

Grammar Engineering for Deep Linguistic Processing SS2010

Lecture 7: Unbounded Dependencies

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Outline

- 1 Unbounded (or Non-Local) Dependencies
 - Overview
 - Mechanisms



Overview

- Some sentences exhibit phrases that appear “out of place” based on simple head-argument or head-modifier constraints
- The distance from the position of the “dislocated” phrase to its “natural home” can be quite far (in the limit, unbounded)
- Our grammars need a mechanism for expressing these non-local dependencies



Examples

- (1) *That cat, the dog chased* _.
- (2) *That cat, the aardvark believes the dog chased* _.
- (3) *That cat, I know the aardvark believes the dog chased* _.
- (4) *On that aardvark, you can rely* _.
- (5) *That aardvark, you can rely on* _.
- (6) **On that aardvark, you can rely on* _.



Mechanisms in the Matrix

- Introduction of the 'gap' in SLASH feature
- Percolation of SLASH
- Filling the gap's requirements



Mechanisms in the Matrix

SLASH introduction

- basic-extracted-subj-phrase
- basic-extracted-comp-phrase
- basic-extracted-adj-phrase

SLASH percolation

- head-valence-phrase

SLASH termination (gap-filling)

- basic-head-filler-phrase



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SLASH percolation

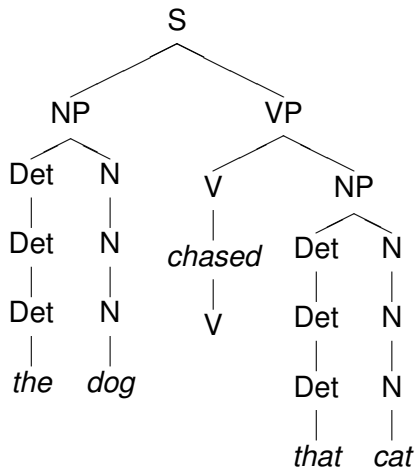
- head-valence-phrase

SLASH termination (gap-filling)

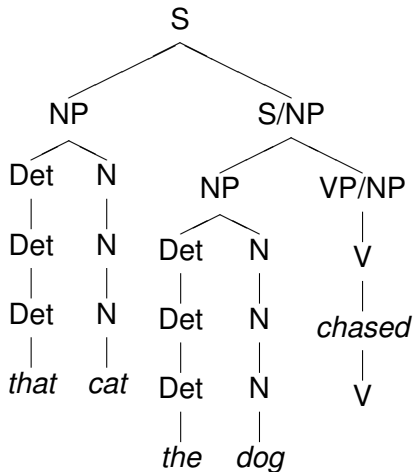
- basic-head-filler-phrase



Comparison of Tree Topologies



Comparison of Tree Topologies



basic-extracted-comp-phrase

```

basic-extracted-comp-phrase := basic-extracted-arg-phrase &
                               head-compositional &
  [ SYNSEM canonical-synsem &
    [ LOCAL.CAT [ VAL [ SUBJ #subj,
                       SPR #spr,
                       COMPS #comps ],
                  MC #mc ] ],
    HEAD-DTR [ SYNSEM
              [ LOCAL.CAT [ VAL [ SUBJ #subj,
                                  SPR #spr,
                                  COMPS < gap &
                                      [ NON-LOCAL.SLASH #slash ]
                                      . #comps > ],
                              MC #mc ],
              NON-LOCAL.SLASH #slash ] ],
    C-CONT [ RELS <! !>,
            HCONS <! !> ] ]].

```



head-valence-phrase

```
head-valence-phrase := head-nexus-phrase &  
  [ SYNSEM.NON-LOCAL.SLASH #slash,  
    HEAD-DTR.SYNSEM.NON-LOCAL.SLASH #slash ].
```



basic-head-filler-phrase

```

basic-filler-phrase := binary-phrase & phrasal &
  [ SYNSEM [ LOCAL [ CAT [ VAL [ COMPS < >,
                                SPR < > ],
                                POSTHEAD + ] ],
    NON-LOCAL.SLASH 0-dlist ],
  ARGS < [ SYNSEM [ LOCAL #slash & local &
                  [ CAT.VAL [ SUBJ olist,
                              COMPS olist,
                              SPR olist ],
                  CTXT.ACTIVATED + ],
          NON-LOCAL.SLASH 0-dlist ] ],
  [ SYNSEM [ LOCAL.CAT [ VAL.COMPS olist ],
            NON-LOCAL [ SLASH 1-dlist &
                        [ LIST [ FIRST #slash,
                                REST < > & #last ],
                              LAST #last ],
                        QUE 0-dlist,
                        REL 0-dlist ] ] ] > ].

```

```

basic-head-filler-phrase := basic-filler-phrase & headed-phrase.

```



References I



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