(Un-)folding fields

1. BACKGROUND (AND PROBLEMS): A widely held (but tacit) assumption about so-called Roots is that, unlike both lexical and functional categories (V, N, C, D, T, etc.), they cannot be decomposed. This well-known property has lead different authors to analyze roots as the sole *syntactic atoms* (the closest counterpart to *concepts*; *cf*. Fodor 1994; 1998, Hinzen 2006, Pietroski 2008, and Uriagereka 2008). Let us refer to this asymmetry as the *Unfolding Condition*, to indicate that Roots cannot unfold (=decompose) into different (smaller) components (see (1)).

The distinction embodied by (1) readily recalls that between *primitive* and *non-primitive* elements, particularly salient in decompositionalism debates (*cf*. Fodor & Leporse 1999, Hale & Keyser 1999, and Mateu 2005). However appealing and intuitively deep, the cut between Roots and non-Roots leaves unresolved different properties of the Lexicon: apart from an answer to the question of why the former cannot be syntactically decomposed, the questions in (2) lack a principled answer.

To some extent, the decomposition issue interacts with cartographic approaches, which pose non-trivial problems to the task of ascertaining how complex categories can be, for there seems to be no known limits on category-expansion, apart form those imposed by the interfaces (*cf*. Cinque 1999). In fact, the idea that all categories can be divided in small subparts is also held by mainstream minimalism, when it is argued that categories are “covert terms for a richer array of functional categories” (Chomsky 2001:43), or “surrogates for richer systems” (Chomsky 2000:143). This very problem is recognized by much cartographic work, where categories are, remarkably enough, referred to as *fields* (CP field, IP field, etc.; *cf*. Belletti 2004, Cinque 1999, Poletto 2000, Rizzi 1997; 2004).

Technically, a *field* can be defined as *a (n algebraich) structure* –therefore, as a syntactic object that involves (at least) context-free properties. Saying that both lexical (N, V, A, etc.) and functional (P, C, T, etc.) categories are nothing but abstract labels for more complex entities (i.e., structures themselves) certainly tells us how these units work and how complex they are, but at the cost of serverely restricting any chance to understand asymmetries like (1).

2. A PHASE-BASED PROPOSAL: In this paper we are that the framework of phases outlined in Boeckx (2008a; 2008b; 2009), Chomsky (2007; 2008), Richards (2007), and Uriagereka (2009) can provide answers to the questions in (2) and to the distinction in (1).

To begin with, we assume, following Boeckx (2008b), that ‘lexicalization’ can be conceived of as a process whereby *concepts* are assigned what Chomsky (2008) calls *edge feature*, which provides “a certain ‘inertia,’ a property that makes the lexical item active (i.e., allows it to engage in Merge-relations).” This must be correct for functional categories, lexical categories, and Roots. Consequently, we depart from Mateu’s (2005) hypothesis that lexical items are divided into *relational* and *non-relational*: such a cut seems conceptually non-obvious not only because it is syntax that is relational, not lexical units, but also because if lexical items are endowed with *edge features*, then they are ‘mergeable’ (=relational) by definition –moreover, even *non-relational* elements (nouns and Roots) have been shown to be complemen-taking units (*cf*. Harley 2005, Marantz 1997; 2007).

Notice, importantly, that although all lexical items have this Merge-inducing property, only Roots fail (apparently) to allow decomposition. This may well be due to some inherent property/feature of Roots, which makes them differ from non-Roots –say, Mateu’s (2005) *relational*/*non-relational* distinction–, but if so then it happens to be an idiosincracy, with no general repercusions or wider coverage. Be that as it may, we would like to relate the cut in (1) to the question (2a): in other words, we contend that there must be a connection between Roots’ non-decompositionality and the fact that Roots typically occupy the bottom-most (most deeply embedded) position of a syntactic object. Consider, to see this, the structures in (3), where ‘*x*’ stands for a little/light category (in Marantz’s 1997; 2000; 2007 sense).

The option in (3b) has not, to our mind, been pursued in the literature, but we know of no explanation for that to be so. Here we claim that the *x*-√R structure is forced by the nature of the φ-feature inheritance put forward by Chomsky (2008): if little *x*s (e.g., *v*, *n*, *a*, *p*) are the locus of inflectional features (and parametric variation), then it follows that they “must have something below” (= they cannot be at the bottom of the tree), for otherwise uninterpretable features could not be deleted by means of Chomsky’s *cyclic transfer* (*cf*. Chomsky 2004; 2008, and Richards 2007), as shown in (4).

Technically, the process depicted in (4) requires that one (φ-)feature-less lexical item (a Root) be placed below an *x*. Notice, crucially, that since one Root is all that is needed for the derivation to successfully delete uninterpretable (i.e., viral) morphology, only one Root can be merged below an *x*s, given Chomsky's (2000) *strong minimalist thesis*. Accordingly, any structure along the lines of (5b) and (5c) will be ruled out (*cf*. Richards 2007), for there will be more elements than needed to satisfy interface demands. Interestingly for our purposes, the idea that it is bottom-most elements that cannot be decomposed is reinforeced by efficient computation factors: in particular, Roots cannot be decomposed for the same reasons syntactic objects can only 'grow' by extending the root (the edge), in accord to the *No-Tampering/Extension Condition* (*cf*. Chomsky 2008).

