Grammar 16

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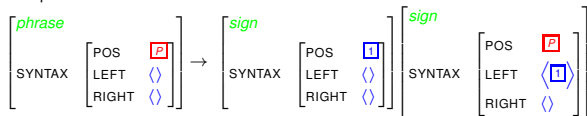University of Frankfurt

The grammar so far

There are only two grammar rules:

The rules appear in the order in which they apply, from the bottom of the tree to the top.

Complete-on-the-right-rule:

$$\begin{bmatrix} \textit{phrase} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{P} \\ \text{LEFT} & \boxed{1} \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textit{word} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{P} \\ \text{LEFT} & \boxed{1} \\ \text{RIGHT} & \langle \boxed{2},\ldots,\boxed{n} \rangle \end{bmatrix} \end{bmatrix} \begin{bmatrix} \textit{sign} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{2} \\ \text{LEFT} & \langle\rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \ldots \begin{bmatrix} \textit{sign} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{n} \\ \text{LEFT} & \langle\rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix}$$

Complete-on-the-left-rule:

$$\begin{bmatrix} \textit{phrase} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{P} \\ \text{LEFT} & \langle\rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textit{sign} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{1} \\ \text{LEFT} & \langle\rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix} \begin{bmatrix} \textit{sign} \\ \text{SYNTAX} \begin{bmatrix} \text{POS} & \boxed{P} \\ \text{LEFT} & \langle \boxed{1} \rangle \\ \text{RIGHT} & \langle\rangle \end{bmatrix} \end{bmatrix}$$

Lexical entries for typical nouns

$$
\begin{bmatrix}
\textit{word} \\
\text{PHONOLOGY} \quad \langle \text{student} \rangle \\
\text{SYNTAX} \quad
\begin{bmatrix}
\text{POS} &
\begin{bmatrix}
\textit{noun} \\
\text{CASE} & \textit{nominative} \\
\text{NOUN AGREEMENT} & \boxed{1}\,\textit{third-singular}
\end{bmatrix} \\
\text{LEFT} & \left\langle
\begin{bmatrix}
\textit{determiner} \\
\text{DETERMINER AGREEMENT} & \boxed{1}
\end{bmatrix}
\right\rangle \\
\text{RIGHT} & \langle\,\rangle
\end{bmatrix}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\textit{word} \\
\text{PHONOLOGY} \quad \langle \text{students} \rangle \\
\text{SYNTAX} \quad
\begin{bmatrix}
\text{POS} &
\begin{bmatrix}
\textit{noun} \\
\text{CASE} & \textit{nominative} \\
\text{NOUN AGREEMENT} & \boxed{1}\,\textit{third-plural}
\end{bmatrix} \\
\text{LEFT} & \left\langle
\begin{bmatrix}
\textit{determiner} \\
\text{DETERMINER AGREEMENT} & \boxed{1}
\end{bmatrix}
\right\rangle \\
\text{RIGHT} & \langle\,\rangle
\end{bmatrix}
\end{bmatrix}
$$

Lexical entries for typical determiners

$$
\begin{bmatrix}
\textit{word} & & \\
\text{PHONOLOGY} & \langle \text{a} \rangle & \\
\text{SYNTAX} & \begin{bmatrix}
\text{POS} & \begin{bmatrix} \textit{determiner} \\ \text{DETERMINER AGREEMENT} & \textit{third-singular} \end{bmatrix} \\
\text{LEFT} & \langle \rangle \\
\text{RIGHT} & \langle \rangle
\end{bmatrix}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\textit{word} & & \\
\text{PHONOLOGY} & \langle \text{those} \rangle & \\
\text{SYNTAX} & \begin{bmatrix}
\text{POS} & \begin{bmatrix} \textit{determiner} \\ \text{DETERMINER AGREEMENT} & \textit{third-plural} \end{bmatrix} \\
\text{LEFT} & \langle \rangle \\
\text{RIGHT} & \langle \rangle
\end{bmatrix}
\end{bmatrix}
$$

Lexical entries for typical verbs

$$
\begin{bmatrix}
word \\
\text{PHONOLOGY} & \langle \text{smoke} \rangle \\
\text{SYNTAX} &
\begin{bmatrix}
\text{POS} &
\begin{bmatrix}
verb \\
\text{VERB AGREEMENT} & \boxed{1}\,first\text{-}singular \\
\text{VERB FORM} & finite
\end{bmatrix} \\
\text{LEFT} &
\left\langle
\begin{bmatrix}
noun \\
\text{CASE} & nominative \\
\text{NOUN AGREEMENT} & \boxed{1}
\end{bmatrix}
\right\rangle \\
\text{RIGHT} & \langle \rangle
\end{bmatrix}
\end{bmatrix}
$$

$$
\begin{bmatrix}
word \\
\text{PHONOLOGY} & \langle \text{smokes} \rangle \\
\text{SYNTAX} &
\begin{bmatrix}
\text{POS} &
\begin{bmatrix}
verb \\
\text{VERB AGREEMENT} & \boxed{1}\,third\text{-}singular \\
\text{VERB FORM} & finite
\end{bmatrix} \\
\text{LEFT} &
\left\langle
\begin{bmatrix}
noun \\
\text{CASE} & nominative \\
\text{NOUN AGREEMENT} & \boxed{1}
\end{bmatrix}
\right\rangle \\
\text{RIGHT} & \langle \rangle
\end{bmatrix}
\end{bmatrix}
$$

Auxiliaries

So far, our grammar accepts sentences with 0 and with 1 auxiliary:

(1) a. Robin eats an apple.
   b. Robin is eating an apple.
   c. Robin has eaten an apple.
   d. Robin will eat an apple.

