An Introduction to Radical Minimalism II

Internal Merge Beyond Explanatory Adequacy

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1. Introduction:

In this paper, which we conceive of as an extension of Krivochen (2011b), we will analyze the ultimate motivations of *internal merge*, as part of our attempt to develop a "Radical Theory for the Minimalist Program". External Merge and Transfer have already been analyzed *beyond explanatory adequacy* in our previous paper (see Chomsky, 2001). Going *Beyond Explanatory Adequacy* is a notion we will resignify here as aiming to an understanding of the ultimate computational-biological motivations of phenomena, in terms of *interface requirements* in the context of a *massively modular mind-brain* (the "third factor" in Chomsky, 2005b).

2. Development:

2.1 Outlining the framework:

To begin with, we must outline the framework within which we will be working: *Radical Minimalism*. It is a theory within the Minimalist Program that attempts to provide *principled* explanations for linguistic phenomena without ignoring interaction between mental faculties or biological-computational plausibility and, perhaps most importantly of all, seeking the elimination of all intra-theoretical stipulations via interface conditions and (we will claim, *universal*) economy principles. Let us review some of the basic tenets of radical minimalism, and then discuss the framework:

1. Language is part of the "natural world"; therefore, it is fundamentally a physical system.
2. As a consequence of 1, it shares the basic properties of physical systems and the same principles can be applied (*indeterminacy*, the *Conservation Principle*, *locality*, etc.), the only difference being the properties of the elements that are manipulated in the relevant system.
3. The operations are taken to be very basic, simple and universal, as well as the constraints upon them, which are determined by the interaction with other systems, not by stipulative intra-theoretical filters.
4. 2 and 3 can be summarized as follows:

Strong Radically Minimalist thesis (SRMT):

All differences between physical systems are "superficial" and rely only on the characteristics of their basic units [i.e., the elements that are manipulated], *which require minimal adjustments in the* ***formulation*** *of operations and constraints* [that is, only notational issues]. *At a* ***principled level****, all physical systems are identical, make use of the same operations and respond to the same principles.*

From SRMT, we can follow the regularities that have been found regarding the structure of each faculty in the context of a massively modular mind (Katz & Pesetsky's, 2011 "*Identity Thesis*" as an example), as well as the parallels existing between subpersonal systems (i.e., mental faculties) and other biological / physical systems (see Uriagereka, 1998 for some examples and references). It seems relevant to insist on the fact that we are not making a *reduction* of biology (as language is ultimately a biological system, if we accept Chomsky's claim that language is a natural object) to physics, but simply analyzing a *biological* phenomenon in physical terms, as a physical system (in which there is no contradiction whatsoever) and, as such, applying the *tools* that have been devised in physics in the degree that it is possible, and without confusing the *methodological* tools with *substantive* elements. Of course, looking for exact correlates between *any* two fields would be irrational in the *substantive* level (i.e, units of analysis, as Poppel & Embick, 2005 correctly point out), but we put forth that the *methodological level* has much to tell us, as we are all working with "parcels" of the same Universe that, we tried to show in our previous work and will also argue here, are ***identical in a principled level of abstraction***.

We claim that there is *only one* generative operation in the mind-brain, namely *Merge*, which is free, "blind" (that is, insensitive to the *characteristics* of the objects it manipulates, we follow and extend the thesis of Boeckx, 2010 that only *format* is relevant) and unbounded, and an operation *Transfer* that provides us with a way of delivering structured information across modules. Merge is an inherently diachronic operation that generates binary-branched hierarchical structures, endocentricity being merely a C-I interface requirement in the case of FL. Transfer takes place as soon as it can, and this timing is determined by the formation of a fully interpretable configuration in terms of "bare output conditions", what we call a *phase*[1].

There we have what Phoevos Panagiotidis has humorously called a "dumb machine" (p.c.), a computational system whose instantiation is something irrelevant: there will always be, by conceptual necessity, a generative operation and the possibility of sharing information in the form of structured symbolic representations. This mechanism is "dumb" in as much as it is insensitive to the properties of the elements it manipulates: elements are put together in the working area of a determined module because they share a "common format" (Boeckx, 2010), regardless of the characteristics of these elements, and even the characteristics of the resultant object.

[1] Cf. Chomsky, 1998, 1999, 2001, 2005.

From this it follows that *there is no "malformation" in the syntax, but only in the interface levels*, if a transferred configuration does not allow the licensing of a given dimension, or no explicature can be built with the instructions provided by the syntax in the form of a Logic Form (in Relevance Theory's terms) representation.

In a "dumb syntax" there are no constraints at all, so there is no point in positing feature-driven operations as it represents a substantive complication of the theory, rather than being the null hypothesis. Merge applies because two whichever objects share a common format, and Transfer applies as soon as interface conditions allow it. The role of features, which has been one of extreme importance in Minimalist syntax[2], is questioned, and the very notion of feature is put to test. Our argument goes as follows: let us assume that we start with a fully interpretable Relational Semantic Structure (see Mateu, 2000a, b for the original presentation, Krivochen 2010b, d for developments within this framework), built by merging *generic concepts* in the pre-syntactic instance of C-I. According to the *Conservation Principle* (Krivochen, 2011b), information must be carried along the whole derivational path (i.e., information cannot be erased, but instantiated in a way so that it can be manipulated by the relevant module), which implies that the concepts will have to be instantiated in such a way that they can be manipulated by the syntax, those concepts take the form of *roots*. So far, we have no features or procedural instructions, only semantic primitives. Apparently, features should be added at this point in the derivation, when a semantic object is transformed into a syntactic object. (Un-)Interpretability depends on valuation (Chomsky, 1999), and valuation depends on the category on which they appear. Those features that enter to the derivation unvalued in a category must be eliminated for the derivation to converge. Our objection here is: why adding features in the first place if the system will then eliminate (some of) them? This, without taking into account the stipulation that underlies the whole system regarding the fact that a feature [X] enters the derivation valued in category P but not in category Q. Even if the reader does not accept our use of the Conservation Principle, this second objection is valid within an orthodox Minimalist framework. Feature valuation-deletion also entails the following problem, first noticed by Epstein & Seeley (2002): *the timing of Spell-Out*. If we accept the orthodox view that Spell-Out deletes the features that are uninterpretable by LF (i.e., those which have entered the derivation unvalued, and have therefore acted as *probes*, copying the value of a c-commanded *goal*), then we have to indicate to the system which of all the features that we have in a determined derivational point had entered the derivation unvalued. But, in order to do so, we would have to look back and see the derivational point immediately before valuation, which is impossible in a derivational (even if it is not as strong as Epstein's 1999) approach as the derivation is a diachronic process, and past states of the system are no longer accessible. The situation can be summed up like this:

