A Comparative Introduction to XDG: The Deep Syntax Dimension

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Introducing the Deep Syntax Dimension

- going towards semantics
- in particular: finding the predicates’ arguments
- word order already factored out
- dependency trees (Immediate Dominance) already “semantic”
Factoring out word order

- different word order, same grammatical functions/predicate argument structure
Moving on to semantics

- it seems we can already move on to semantics/predicate-argument structure then:

\[
\text{novel}'(x) \land \text{write}'(m, x)
\]
Moving on to semantics contd.

- it seems we can already move on to semantics/predicate-argument structure then:

```
maria einen roman schreibt
```

```
\text{novel}'(x) \land \text{write}'(m, x)
```

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Linking theory

- idea: state how semantic arguments are realized in syntax:

\[
\text{schreiben} = \begin{bmatrix}
\text{multi} : \\
\text{link} : \\
\text{arg1} \leftrightarrow \{\text{subj}\} \\
\text{arg2} \leftrightarrow \{\text{obj}\}
\end{bmatrix}
\]
Raising and control

• Control
  1. subject control: *Maria einen Roman zu schreiben verspricht* (promise)
  2. object control: *Maria einen Mann überredet, einen Roman schreiben* (persuade)
  3. indirect object control: *Maria einem Mann hilft, einen Roman zu schreiben* (help)

• Raising
  1. subject raising: *Maria einen Roman zu schreiben scheint* (seem)
  2. object raising: *Maria einen Mann einen Roman schreiben sieht* (see)
Subject raising

\[
\text{schreiben} = \left[ \text{multi} : \left[ \text{link} : \left[ \text{arg1} \mapsto \{\text{subj}\}(?) \right] \right] \right]
\]
Subject control

\[
\text{schreiben} = \left[ \begin{array}{c}
\text{multi} : \\
\text{link} : \\
\end{array} \right]
\left[ \begin{array}{c}
\text{arg1} \mapsto \{\text{subj}\} (\?) \\
\text{arg2} \mapsto \{\text{obj}\}
\end{array} \right]
\]
Object control

schreiben = \[
\begin{array}{ccc}
\text{arg1} & \text{arg2} & \text{arge} \\
\text{arg1} & \text{arg1} & \text{arg2} \\
\text{arg1} & \text{arg2} & \\
\text{arg1} & \text{arg1} & \\
\text{arg1} & \\
\end{array}
\]

\[
\text{multi} : \begin{array}{c}
\text{link} : \begin{array}{c}
\text{arg1} \mapsto \{ \text{obj} \} (?) \\
\text{arg2} \mapsto \{ \text{obj} \}
\end{array}
\end{array}
\]
What’s happening?

- idea: linking theory relates predicate-argument structure to a more abstract syntactic system
- Immediate Dominance dimension: cannot properly reflect this abstract system
- e.g. cannot directly verbalize re-entrancies
- so: add this abstract syntactic level, called Deep Syntax:

\[ \text{Predicate-Argument Structure} \rightarrow \text{Deep Syntax} \rightarrow \text{Immediate Dominance} \]
Deep Syntax: Subject raising

Maria einen Roman zu schreiben scheint.
Deep Syntax: Subject raising contd.

Maria scheint einen Roman zu schreiben.

Diagram showing the deep syntax of the sentence.
Deep Syntax: Subject control

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Deep Syntax: Subject control contd.
Deep Syntax: Object control

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Deep Syntax: Object control contd.

Maria einen Mann einen Roman zu schreiben überehret.

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Deep Syntax: Linking

- linking of semantic to syntactic arguments kept simple, intuitive:

\[
\text{schreiben} = \begin{bmatrix}
\text{multi} & \left[
\begin{array}{c}
\text{arg1} 
\leftrightarrow 
\{\text{subj}\}
\end{array}
\begin{array}{c}
\text{arg2} 
\leftrightarrow 
\{\text{objd}\}
\end{array}
\end{bmatrix}
\end{bmatrix}
\]

- passives would look like this:

\[
\text{schreiben} = \begin{bmatrix}
\text{multi} & \left[
\begin{array}{c}
\text{arg1} 
\leftrightarrow 
\{\text{objd}\}
\end{array}
\begin{array}{c}
\text{arg2} 
\leftrightarrow 
\{\text{subj}\}
\end{array}
\end{bmatrix}
\end{bmatrix}
\]
• Deep Syntactic structures are dags (re-entrancies):
Valency

- valency (deep subcategorization):

\[
\text{schreiben} = \left[ \begin{array}{l}
\text{ds} : \left[ \begin{array}{l}
\text{out} : \{\text{subj!}, \text{objd!}\}
\end{array} \right]
\end{array} \right]
\]
only deep subjects can be raised or controlled:

\[ Maria = \left[ \begin{array}{l} \text{ds} : \left[ \begin{array}{l} \text{in} : \{ \text{subj*}, \text{objd}\} \end{array} \right] \end{array} \right] \]
Climbing

• dependents can “climb up” from the DS to the ID dimension
Linking

- how are the deep syntactic arguments realized in the surface syntax:

\[
\text{schreiben} = \begin{cases} 
\text{ds} : & \{\text{subj!}, \text{objd!}\} \\
\text{multi} : & \{\text{objd} \mapsto \{\text{obj}\}\} 
\end{cases}
\]

- idea: deep objects are locally realized as surface objects
- declarative semantics:

\[
\forall h \rightarrow_{\text{DS}}^l d : \rightarrow_{\text{ID}}^{l'} d \land \\
l' \in \text{link}(h)(l)
\]
deep subjects need to be realized locally, and not as surface subjects:

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• which surface dependents realize embedded deep subjects?
• subject raising:

\[
\text{scheint} = \begin{cases} 
\text{id} : & \begin{cases} 
\text{out} : & \{\text{subj}, \text{vinf}\} 
\end{cases} \\
\text{ds} : & \begin{cases} 
\text{out} : & \{\text{vcd}\} 
\end{cases} \\
\text{multi} : & \begin{cases} 
\text{link}^{-1} : & \{\text{subj} \mapsto \{\text{subj}\}\} 
\end{cases} 
\end{cases}
\]


\[ \text{verspricht} = \begin{cases} \text{id} : & \{ \text{subj!}, \text{vinf!} \} \\ \text{ds} : & \{ \text{subj!}, \text{vcd!} \} \\ \text{multi} : & \{ \text{subj} \mapsto \{ \text{subjd} \} \} \end{cases} \]
object control:

\[
\text{überredet} = \begin{bmatrix}
\text{id} : & \text{out} : \{\text{subj!}, \text{obj!}, \text{vinf!}\} \\
\text{ds} : & \text{out} : \{\text{subj!}, \text{obj!}, \text{vcd!}\} \\
\text{multi} : & \text{link}^{-1} : \{\text{obj} \mapsto \{\text{subj}\}\}
\end{bmatrix}
\]