The paradigms in (5b) and (5c) brings us to the question (2b), and, more generally, to the larger (and more intricate) issue of how big can (syntactic) *fields* be. We would like to argue that the question to (2b) is again to be found in the context of phase theory and *cyclic transfer*: since this process is triggered by φ-feature valuation/deletion, structures like the one in (6) are barred because they will fail to provide adequate mappings to the interfaces: there being no phase boundaries (signaled by Chomsky/Marantz's *x*s), computational burden is potentially unbounded, failing to distinguish relevant groupings in terms of theta role configurations, prosodic boundaries, etc.

The scenarios in (5b,c) and (6) can be fixed if *x*s are sandwiched between Roots (see (7)). One might argue that the necessity of "*x*-√R" clusters might be rooted in the C-I systems, which may require categorial information (associated to relevant semantic counterparts: D = reference; V = event; T = tense; C = force; P = central/terminal coincidence; etc.). Nonetheless, we want to argue that the presence of *x*-units is motivated by *cyclic transfer* at the phase level –semantic effects (related to categorization) being an ancillary consequence.

Once we have said something about (2a) and (2b), let us return to (1). Recall that, contrary to Roots, lexical/functional categories can be decomposed (i.e., unfolded), the question is how and how much. Following ideas by Boeckx (2008a) and Uriagereka (2009), we would like to sugget that syntactic decomposition is structurally constrained in such a way that a given category C can only be decomposed into three layers at most. As Boeckx (2008a) argues, this pattern appears to be not exclusive of categories: it is also found in chains (A-bar position, A-position, base position), feature values (e.g., person = 1^{st}, 2^{nd}, 3^{rd}), category types (e.g., *v* = transitive, unergative, unaccusative), syntactic domains (e.g., specifier, head, complement), and extended projections (in Grimshaw's 1991 sense). This can be seen in the correspondences in (8) below, taken from Boeckx (2008a).

That non-Roots can unfold in such a restricted fashion is not forced by phase-based dynamics, but it is –we feel– in the same spirit regardless: just like phase-by-phase derivations yield optimal computation, a three-way organization like the one in (8) yields optimal computation too in that the resulting structure is 'unambiguous' (as Hale & Keyser's project emphasized). Notice, in fact, that the configurations that, according to Hale & Keyser, give rise to argument structures are three: (9a), (9b), and (9c), whose head (i.e., X) typically correspond to verbs, prepositions, and nouns respectively.

CONCLUSIONS: The goal of this paper was to provide principled answers to the questions in (2). As far as we can tell, the properties encoded in (2) are tightly (and naturally) connected to the distinction in (1), which is widely entertained by most scholars, but remains underived from any other property of the system. Here we have suggested that the framework of phases (and, in particular, Chomsky's 2007; 2008 analysis of φ-feature inheritance and *cyclic transfer*) can provide interesting answers to (2a) and (2b) –(2c) remaining obscure, perhaps a consequence of the different types of information that Chomsky's phases encode: if CP only encodes intentional information (as Boeckx 2009 argues), then Roots, whose nature is conceptual in essence, do not fit in that domain. If correct, our proposal entails that the key properties of Roots, and their key differences with respect to non-Roots, boil down to the dynamics that rule derivational syntax.

Notice, for the punch line, that this framework also provides an answer to the question of why Roots typically encode non-compositional meaning (*cf*. Marantz 2000; 2007). If compositional meaning is a consequence of Merge-based syntax, then it follows that Roots do not encode compositional meanings: not because there is a distinction between above/below *x* categories (as Marantz contends), but because Roots are the bottom-most elements, representing a Mergeless stage of the derivation.

(1) *(Un)folding Condition*
a. Roots are non-decomposable units
b. Lexical categories are decomposable units

(2) a. Why are Roots bottom-most units?
b. Why can't there be sequences of Roots?
c. Why can't Roots appear in high (=functional) layers of the clause structure?

(3) a. [*x* [√R]]
b. [√R [*x*]]

(4) a. [*x*φ [√R]] before inheritance
b. [*x* [√Rφ]] after inheritance
c. [*x* ~~[√Rφ]~~] deletion (through *cyclic transfer*)

(5) a. [*x* [√Rφ]]
b. *[*x* [√Rφ [√R]]]
c. *[*x* [√Rφ [√R [√R]]]]

(6) *[√R [√R [√R [√R]]]]

(7) [*x* [√R [*x* [√R [*x* [√R [*x* [√R]]]]]]]]

(8) a. V = [*v* [V [P]]] b. N = [D [Num [Class]]] c. A = [Deg [Q [A]]]
d. P = [Path [Place [AxPart]]] e. C = [Force [Topic-Focus [Fin]]]

(9) a. [X [Y]] b. [Z [X Y]] c. X

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