Spell-Out timing:

[2] For an exhaustive analysis and references, see Adger (2010), Adger & Svenonius (2009).

a) Prior to valuation. Result: *crash*. Uninterpretable features get to the interface levels.

b) After valuation. Result: *crash*. There is no way of knowing which features entered the derivation unvalued (and were, therefore, uninterpretable by LF).

Chomsky (1999) attempted to solve the problem by stipulating that Spell-Out (i.e., *Transfer* to PF) takes place "shortly after" valuation, but we do not see how this could help solving the problem. Epstein & Seeley also tried to provide an explanation by saying that the transference took place *within a transformational cycle*, that is, not before, not after valuation, but *during the process*. For us, that is not a satisfactory answer, since it is simply not principled, but stated. Our solution is quite more radical: we just *eliminate features from the picture*. Our proposal is the following: instead of binary-valued dimensions, we have primitive dimensions with procedural value (Case, to give a well-known example) that can adopt a number X of values, in this case, 3: Nominative, Accusative and Dative (Krivochen, 2010c). In isolation, the relevant dimension will *comprise all three values* because if all three outcomes are possible states of the system, their linear combination is a possible state if the system as well. The relevant dimension will then be in what we call (following Quantum Mechanics) the *ψ-state*. The ψ-state of the Case dimension would be something like this:

$[\text{Case}_X] \rightarrow N\varphi + A\theta + D\lambda$

The system can manipulate an element with a dimension in its ψ-state, but there will be a collapse in the explicature level, since the procedural contribution of the dimension will be the same as null as no mental module can interpret ψ-states (see Schrödinger, 1935 for a simple but extremely clear and useful example). That state will maintain only if the element is not inserted in a syntactic (i.e., structural) configuration, in which it appears in a Minimal Configuration (Rizzi, 2004) with a Functional Head. The functional head in a local relation with the dimension makes it collapse to one of its possible states depending on the "interpretable" procedural semantic features it carries. Therefore, if the procedural head in question is P, to take an example, the closest $[\text{Case}_X]$ dimension will be *collapsed* to the Dλ state, namely, the *Dative Sphere*. The advantages of our view are clear: there are neither *probes* and *goals*, nor the stipulation that the same dimension be in both. No more *valuation* / *interpretability* problem, no more stipulations as regards where features are or any of the concomitant proposals (feature inheritance / sharing, etc.). Besides, we agree with Cedric Boeckx in that, if syntax is really *free*, Agree is a(n *unprincipled*) form of constraining it, which goes against our goals in Radical Minimalism. As we already claimed in Krivochen (2011b), we can derive the correlations (*Split*)T-Nom, *v*-Acc and P-Dat from interface requirements, the dynamics of the derivation in interaction with bare output conditions. In our architecture, then, syntax may be blind, but C-I is certainly *not*[3]. Having two instances of C-I (a pre-syntactic one

[3] We will not address in depth here the question whether C-I is computational (i.e., "generative" in some way) or not. Fodor (2000) and Panagiotidis (p.c.) argue against it. We claim (quite in the line of Jackendoff, 1983 and taking ideas from Mateu,

and a post-syntactic one) means that C-I systems not only *drive* syntactic derivations (as the Conservation Principle predicts) but they *are* syntactic derivations, as RSSs, for example, are built by *Merge*. Of course, it may be claimed that we know very little about C-I to make these assumptions, but what we are doing is inferring what characteristics it should have if it is the case that *the mind-brain can actually described and explained in terms of Radical Minimalism*. Whether it is or not, is still to be proven.

2.2 Quantum driven movement:

Let us assume the framework outlined in Boeckx (2010) and Krivochen (2011b) -summed up above-, focusing on *free merge* and the importance of interface conditions in the definition of minimally transferable objects (i.e., *phases*, in our view). Boeckx says (p. 80):

> "(…) *constraints in movement (what Chomsky (1973) called "Conditions on transformations"), typically thought of as part of Narrow Syntax, cannot in fact be narrowly syntactic. Internal Merge (`movement') is just as free as any other type of Merge. To the extent constraints on movement exist (and I take it that they do),* ***they must be construed as arising from problems at the external systems, or as emerging from the way syntactic information is passed onto these external systems***.(…)" Our highlighting.

That is a very interesting passage, and we would like to build some questions on it. We take it as valid that Merge is free and unbounded, by conceptual necessity, and that, if Move is interpreted as an instance of Merge, it should be free as well. However, even though Boeckx (2010) explains the characteristics of the operation *Merge α*, we could not find a *justification* for it. That is, we know that things (features, morphemes, lexical items, you name it) have to be merged, and in fact they are, but why? In Krivochen (2011b), we said that Merge prevents triviality in the interface levels (especially, LF taken as in Relevance Theory): for example, { ,{α}} makes no contribution to the explicature in isolation, and if α = conceptual category, then the crash will be especially noticeable, as conceptual categories (lexical categories) denote generic entities (either verbal or nominal), but they cannot be assigned a referent in the construction of the explicature. The dynamics of (external) Merge, then, can be motivated independently by appealing to interface conditions (which we have done in Krivochen, 2010b, d, 2011b). External Merge is actually not difficult to *justify*, if we depart from some simple (radically) minimalist assumptions and attempt an operationalization in Boeckx's terms, dispensing with EF and other stipulations. We would now like to test some ideas on the analysis of *Internal Merge*. Let us assume that it is as free as Boeckx's argumentation leads us to think. Again, the procedure is described and

