Seminar für Sprachwissenschaft
Abteilung Computerlinguistk
Universität Tübingen

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Grammar Formalisms and Parsing

Prof. Dr. Erhard W. Hinrichs
Frank Richter
Beata Trawiński

As we saw in the seminar, our first Trale grammar only specifies one phrase structure rule with descriptive decorations besides the lexicon. What is particularly interesting is that there are no implicational principles of the kind that we know from the theories of HPSG grammars. In order to understand the effect of the annotated phrase structure rule on the models of our first Trale grammar, we reformulate the grammar by recreating the effect of the phrase structure rule with a standard grammatical principle:

(1) *An HPSG description for the theory of Grammar 1*

$$\left[\textit{phrase}\right] \rightarrow$$
$$\left[\begin{array}{ll}
\text{PHON} & \left\langle \boxed{4} | \boxed{5} \right\rangle \\
\text{SYNSEM} & \left[\begin{array}{ll} \text{CATEGORY} & \left[\begin{array}{ll} \text{HEAD} & \boxed{1} \\ \text{SUBCAT} & \langle\rangle \end{array}\right] \\ \text{CONTENT} & \boxed{2} \end{array}\right] \\
\text{DTR1} & \left[\begin{array}{ll} \text{PHON} & \left\langle \boxed{4} \right\rangle \\ \text{SYNSEM} & \boxed{3} \end{array}\right] \\
\text{DTR2} & \left[\begin{array}{ll} \text{PHON} & \boxed{5} \\ \text{SYNSEM} & \left[\begin{array}{ll} \text{CATEGORY} & \left[\begin{array}{ll} \text{HEAD} & \boxed{1} \\ \text{SUBCAT} & \left\langle \boxed{3} \right\rangle \end{array}\right] \\ \text{CONTENT} & \boxed{2} \end{array}\right] \end{array}\right]
\end{array}\right]$$

We noted that the tags $\boxed{1}$, $\boxed{2}$, and $\boxed{3}$ do what the variables H, $Content$ and $Synsem$ did in the description annotation of the phrase structure rule. We also observed that they take over the task of the HEAD FEATURE PRINCIPLE, the SEMANTICS PRINCIPLE, and the SUBCATEGORIZATION PRINCIPLE in bigger, modularily built grammars. The distribution of daughters in the phrase, which is done in the Trale grammar by the phrase structure rule proper, is now regulated by the description of the values of DTR1 and DTR2 in the consequent of the principle. Similarily, the phrase structure rule itself fixes the order of the phonological strings of the daughters in the overall phrase by imposing a linear order on the daughters. In our principle, the order of the phonological contributions of the daughters to the phrase is fixed using the tags $\boxed{4}$ and $\boxed{5}$. Note the use of the notation for lists: $\boxed{4}$ refers to the single element on the PHON list of the first daughter, whereas $\boxed{5}$ refers to the entire PHON list of the second daughter. Of course, this could be done differently while maintaining the intended effect in all relevant respects.