But of course there are sentences with multiple auxiliaries:
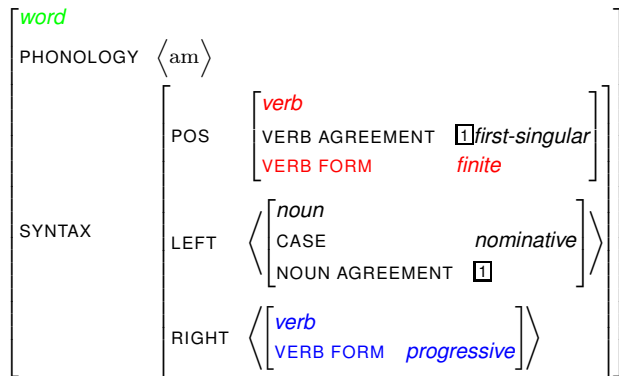
(2) a. Robin has been eating an apple.
   b. Robin will have eaten an apple.
   c. Robin will be eating an apple.
   d. Robin will have been eating an apple.

The reason that the grammar is unable to accept sentences with multiple auxiliaries is simple:

The lexicon of the previous grammars does not contain lexical entries for non-finite auxiliary forms.

Adding lexical entries for non-finite auxiliary forms

Reminder: this is the structure of a finite auxiliary, the progressive auxiliary *am*:
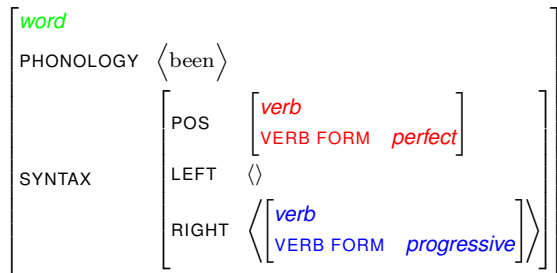
$$
\begin{bmatrix}
\textit{word} \\
\text{PHONOLOGY} \quad \langle \text{am} \rangle \\
\text{SYNTAX}
\begin{bmatrix}
\text{POS}
\begin{bmatrix}
\textit{verb} \\
\text{VERB AGREEMENT} \quad \boxed{1}\,\textit{first-singular} \\
\text{VERB FORM} \qquad \textit{finite}
\end{bmatrix} \\
\text{LEFT} \quad \left\langle
\begin{bmatrix}
\textit{noun} \\
\text{CASE} \qquad \textit{nominative} \\
\text{NOUN AGREEMENT} \quad \boxed{1}
\end{bmatrix}
\right\rangle \\
\text{RIGHT} \quad \left\langle
\begin{bmatrix}
\textit{verb} \\
\text{VERB FORM} \quad \textit{progressive}
\end{bmatrix}
\right\rangle
\end{bmatrix}
\end{bmatrix}
$$

Note two things:

1. The form of the auxiliary is *finite*.
2. The form it requires the verb (phrase) to its right to have is *progressive*.

Adding lexical entries for non-finite auxiliary forms, 2

It is now easy to see what the lexical entries for the non-finite forms of the progressive auxiliary have to look like:

$$
\begin{bmatrix}
\textit{word} \\
\text{PHONOLOGY} \quad \langle \text{been} \rangle \\
\\
\text{SYNTAX} \quad
\begin{bmatrix}
\text{POS} \quad
\begin{bmatrix}
\textit{verb} \\
\text{VERB FORM} \quad \textit{perfect}
\end{bmatrix} \\
\text{LEFT} \quad \langle \rangle \\
\text{RIGHT} \quad
\left\langle
\begin{bmatrix}
\textit{verb} \\
\text{VERB FORM} \quad \textit{progressive}
\end{bmatrix}
\right\rangle
\end{bmatrix}
\end{bmatrix}
$$

Note:

1. The non-finite forms have no verb agreement.

2. Their verb form is one of: *bare, perfect, progressive.*

3. Unlike the finite forms, they do not select a subject.

Excercises

1. Parse the words "be", "been", and "being" and inspect the results. Explain how many results the grammar returns in each case!

2. Do the same for the words "have", "had", and "having"!

3. Parse test items (164)-(219) and explain why you get the results you get and their number!

4. What do the result for test items (220)-(222) show about the lexical paradigms of the progressive and the perfect auxiliaries?

5. Is this state of affairs unusual for auxiliaries? Hint: think of the behavior of the modal auxiliaries!

6. Why does the grammar not parse test items (223)-(230)?