Long distance dependencies

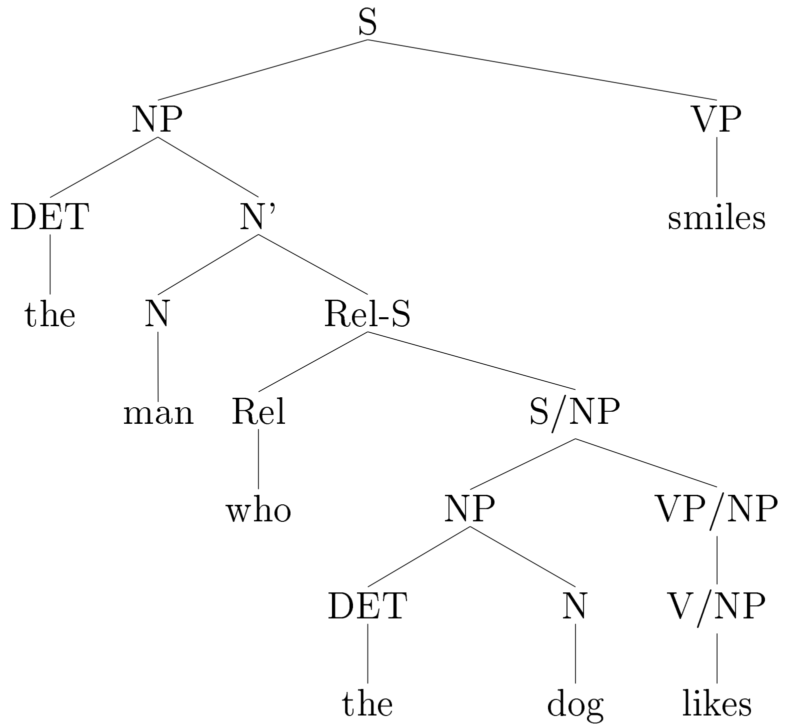
Two realizations:

- Topicalization:
  - *The cat the dog chases.*
  - *The cat the man claims that the dog chases.*
- Relative clauses:
  - *The man who the dog likes, smiles.*
  - *The man who the cat claims that the dog admires, smiles.*

Three operations:

- Extraction
  - *basic-extracted-subj-phrase*
  - *basic-extracted-comp-phrase*
  - *basic-extracted-arg-phrase*
- Perculation of the SLASH feature
  - *head-valence-phrase*
- Filling
  - *basic-head-filler-phrase*

Relative clauses



Extraction

$$\left[\begin{array}{l} \text{basic-extracted-comp-phrase} \\ \text{SYNSEM} \left[\begin{array}{l} \text{LOCAL}\,|\,\text{CAT}\,|\,\text{VAL}\,|\,\text{COMPS } \boxed{1} \\ \text{NON-LOCAL}\,|\,\text{SLASH } \boxed{2} \end{array}\right] \\ \text{HEAD-DTR}\,|\,\text{SYNSEM} \left[\begin{array}{l} \text{LOCAL}\,|\,\text{CAT}\,|\,\text{VAL}\,|\,\text{COMPS} \left\langle \left[\begin{array}{l} \text{gap} \\ \text{LOCAL } \boxed{3} \\ \text{NON-LOCAL}\,|\,\text{SLASH } \boxed{2} \left\langle !\ \boxed{3}\ ! \right\rangle \end{array}\right] .\ \boxed{1} \right\rangle \\ \\ \text{NON-LOCAL}\,|\,\text{SLASH } \boxed{2} \end{array}\right] \end{array}\right]$$

Filling

$$\left[\begin{array}{l} \textit{basic-head-filler-phrase} \\ \text{SYNSEM} \mid \text{NON-LOCAL} \mid \text{SLASH} \left\langle !! \right\rangle \\ \text{ARGS} \left\langle \begin{array}{l} \left[\text{SYNSEM} \mid \text{LOCAL} \; \boxed{1} \right], \\ \left[\text{SYNSEM} \mid \text{NON-LOCAL} \mid \text{SLASH} \left\langle ! \; \boxed{1} \; ! \right\rangle \right] \end{array} \right\rangle \end{array}\right]$$

How can a verb see whether one of its arguments has a gap?

```
slash-subj-2comp := lex-item &
  [ SYNSEM [ LOCAL.CAT.VAL [ SUBJ < [ NON-LOCAL.SLASH [ LIST #middle2,
                                                        LAST #last ] ] >,
                             COMPS < [ NON-LOCAL.SLASH [ LIST #list,
                                                         LAST #middle1 ] ],
                                     [ NON-LOCAL.SLASH [ LIST #middle1,
                                                         LAST #middle2 ] ] > ],
             NON-LOCAL.SLASH [ LIST #list,
                               LAST #last ] ] ].
```