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2000) that there are purely conceptual structures that, even though they can be instantiated linguistically, they are not linguistic in nature. Our view clearly contradicts the conception about the semantic component that has been accepted since early Generativism (see Chomsky, 1965, for example), namely, it is *only interpretative*. For us, there is *syntax* in every module that deals with *structured symbolic representations*, therefore, C-I *must* be computational.

explained, but, to our opinion, it is not justified in a *principled* level, that is, we all take for granted that the operation exists, and the work done on movement has focused on constraints, locality, antilocality (e.g., Grohmann, 2003, 2004), islandhood, etc. Movement has been taken to be feature-driven (in order to check a feature, satisfy an EPP, etc). But what happens when we have a feature-less theory? What we will try to do, is outline a proposal for *justifying* Internal Merge in terms of interface conditions appealing only to the theoretical apparatus of *Radical Minimalism* (i.e., quantum dimensions, convergent phases, informational domains, etc.). The idea will be as follows: syntactic objects have quantum dimensions, which collapse to one of the possible outcomes in a local relation with a functional / procedural head. The outcome depends on the features of the head, that is, the procedural contribution it makes to the explicature, and it is possible that a head may not have the necessary features to make a certain dimension collapse. Optimally, all quantum dimensions on a certain element should collapse within the *minimal collapse area* (or informational domain, as we have said above). The three Case spheres, as we have already said in Krivochen (2010c), are in correlation with the Thematic spheres, following DeLancey's (2001) proposal. The boundaries we descriptively establish of an informational domain should optimally coincide with the boundaries of Minimal Configurations and *collapsing areas*. Collapsing cannot take place across boundaries for two reasons: first, because of the Earliness Principle: operations take place as soon as they can, and there is no reason to wait for another functional head to merge when we already have a head that can make the quantum dimension collapse. Second, because of Minimality: different types of informational domains are like different perspectives for measurement, they make the dimension collapse to one state or the other. Movement, then, would be a last resort to create a structural configuration (a Minimal Configuration, using Rizzi's 2004 terms) in which the aforementioned collapsing can take place. Now, it may seem that we are again in a feature-driven system, but we are not. Mainly, because what we have called "features" on functional heads have to do with *the type of information they convey*, namely, spatial (P), agentive (*v*), temporal (T), aspectual (Asp), etc. That is, there are no features in the traditional sense, as we have already said, only heads with interpretable information (that is how we define "informational domains" as wholes: certain heads that convey the same ***type*** of information relevant to the explicature are grouped for interface purposes: in LF, we are concerned with the contribution to the explicature, in PF, heads of the same informational domain can be *fused* in the instance of Vocabulary Insertion) and quantum dimensions in syntactic objects that have to collapse to be successfully transferred. The information that the FL conveys is strictly compositional, all other process being inferential. Our thesis about the interface *syntax-semantics* (Krivochen, 2010a) is that ***syntax pre-sub-determines inference*** in the sense that there cannot be an inferential process that is not licensed by a procedural element, but also, at the same time, the inferential module takes the LF (the output of the syntax, transferred by phases) as the most accessible option, but certainly *not the only one*. This means that if, for some reason, the first (most obvious and less costly) interpretation does not fulfill the relevance expectations, the second one in order of accessibility is analyzed by the same parameters: cost (computational

bargain) / benefit (positive cognitive effects). The inferential module reads "outcomes", but it cannot work with ψ-states, as their contribution to the explicature would be null. Collapsing, therefore, is a *principled* process (not an operation, in a strict sense, as it "occurs ergatively", not agentively) ***justified by interface conditions***.

Having said this, the collapsing of quantum dimensions can be taken as a possible justification for certain instances of *movement*: a quantum dimension in its ψ-state is not legible by the interface levels, as we have said. Let us suppose that we have a SO [X] with two quantum dimensions, $[P_X]$ and $[Q_X]$. We have said that there is a correlation between the information that a certain head carries and the dimensions it can license, not because of a syntactic constraint, but because of interface conditions: if a procedural node carries spatial information, and makes a definiteness dimension collapse, the result will be a crash in the explicature level, since that node -P, for the sake of clarity- is related with the Dative / Locative sphere (Krivochen, 2010c), but not with definiteness or so. A certain object must have *all of its quantum dimensions collapsed* by the time it is transferred or, better explained, *a certain object will be transferred if and only if it has all of its quantum dimensions collapsed* (i.e., it is *fully interpretable*, see Krivochen, 2010b), so if in the merge position not all dimensions have collapsed because of the characteristics of the nearest head, the element must look for a procedural head that can license that dimension *prior to Transfer*. It is possible that Movement of [X] applies as a *last resort* to create a structural configuration where its dimensions can collapse while respecting Minimality, when the derivation has reached a point in which there is an intermediate element blocking the minimal configuration required for licensing / collapsing quantum dimensions in the *smallest unit* containing [X]. Convergence is not assured this way, but we maintain the freedom of syntax. The question would be now: how does this contribute to reduction of the computational burden? What does this work? Nothing in the syntax, for sure. Our proposal is that rutinized neurological connections should be taken into account. Syntax (i.e., Merge) may be dumb, but the brain is certainly not. If a derivation always crashes, it will simply be ruled out by the interfaces themselves and the biological basis of $C_{(HL)}$, taking that neurological networks have "memory"[4].

