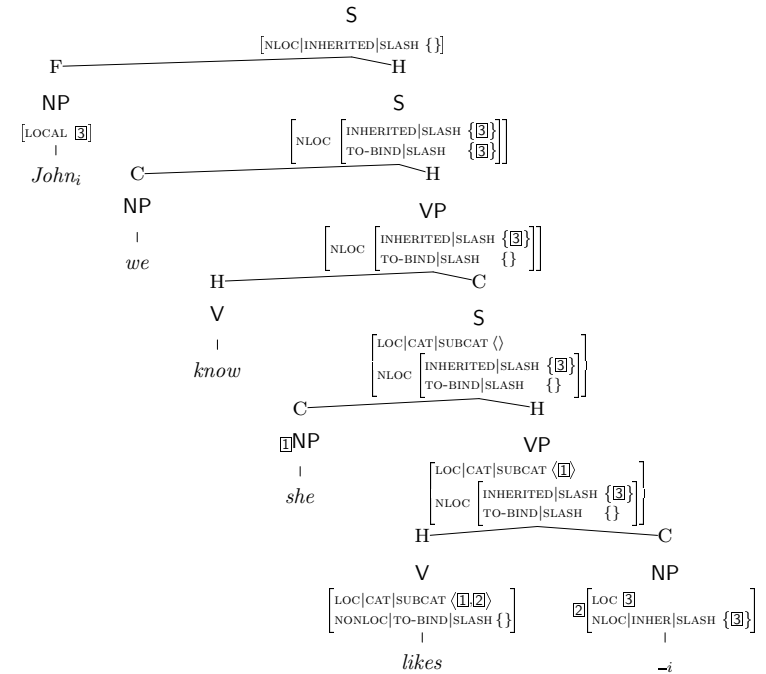


### The top of a UDC: Filler-head structures Example for a structure licensed by the filler-head schema



13

### The analysis of the strong UDC example



### The middle of a UDC: The Nonlocal Feature Principle (NFP)

For each nonlocal feature, the INHERITED value on the mother is the union of the INHERITED values on the daughter minus the TO-BIND value on the head daughter.

14

### The analysis of weak UDCs

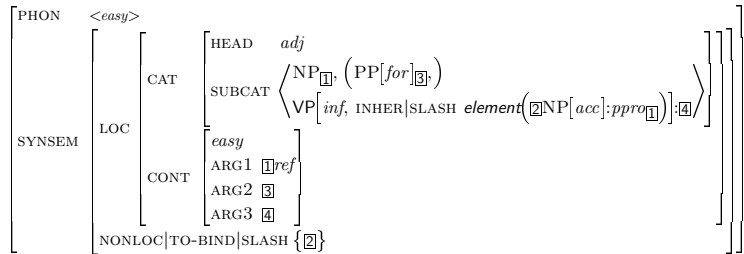
- (21) a. *Kim<sub>i</sub> is easy (for John) to please -<sub>i</sub>*  
 b. *Kim<sub>i</sub> is easy to prove that Mary asked Paul to bribe -<sub>i</sub>.*
- (22) a. *It is easy to please him<sub>ACC</sub> / \*he<sub>NOM}</sub>.*  
 b. *I<sub>NOM} am easy to please -<sub>ACC}</sub>.</sub>*

Subject is role assigned:

- (23) a. *I believe there to be a unicorn in the garden.*  
 b. *\* There is easy to believe a unicorn in the garden.*
- (24) a. *[This sonata]<sub>i</sub> is easy to play -<sub>i</sub> on that violin.*  
 b. *[This violin]<sub>i</sub> is easy to play this sonata [on -<sub>i</sub>].*

16

## Lexical entry of adjective *easy*



17

## Limiting the occurrence of traces

The *that*-trace effect, one of the island effects:

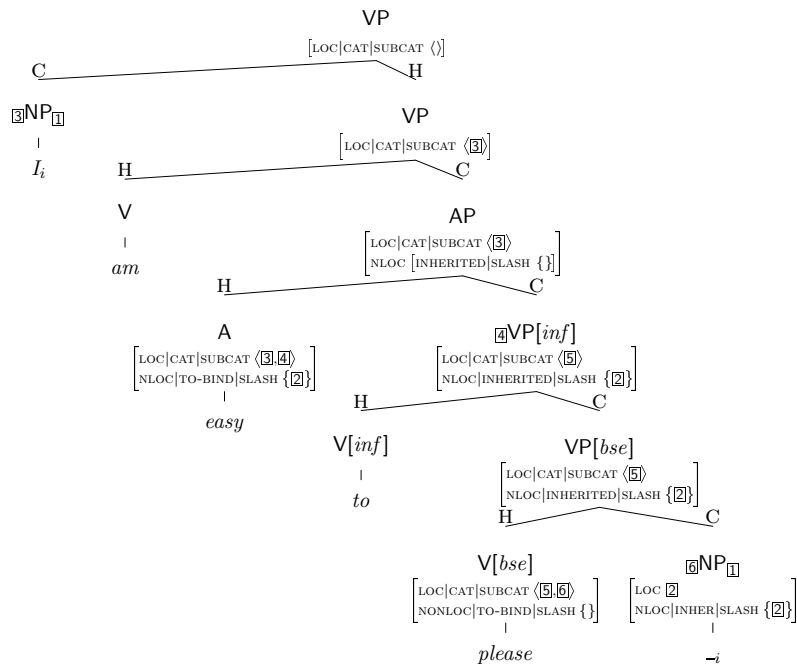
- (25) *Who<sub>i</sub> did he claim that she kissed <sub>-i</sub>*  
 (26) \* *Who<sub>i</sub> did he claim that <sub>-i</sub> kissed her.*

### The trace principle

Every trace must be strictly subcategorized by a substantive head, i.e., its SYNSEM value must be a non-initial member of a substantive head's SUBCAT list.

19

## A weak UDC analysis

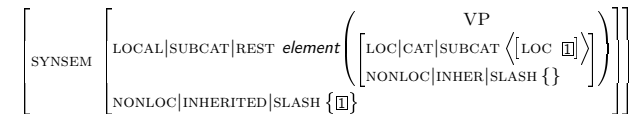


## Subject extraction

- (27) \* *Who<sub>i</sub> did he claim that <sub>-i</sub> kissed her.*  
 (28) *Who<sub>i</sub> did he claim <sub>-i</sub> kissed her.*

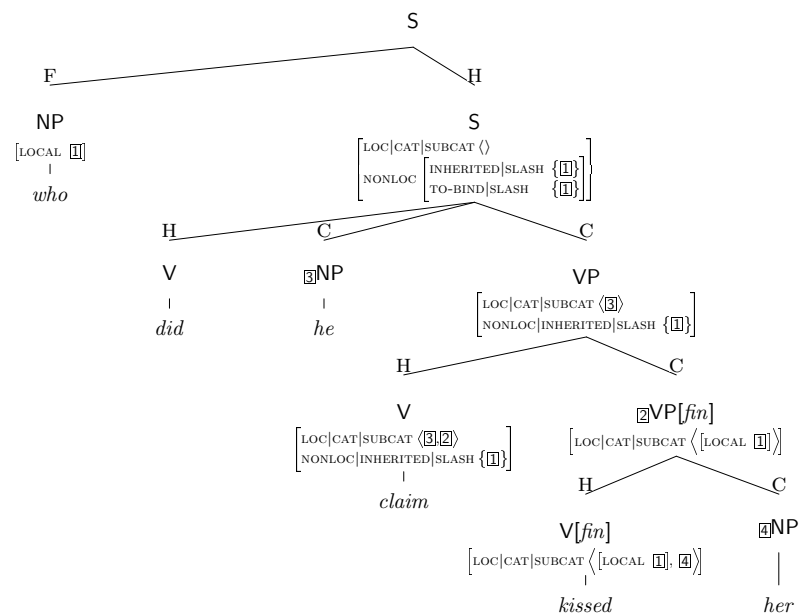
### Subject extraction lexical rule (SELR):

$\left[ \begin{array}{l} \text{word} \\ \text{SYNSEM|LOCAL|CAT|SUBCAT|REST } \textit{element}(S[\textit{unmarked}]) \end{array} \right] \mapsto$



20

## A subject extraction analysis



## Parasitic gaps

Extraction **out of objects** is possible in English:

(31) *Who did John assassinate [rivals of \_] ?*

Extraction **out of subjects**, however, is only possible in the presence of a second gap:

(32) *Who did [rivals of \_] assassinate \_ ?*

(33) a. \**Who did [rivals of \_] assassinate the President?*  
 b. *Who did [rivals of the president] assassinate \_ ?*

### The subject condition

The initial element of a lexical head's SUBCAT list may be slashed only if that list contains another slashed element.

23

## Multiple unbounded dependencies

- (29) a. *It will be easy to play even the most difficult sonata on a violin this well crafted.*  
 b. *[A violin this well crafted]<sub>1</sub>, even [the most difficult sonata]<sub>2</sub> will be easy to play <sub>-2</sub> on <sub>-1</sub>.*
- (30) a. *It is easy to talk to John about this topic.*  
 b. *This is the topic which<sub>1</sub> John<sub>2</sub> is easy to talk to <sub>-2</sub> about <sub>-1</sub>.*