A Comparative Introduction to XDG: The Immediate Dominance Dimension

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Immediate Dominance Dimension

- idea: model surface syntactic structure
- choices:
  - factor out word order
  - factor out deep dependencies (e.g. control, raising)

\[ \text{einen roman maria zu schreiben verspricht} \]
Specifying the class of models

- labeled trees
- edge labels: grammatical functions like subject, object, determiner etc.
- additional root node for the full stop for convenience
Subcategorization

- incoming edges: possible grammatical functions
- outgoing edges: required/optional grammatical functions

**Roman**

\[
\begin{align*}
\text{in} & : \{\text{subj?}, \text{obj?}, \text{iobj?}\} \\
\text{out} & : \{\text{det!}, \text{adj*}, \text{prep?}, \text{rel}\}
\end{align*}
\]

**verspricht**

\[
\begin{align*}
\text{in} & : \{\text{sub?}, \text{rel?}, \text{root}\} \\
\text{out} & : \{\text{subj!}, \text{vinf!}, \text{adv*}, \text{prep*}\}
\end{align*}
\]
Agreement

- restriction to case (nominative and accusative only) for simplicity
- concepts:
  - case assignment
  - case agreement
  - case government
Case assignment

- first idea: lexically:

  \[
  \text{Frau}_1 : \begin{bmatrix} \text{agr} : \text{nom} \end{bmatrix} \\
  \text{Frau}_2 : \begin{bmatrix} \text{agr} : \text{acc} \end{bmatrix}
  \]

- uneconomical. better: lexically assign a set of possible cases:

  \[
  \text{Frau} : \begin{bmatrix} \text{agrs} : \{\text{nom, acc}\} \end{bmatrix}
  \]

- use additional node attribute to pick out one of the cases for each node:

  \[
  \forall v \in V : \text{agr}(v) \in \text{agrs}(v)
  \]
Case agreement

- for certain grammatical relations: case agreement
- e.g. for German, the determiners and adjectives agree with their nouns
- but nouns do not agree with their PPs and relative clauses
- i.e. set of agreeing edge labels: $\text{agree} = \{\text{det, adj}\}$

\[
\forall h \xrightarrow{l} d : l \in \text{agree} \Rightarrow \text{agr}(h) = \text{agr}(d)
\]
Case agreement contd.

- want to get more flexibility: lexicalize the set of agreeing edge labels:

\[
\text{Roman} : \begin{bmatrix}
\text{out} : \{\text{det!}, \text{adj*}, \text{prep?}, \text{rel}\} \\
\text{agree} : \{\text{det}, \text{adj}\}
\end{bmatrix}
\]

\[\forall h \xrightarrow{l} d : l \in \text{agree}(h) \Rightarrow \text{agr}(h) = \text{agr}(d)\]
Case government

- for certain grammatical relations: heads restrict the agreement of their dependents
- e.g. for German and also English, finite verbs require their subjects to be nominative
- and transitive verbs require their objects to be accusative
- i.e. mapping of governed edge labels to agreement restrictions:

\[
govern = \{\text{subj} \mapsto \{\text{nom}\}, \text{obj} \mapsto \{\text{acc}\}\}
\]

\[
\forall h \xrightarrow{l} d : \text{agr}(d) \in govern(l)
\]
Case government contd.

• want more flexibility: lexicalize the mapping of governed edge labels to agreement restrictions:

\[
\text{verspricht} : \begin{cases}
\text{out} : \{\text{subj!}, \text{vinf!}, \text{adv*}, \text{prep*}\} \\
\text{govern} : \{\text{subj} \mapsto \{\text{nom}\}\} \\
\end{cases}
\]

\[\forall h \xrightarrow{l} d : \text{agr}(d) \in \text{govern}(h)(l)\]