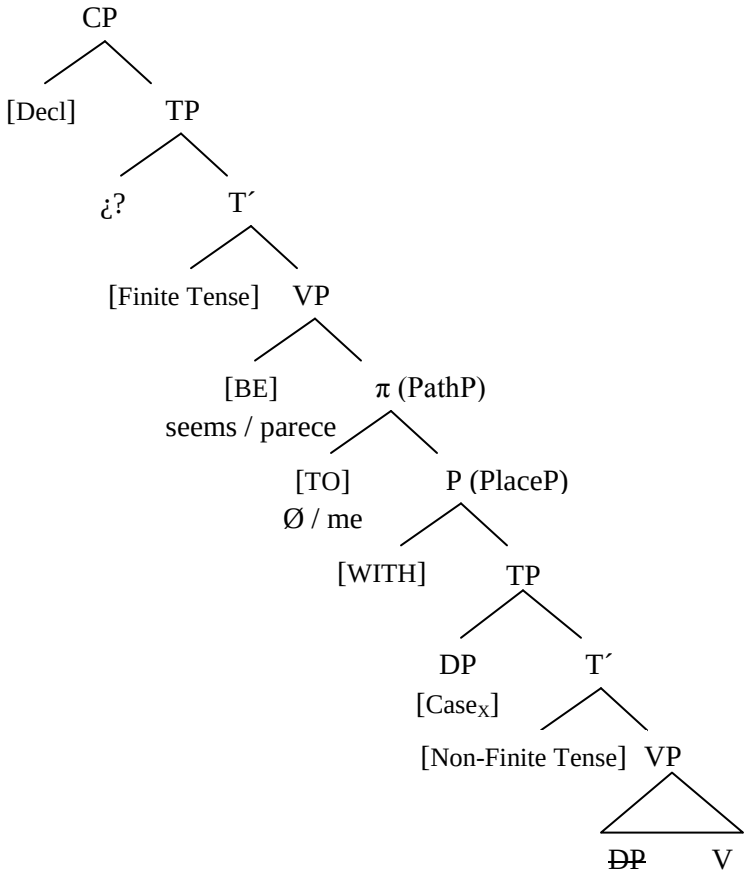
It is worth pointing out now that we are not saying that the interface levels are the *locus* of movement. All we say is that so-called movement is actually a reorganization of a structural configuration, *in the working area* in order to create a *fully interpretable* (and therefore *transferable*) object. Movement does not have any effect on syntax whatsoever, as "syntax" equals "Merge", which is an operation, not a level of representation that can be well- or ill-formed. We will not claim that interface levels are the *locus* of this structural reorganization because, according to our module-neutral definition of *phase* (Krivochen, 2010b, d, 2011b), an object that reaches the

[4] There is no need to resort to connectionist networks like Elmans' to have neurological structures with "memory". There is evidence of statistical learning within Generative Grammar (Thornton & Tesan, 2006), which is, ultimately, expressible in terms of rutinized neurological connections. It is a proved fact in neurology that connections which are regularly activated are reinforced, and thus our proposal gains biological plausibility.

interface levels must be already fully interpretable, if we accept that *phases* are the units that undergo *Transfer* and that *Transfer* is, in this particular case, to send information from the working area of Facle to C-I and A-P. In one word, "movement" applies in the syntax because it is the last resort to assure convergence, but it is interface-driven and its "effects", which we will discuss below, are felt in the interfaces.

2.2.1 Raising-to-subject movement:

We will address now a problem that has been analyzed from very different perspectives: raising-to-subject. We are not only referring to instances of "seem"-type verbs, but, in a more general spirit, the movement of a constituent to Spec-TP. The solution to the problem may have to do with the concept of *theme*, and the semantic component. Let us consider a typical seem-raising structure as analyzed in Krivochen (2011a), with a *split spatial domain* (Mateu, 2010, Krivochen, 2011a):



What we have to do now is check whether the conditions for the collapsing of the Case Feature in the DP obtain. Let us proceed bottom-up. After the complete assembling of the thematic domain (*v*P / VP), we merge a T node. This T, being non-finite, cannot license NOM Case in the relevant argument. If V tried to license ACC / OBJ in that DP the derivation would crash in the explicature level, so we must find an appropriate "probe" for NOM

licensing. All the heads that are merged until matrix T are unable to license NOM, so they are not intervenient heads in terms of Minimality. If the only requirement to license NOM is finite T, which would be the optimal scenario (and the one we will assume), then matrix T is the only appropriate "probe". As there are no intervenient heads between T and DP, T can make the Case dimension in D collapse. So how and why do we fill Spec-TP? The answer seems to have to do with the concept of *theme*. One proposal could be the following: we can dispense with [EPP] if we consider that Spec-TP is an *informationally relevant* position, in terms of the construction of the explicature. Of course we are not trying to do discourse analysis here, but it is known that the dynamic *old information-new information* is important for determining the relevance of a proposition. If it only provides old information, it will not be relevant. If it provides only new information, then we will not be able to select an appropriate context to process it, and optimal relevance could not be achieved. Elements that move to Spec-TP are *themes*, and when we have mere presentational sentences, which introduce new referents to the discourse, an *expletive* is required:

i) There is a book on the table

ii) Hay un libro sobre la mesa

[a book] is not an element that can be independently manipulated by C-I, that is, it is *not a phase* in Krivochen's (2010b) terms. Indefinite elements cannot rise because they *cannot be theme*, as they are newly introduced. Sentences like (xxi) and (xxii) are called *thetic sentences*, as they lack *theme*[5]. Spec-TP seems to be a position reserved to elements whose features of definiteness have already been licensed (in the way described in Krivochen, 2010a) and that are thus able to function as *theme*. Violations of these descriptive generalizations rarely generate ungrammaticality (since no principles of the grammar –if there are such things in a- are violated), but semantic anomaly at the *explicature* level. See, for example, (xxiii):

iii) ?! There seems John to be in the room (irrelevantly, [There seems to be John in the room] is equally anomalous)

[John], as a proper noun, is by definition *thematic*, and thus its raising is "obligatory" for the explicature to be built without any problems. But bear in mind that Case can be assigned without raising, and therefore, it would be wrong to regard (xxiii) as ungrammatical because of case reasons, which is what the generativist orthodoxy would say. Interestingly, we have a preference of Move over Merge for *interface* reasons, contrary to what the Merge-over-Move principle would lead us to think.

[5] For a detailed analysis of these sentences, and existential sentences in general, see Stamboni (2008).

Movement to Spec-TP is, then, triggered by interface conditions, namely, C-I conditions on the construction of the *explicature*.

