Some syntactic definitions

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1. A grammar G consists of a pair of a set of lexical elements L and a set of operations O:
   $G =< L, O >$

2. A derivation on a numeration D_N is a pair:
   $D_N =< N, < PM_1, ..., PM_n >>$, where

   1. N, called the Numeration, is a nonempty set of lexical elements drawn from L and a possibly empty set S of phrase markers PM (each of which is itself the result of a separate convergent or semi-convergent derivation), and
   2. $< PM_1, ..., PM_n >$ is an ordered n-tuple of phrase markers PM.

3. A derivation D_N is said to be *convergent* (or to *converge*)[1] iff

   1. PM_n contains no unvalued (:__) features
   2. PM_n contains no unchecked phrasal movement (> or <) features
   3. PM_n contains no selectional features
   4. PM_n contains no head movement features (=)
   5. All elements in the Numeration have been Merged
   6. For each adjacent pair of phrase markers $< PM_k, PM_{k+1} >$ in D_N, there is an operation $\omega \in O$ such that ω applied to PM_k yields PM_{k+1}.

4. A phrase P (including a sentence) is *well-formed* iff there is at least one convergent derivation for P.

5. The Minimalist Program, in essence = $min|O|$ (Minimize the number of operations in O).

[1] A derivation D_N is *semi-convergent* iff it satisfies conditions 2-6 of this definition.

1 Operations

(1) Merge(α, β)
For any syntactic objects α, β, where α bears a nonempty selectional list $\ell = \langle \bullet F_1, \ldots, \bullet F_n \rangle$ of selectional features, and β bears a categorial feature F$'$ that matches $\bullet F_1$,
call α the *head* and

a. let α = { γ, { $\alpha - \ell$, β}} call γ the projection of α, and
b. if n $>$ 1, let $\ell = \langle \bullet F_2, ..., \bullet F_n \rangle$, else let $\ell = \emptyset$, and
c. let $\gamma = \begin{bmatrix} \text{CAT} & [cat(\alpha)] \\ \text{SEL} & [\ell] \end{bmatrix}$[2]

(2) Adjoin(α, β)
For any syntactic objects α, β, where neither α nor β has any unchecked selectional feature,
call α the host, and

a. let α = { γ,{ α, β}}
call γ the label (or projection) and
b. let γ = α

(3) Move$_{head}$(X,Y) (read: ‘Y moves to X’ or ‘X attracts Y’)
For any syntactic heads X, Y, where X has feature F= (‘suffixing on F’) or =F (‘prefixing on F’), Y has a matching feature F, and X c-commands Y, and there is no head Z that intervenes between X and Y, then

a. if X has F=, let X = $[_{\text{cat(X)}}$ Y X], otherwise let X = $[_{\text{cat(X)}}$ X Y], and
b. let Y = <Y>

(4) Move$_{phrase}$(Y, X) (read: ‘Y moves to specXP’)
If X is a projection with a feature F, Y a maximal projection with a matching feature F$'$, and X contains Y, and F is strong (marked >F) on X or Y or both, then

a. let X = {X, {Y, X}} and
b. let all occurrences of >F on X, Y = $F^{<}<^{>}$, and
c. let Y = <Y>

[2] In other words, all category features project, all unused selectional features project, and no inflectional features project. Inflectional features are therefore found only on heads, never on projections.

(5) Agree(X,Y; F) (read: 'X triggers agreement on Y with respect to F' or 'Y agrees with X in F' or 'X controls agreement on target Y for F')
For any syntactic objects X and Y in a phrase marker, where X bears a feature F with value Val(F) and Y bears a matching[3] unvalued[4] inflectional feature F′:__, and X is accessible to Y ,
a. let Val(F′) = Val(F)

2 Feature Structures

A lexical item LI has the following feature structure, with categorial, inflectional (or morphological), and selectional feature arrays:[5]

$$LI \begin{bmatrix} \textsc{cat}[...] \\ \textsc{infl}[...] \\ \textsc{sel}[...] \end{bmatrix}$$

Some examples:

(6) $$\sqrt{libro} \begin{bmatrix} \textsc{cat} & [N, \text{gender:}\underline{\text{masc}}, \text{number:}\underline{\text{sg}}\ ] \\ \textsc{infl} & [\text{Case:}\_\_] \\ \textsc{sel} & [\ ] \end{bmatrix}$$

(7) $$\sqrt{eat} \begin{bmatrix} \textsc{cat} & [V] \\ \textsc{infl} & [\text{person:}\_\_, \text{number:}\_\_\ ] \\ \textsc{sel} & [< (D) >] \end{bmatrix}$$

(8) $$\sqrt{dog} \begin{bmatrix} \textsc{cat} & [N, \phi : 3sm] \\ \textsc{infl} & [\text{Case:}\_\_] \\ \textsc{sel} & [\ ] \end{bmatrix}$$

(9) $$\sqrt{see} \begin{bmatrix} \textsc{cat} & [V] \\ \textsc{infl} & [\ ] \\ \textsc{sel} & [D] \end{bmatrix}$$

[3]A feature F matches a feature F′ iff F=F′.
[4]A feature F is unvalued iff Val(F)=∅.
[5]If Georgi 2014 is right, then we don't need to structure the 'inflectional' (including Agree and movement-triggering) and selectional features this way; we merely need to order them with respect to each other, on a possibly language-particular basis.

(10) $$v_{trans} \begin{bmatrix} \text{CAT} & [v, -aux, \text{Case:ACC}] \\ \text{INFL} & \begin{bmatrix} \phi : \_\_ \\ V\text{=} \\ \text{Infl:}\_\_ \end{bmatrix} \\ \text{SEL} & \begin{bmatrix} < V, D > \end{bmatrix} \end{bmatrix}$$

(11) $$T^{Pres}_{mv} \begin{bmatrix} \text{CAT} & [T, \textit{+fin, Tns:Pres}, \text{Case:NOM}] \\ \text{INFL} & \begin{bmatrix} \phi : \_\_, \text{D<} \end{bmatrix} \\ \text{SEL} & \begin{bmatrix} v[-aux] \end{bmatrix} \end{bmatrix}$$

(12) $$T^{Pres}_{aux} \begin{bmatrix} \text{CAT} & [T, \textit{+fin, Tns:Pres}] \\ \text{INFL} & \begin{bmatrix} \phi : \_\_, v\text{=}, \text{D<} \end{bmatrix} \\ \text{SEL} & \begin{bmatrix} v[+aux] \end{bmatrix} \end{bmatrix}$$

3 Other

Three **major** syntactic phenomena have largely been factored out of the above definitions and must be added to the system to make it account for word order and other important syntactic facts:

(13) Linearization (an algorithm or principle to determine the linear order of any two sister nodes)[6]

(14) Locality of application (Relativized Minimality)

(15) The spellout of complex heads by the Morphology[7]

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[6]This could be done on some general basis, as Kayne 1994 does with his Linear Correspondence Axiom (LCA: x precedes y iff x c-commands y, for any two heads x and y, roughly), or on a more mundane, potentially head-by-head differing basis, by e.g. making the strong diacritic that drives movement come in two varieties: *< and *>, with *< resulting in the moved element preceding the probe, and *> following; the minimal changes to the definitions of the Move operations are left as an exercise for the reader. The same applies, *mutatis mutandis*, to Merge of complements and specifiers, and to adjoined elements.

[7]The input to the morphological component of the grammar is PM_n; the notion of generating a string can be defined on the output of the morphological component:

1. A string s is *generated* iff there is a well-formed phrase for which it holds that the concatenation of the Vocabulary Items that realize its ordered terminal nodes corresponds to s.