How would this work in a Radically BPS scenario? No major changes have to be done, but a note is necessary. Instead of talking about "Spec-TP", we can simply say "the leftmost position". Bear in mind that the structure above is simplified, since TP is not *Split*, as it should be. Consider a RBPS with separate T, Asp and Mod nodes. If movement to merge with T is motivated by *themehood* (a claim that is too strong and general to be true), we can very well assume that movement to merge with each of the nodes is motivated by a different semantic reason. Let us take Mod, for example. Taking into account that our model is strongly componential, there is no way of determining *a priori* what the motivation may be in a given case, we have to look at the whole derivation. But, for the sake of expository simplification, we can say that, depending on whether the clause we are considering is a simple matrix clause or a subordinate clause, the "subject" of the sentence (in traditional terms) can be the modal subject, that is, the person that makes the modal judgement in either epistemic or deontic terms; or the modal object, that is, the object of the modal judgement by the subject of the main clause. Ultimately, it all reduces to a question of *scope* in LF, as the reader may have imagined. Needless to say, an element "retains" the semantic properties of the intermediate places it has "moved to" in the course of the derivation, if the movement was *not quantum-driven* (in which case, something very much in the spirit of Grohmann's CDE applies, also see discussion below), so that a DP can be at the same time a modal subject and the theme of a clause, if there are occurrences of that element in the external positions of Mod and T respectively. We have, then, an elegant account of movement, without resorting to anything but interface conditions and *explicature* possibilities.

2.2.2 Locality and successive cyclicity revisited:

The explanation of movement we have presented is very much like Grohmann's (2003, 2004) *intra-clausal movement*, it goes upwards to the *immediately "dominant" informational domain*, built and analyzed by the interface in real time. In our system, the notions of *locality* and *anti-locality*, of frequent appearance in recent works on syntactic theory, follow naturally from the way in which the dynamics of the (syntactic) derivation interact with interface conditions. We want to *justify* these concepts, to go further than descriptions and explanations that have been given so far (Rizzi, 2004, Grohmann, 2003, Boeckx, 2010, to name just a few of the most important works). The relevant element would not need to stop in each available position, but only on those that, once the relevant head is merged, can collapse the quantum dimension, as the derivation proceeds *in real time* and no object can "see" what will be merged later on. This is **why** we have ***locality***: although it can be argued that it would be simpler to wait until the whole derivation is completed and just move the element to its final position, that option would imply maintaining a larger structure in the working memory, a scenario that is far from optimal (and would wipe phases clean, incidentally). *Successive cyclic movement* is a way of

minimizing computational cost. Movement applies as soon as it can (i.e., as soon as a new informational domain is created and we have therefore new heads that can enter in a *licensing* relation with the object in question), waiting would imply departing from the best option, which has to be justified independently. ***Anti-locality*** derives from the fact that each informational domain has the procedural features to make a certain dimension collapse, but not other, so *intra-domain* movement would be trivial, with no effect in the interface. Informational domains are both *homogeneous* and *heterogeneous* in nature, let us see why: they are *homogeneous* because they are defined taking into account the ***type*** of information they provide the interface with (e.g., T, and Asp give definition, reference to the generic event denoted by the *v*P domain), and this homogeneity can be seen in instances of *morphological fusion*, heads belonging to the same domain can be fused, as it happens in Spanish with T, Asp and Mod, spelled-out as a single affix (i.e., by means of a single VI). Their *heterogeneity* comes into play when considering these domains closer: they convey the same ***type*** of information, but not the same information by any means, or the *Split TP* would not have any sense (and we hope to have demonstrated otherwise in Krivochen, 2010a). Homogeneity has to do with "cumulative influence" over an object's quantum dimensions; heterogeneity has to do with the specific contribution a head makes to the explicature level.

We have to take into account that optimally, at every point in the diachronic derivation, full interpretability should be satisfied. That is, if at a determined point in the derivation we face a structural configuration in which a SO cannot collapse all of its quantum dimensions, it *must* "move" immediately, which we will understand in the sense of "merging a *token* of that element following monotonic Merge", in consonance with the *extension condition*. In a more general spirit, let us say that there is only one "constraint" to operations in the syntax, which we will call *Dynamic Full Interpretation*[6]:

Dynamic Full Interpretation: *any derivational step is justified only insofar as it generates a fully interpretable object; that is, Full Interpretation should be obeyed in every point in the derivation*.

If a derivational point does not, then we can expect that the only option is to create a structural configuration in which all quantum dimensions can collapse (taken as valid that there is nothing more to cause crash than quantum features, which would be a desirable result). The reader must take into account that this does not mean that we are changing a strong derivational model for a representational one, since FIP must be satisfied *in real time*, after every application of Merge, as we have said. In a representational model (GB, for example); conditions on good formation were applied to fully-fledged representations, namely, D-Structure, S-Structure, LF and PF. Our syntax is free, conditions upon it are interface-driven and there is nothing more to it. A note

[6] We will make use of DFI to analyze the topic of *edges*, but it is very useful to gain insight into other areas as well. For example, the analysis of Merge in Adger (2011) can be revisited under this light, as well as the derivation of roots in De Belder & Van Craenenbroeck (2011).

should be made here: we have already argued against *Phase Edges* in previous works (Krivochen, 2010b, 2011b), and here we will provide some more evidence in our favor. If we accept that an operation must is only legitimate if it follows from FIP (that is, interface requirements), then, we can ask ourselves what is (if any) the difference in legibility between (a) and (b):

a) $[_{vP}$ YP $[_{v'}$ $[v]$ $[_{VP}$ $[_{V'}$ $[V]$ $XP_{[u\text{-}F]}]]]]$

b) $[_{vP}$ $XP_{[u\text{-}F]}$ $[_{v'}$ YP $[_{v'}$ $[v]$ $[_{VP}$ $[_{V'}$ $[V]$ ~~$XP_{[u\text{-}F]}$~~$]]]]]$

Let us assume that the "uninterpretable feature" in XP cannot be valued by *v*, but by some other higher head, say, T, or C. Does movement to outer-Spec-*v*P value and erase the feature in question? Certainly not. Therefore, we have an operation that generates an object which is equally uninterpretable by the interface levels. A superfluous operation, put differently. Not only does this take us away from strict *last resort* conception of movement (since the derivation is by no means "saved"), but it also complicates the system descriptively and explanatorily. Such a theoretical apparatus needs stipulations that we will try to eliminate. Our objection is only valid if one accepts our *Dynamic Full Interpretation* Principle, which we think of as an important economy principle in a strong derivational approach: we keep syntax blind and free, and we can provide a justification for legitimate operations in interface-legibility terms only. Let us see what a derivation would look like in Radically Minimalist terms, starting with the SO depicted in (a) (we will use labels just for explanatory purposes, but we beg the reader to think of these representations as the bare structures we used in Krivochen, 2011b):

c) $[_{vP}$ YP $[_{v'}$ $[v]$ $[_{VP}$ $[_{V'}$ $[V]$ $XP_{[Dx]}]]]]$

Once we have reached this stage in the derivation, we have an element that, if transferred, would cause the derivation to crash as it bears a dimension [D] in its ψ-state. As we have said before, *v* cannot make it collapse, suppose it is a feature related with definiteness. In Krivochen (2010a) we -hope to have- demonstrated that definiteness in DPs depended on a local relation with three nodes, Asp, T and Mod, each of which provided the inferential module with different clues for interpretation. So, we will assume this scenario as an example. The next step would be the merger of another element, following *monotonic Merge*. The *v*P domain denotes a *generic* event, so the next relevant head would have to be one that can contribute to the specification of this reference. In Krivochen (2010a, d) we argued in favor of considering that T is this head, so we merge a bunch of procedural features that will be spelled out later. Let us call this syntactically structured bunch of features a T node, for simplification purposes. As the structure is not interpreted by the interface system as a generic event anymore, but as an event situated in a specific time frame, T has scope over *v*P, and a "label" is recognized by C-I. Remember that labels do not exist in the syntax since they are irrelevant to it, they are "recognized" (*not* created, so as not to violate the *inclusiveness condition*) in the interface level. The same happens with Asp, a

node that conveys the way in which the speaker sees the previously defined event: as a point or as a developing event, with internal structure. The Asp "projection" (AspP, in traditional terms) closes the proposition, since the next node, Mod, conveys a subjective evaluation over the propositional content (in epistemic or deontic terms), in order to do which this node must not only be outside the proposition but have scope over it. The order, as we have said in other papers is, then, [Mod [Asp [T [*v* [V]]]]]. In this structure (in which we have omitted the spatial projection in order not to complicate things, let us just assume it is an unergative verb in a transitive alternation) we have two *informational domains* (for the time being), namely, [Mod [Asp [T]]] and [*v* [V]]. Informational domains can be indentified because their nodes can be *fused* in Vocabulary Insertion, as we have already said. By *fusion* we mean that a single VI can Spell-Out dimensions in more than one head, that is, there is no one-to-one correspondence between nodes and VI but, if a given language allows it, a single piece can materialize several nodes. This, of course, is a purely *extralinguistic* and *sociohistoric* matter, as all lexical matters are. All we can do is explain what happens *up to* Vocabulary Insertion, but the historical nature of the lexicon (why some words, even though possible, are not coined, for example) is beyond our scope (as formal linguists concerned with the functioning of the mind-brain).

Our proposal has consequences for the theory of *escape hatches*: in our model, such a notion is simply *unformulable*. Escape hatches (outer-Specs in phase heads) are superfluous positions, which, as we have seen, are not justified in interface terms. Besides, the bare structure we have posited in Krivochen (2011b) renders edges unnecessary, as the notion of a Spec position out of a phase domain is only formulable when we have, in the first place, *endocentric phases*, against which we have already argued; and in the second place, projections in the syntax (i.e., X-bar trees). If we do not have phase heads, a direct consequence of defining phases in terms of convergence, the notions of *domain* and *edge* lose their theoretical weight. Besides, the mere term *specifier* makes sense when we have a projection system in the narrow syntax, which is actually no more than a labeling algorithm (XP, X', X_0). If syntax can do without *labels*, that is, if labels are *interface-identified* in the explicature level, then the whole phase system has to be revisited critically. Another consequence of our proposals is that the very notion of *successive cyclicity* must be revisited, as the "intermediate landing sites" must be legitimized by interface requirements, that is, we cannot have an element in a position in which it is superfluous. In this sense, our proposal is very much in the line of Grohmann (2003), but we tend to a much simpler form of Minimalism. Architecturally, the resultant model is surprisingly simple, but, as the reader must already have thought, there is still a long way to go before full operationalization.

2.2.3 Informational Domains and Prolific Domains:

It is time to devote a section to the analysis of what we have called "***Informational Domains***" (ID), and compare them with K. Grohmann's (2003, 2004) ***Prolific Domains*** (PD), to see in which ways they are similar and in which ways the operationalization of the ideas differ substantially.

First, let us define what Grohmann means by "Prolific Domains" (Grohmann, 2004: 212):

"*A Prolific Domain is a contextually defined part of the computational system, which provides the interfaces with the information relevant to the context and which consists of internal structure, interacting with derivational options".*

CP, TP and VP are thus "prolific" in the sense that they contain more than one "layer":

VP is expanded in *v*P and VP since Larson (1988) (see also Hale & Keyser, 1993).

TP is expanded in Agr_SP-TP-Agr_OP in Pollock (1989) and Chomsky (1995).

CP is expanded in ForceP, TopP, FocP and FinP since Rizzi (1997).

Within *v*P and its associated projections *thematic relations* are established, so this PD will be called *Θ-domain*.

Within TP and its associated projections, *agreement features* are checked (an operation that relies very much on phi-features), so this PD will be called *Φ-domain*.

Within CP and its associated projections, lastly, *discourse-driven* operations are performed. This domain will be called *Ω-domain*.

The revised structure, an expanded version of the classic Chomsky (1986) clause structure is as follows:

[$_{\Omega\Delta}$ ForceP…TopP…FocP…FinP [$_{\Phi\Delta}$ Agr_SP…TP/IP…Agr_OP… [$_{\Theta\Delta}$ *v*P…VP]]]

We have criticized some aspects of this clause structure in Krivochen (2010b), now we are concerned with the *nature* of PD rather than with their inner structure. Grohmann defines them as providing interfaces with information, each domain of a different kind. The informational value of the Ω and Θ domains is clear, and we cannot add much to what Grohmann has said about it. However, the contribution of the Φ domain either to the explicature or to phonology is another matter. Within the Φ-domain, agreement properties are licensed, but we have said that a system with Agree is a stipulatively constrained system, that departs from our idea of a radically simple syntax. Even if we replace the notion of "agreement" with pure "licensing" under the scope of a functional-procedural node (as we have done in Krivochen 2010c and more recent works), the composition of this domain is conflictive from an interface point of view: are AgrS and AgrO fully interpretable? Why would we need them, in the first place? We have demonstrated that we can account for the phenomenon of Case with only *v*, P and T, so those nodes are superfluous. And, as such, must be eliminated.

Apart from these technical issues, which can be solved easily even within a PD framework, there are some other aspects to consider. We will analyze specially two: the *type of information* handed to the interfaces and the *transfer point* ("timing", so to speak).

a) **Type of information**:

Whereas PD handle information about *thematic relations*, *agreement features* and *discourse-driven processes*, we believe that the *theoretical status* of the Φ-domain must be analyzed deeper. Actually, there is no restrictions whatsoever regarding what nodes compose each PD; as a consequence, Grohmann's clauses include Agr_S and Agr_O, both of which were eliminated in Chomsky (1995) for being superfluous projections for FIP purposes. We posit that if a domain is to be interpreted by the interface systems, then all the projections contained within that domain must be fully interpretable (thinking in traditional X-bar terms). PD seem to be defined in quite aprioristic terms, in spite of the definition Grohmann gives, which appears to be dynamic…and it really is, if it were not for the fact that projections are arranged in advance. The diachronical aspect of the syntactic derivation is therefore lost, and the definition loses much of its explanatory potential.

There is another problem, and it is the *interpretability of the Φ-domain*. It is not clear that "agreement" is interface relevant, especially if we can rely on structural configuration for establishing relations between procedural heads and root-based structures (i.e., lexical items). We have to bear in mind that in no point does Grohmann speak about Tense / Time features, but the Φ-domain is the locus of Agr. As we have done away with *agree* as it is conceived of in traditional Minimalism, a Φ-domain formulated in Grohmann's terms is neither necessary in or compatible with our proposal.

Our *informational domains* operate in quite a different way. For us, there is a single combinatory operation that combines elements, roots and functional-procedural nodes, in such a way that convergence in LF is achieved. We will also work with three domains, not structurally but purely interface-defined. In other words, there is no place for *a priori* boundaries in our system, so the syntax builds a structure and then the interface levels *recognize* domain boundaries as fully interpretable material is transferred. Interestingly enough, domains in LF have proven to coincide with domains in PF: domains in LF are defined taking into account the information they provide for an explicature to be built. In PF terms, if certain nodes can be *fused* into a single VI, they are recognized as a domain.

i) {DP, {P, DP}}: LF: locative information

PF: no fusion possible, as the P domain is the one in the bottom, there is no node to fuse with when the P head enters the derivation.

ii) {*v*, {VP, {PP}}: LF: event including a spatial relation

PF: V and *v* are fused[7]. P can conflate onto V if and only if there is no lexical insertion, but we would not be talking about *fusion* but *conflation*.

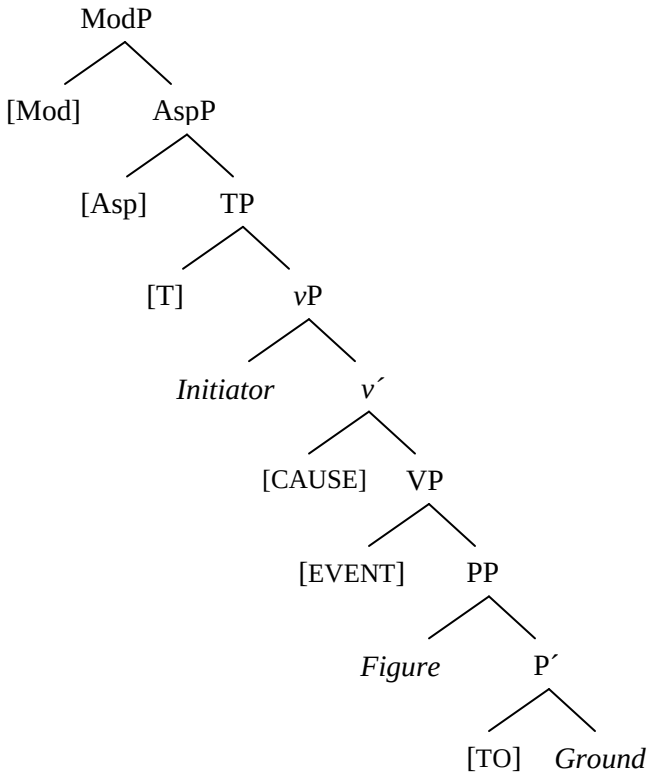
iii) {Mod, {Asp, {T, {*v*P}}}}: LF: in strict dominance order, we have a modalized proposition, which includes an event delimited in time and seen either as a point or as developing.

PF: especially noticeable in synthetic languages like Spanish, in which we can see Mod, Asp and T features spelled-out by a single vocabulary item.

A note has to be made here: the fact that in a given language (English, for example) fusion is not possible is a mere historical accident, product of the lack of a single vocabulary item specified enough to spell-out those nodes. This does not mean that the fusion is not *conceptually possible*. Our claim is that the fact that a group of nodes convey the same *type* of information makes the fused spell out possible. We are consciously giving pre-eminence to LF (C-I) over PF (A-P), as there could not be human language without a conceptual interface, but phonology is not only accidental (i.e., not essential, neither necessary nor sufficient) but also *dispensable*, if we have in mind that communication is an epiphenomenon. That is, the *Morpheme Formation Constraint* is a constraint that is found in every natural language that we know of, since we know them *because of their phonological manifestations*, and what we call "***a*** language" (English, Spanish, Italian, etc.) is nothing more than a non-ordered collection of phonological matrices that spell-out (sub-morphemic) structures. The concept of *a* language has, thus, no theoretical entity, since it is merely an inductive abstraction made from acoustic samples (*observations*, in functionalist models like Diver's) in what is called a linguistic community. Such abstraction needs some internal standardization and regularization (ignore mispronunciations, for example; correct the input in whatever way is required), so as to make real phonological samples compatible with the acoustic image each of us have in his mind. In spite of what some linguists try to put forth, there is no conceptual problem (and less so in a Radically Minimalist framework) in imagining a natural language *without phonology* at all: Merge would only be constrained by C-I requirements. Remember that, if the *great leap forward* is the emergence of *conceptual addresses* (or roots, in our terms), C-I is not dispensable if we think of language as a *mental faculty* related in a more general spirit with the infinite use of finite media (echoing Humboldt's words), not as an external phenomenon (e-language, in Chomsky's terms), communication-oriented.

To sum up, let us remind the reader of the skeleton of the clause that we proposed in our previous works:

[7] This shows clearly in languages where agentivity is presented as a *morpheme* in the V.



Labels are included just for the sake of clarity, but we refer the reader to the discussion in Krivochen (2010b, d, 2011b) regarding the status of labels. Instead of a labeled tree, we should have a bare binary-branched hierarchical structure, as labels (if we interpret them as instructions to take a phrase marker as a unit for further computation) are of no use to syntax: syntax (in the wide sense in which we will always talk about it) is a free unbounded mechanism that combines elements with the same format (Boeckx, 2010, Krivochen, 2011b). A Radically Minimalist theory should do its best to dispense with the *copy* operation that is required for labels to appear (and have relevance) in the syntax. Let us suppose that we have the following object: {H, XP}, and we want to label it. Chomsky's labeling "algorithm" (it is rather a rule) predicts that H will project. For that to occur, we need to copy H's categorial features upwards, so that the information is maintained or rather increased: otherwise, there would be no point in labeling at all. Of course, that system presupposes that elements enter the derivation already categorized, a position we have argued against before. If there is no procedural category to collapse the categorial quantum dimension in H, there is no labeling possible, and there is nothing dominating H in the configuration we have analyzed. We put forth that "labels" are *recognized* rather that *created* in the LF interface level, as they are of essential importance for the construction of an explicature. The *inferential module* recognizes informational domains, delimiting them in the most accessible LF for the construction of an explicature.

b) **Transfer point**:

Even though Grohmann explicitly states that a PD framework does not necessarily entails Multiple Spell-Out, we will assume the MSO variant of the PD theory, as it will be useful to compare it with our own version of *derivation by phase*.

Let us first compare the Spell-Out timing of Chomsky's *phase theory* according to the two versions of the Phase Impenetrability Condition (1998; 1999, 2001, 2005):

- PIC_1 (MI): In the phase α, with a head H, H's domain is not accessible to operations *outside α*, only H and its Edge.

- PIC_2 (DbP, BEA, OP): In the phase α, with a head H, The domain of H is not accessible to operations ***at ZP*** [the next strong phase head], but only H and its edge.

Let us assume the following derivation, where H and Z are strong phase heads (say, *v* and C):

i) [ZP… [XP… [HP [H YP]]]]

Under PIC_1, the transfer of YP occurs when H is merged, as it is explicitly said that no probe outside HP can have access to it, not even XP, which is not a strong phase head (in the terms of Chomsky, 1999). Under PIC_2, however, XP can have access to YP, which means that it is not transferred until Z is merged. Of course, if we consider that phases are the locus of feature checking and transfer, H's condition of strong phase head renders superfluous, as it does not trigger transfer. The "reduction of the computational burden" argument is significantly weakened, as the derivation is transferred when it is completed. The scenario is complicated even more if we have, for example, a CP as a complement of a transitive V. By considering PIC_2, it is conceptually possible that V can have access to C and its whole domain. The only way to prevent this from happening is to stipulate, for example, that CPs always trigger transfer, which is of course untenable within Radical Minimalism.

We will turn now to PD and transfer point. According to Grohmann (2004), "Spell-Out applies *at* each Prolific Domain –as soon as a Prolific Domain is formed it spells out." There are no edges here, therefore, if we have the following configuration:

ii) $[_{vP}$ ZP *v* $[_{VP}$ V XP]

We have a complete Θ-domain, within which thematic relations are "created" (using Grohmann's terminology, with which we do not agree, as it can be seen in Krivochen, 2010c). As soon as *v*P is closed, it spells out *entirely*. This means that there are no edges left behind as in a Chomskyan model. However "natural" this Spell-Out system may seem, it is not stipulation-free. Even though PD provide the interfaces different types of information, and it would seem optimal that each PD be transferred as soon as it is complete, we will see that a dynamic

definition of a MSO system is "more minimalist". The bigger the structure, the more we divide it (Boeckx, 2010). Having a static system means that there is no relation between the complexity of the structure and its chunking, an option we consider far from optimal, as it does not reflect (describe) or explain the mental mechanisms put in practice. It assumes an automatic mind-brain, which chunks information according to some pre-existing stipulative algorithm.

Our version of MSO is a dynamic, system-neutral and non-stipulative one. Let us give the definition and then analyze the consequences of adopting such a framework:

P is a ***phase in*** $\boldsymbol{L_X}$ *iff it is the* ***minimal term fully interpretable in*** $\boldsymbol{L_{X+1}}$

We will maintain Chomsky's (2005, 2007) claim that the *phase* is the locus of *transfer*. Not of feature checking, of course, since we have dispensed both with features as they were conceived in traditional Minimalism and checking operations. Besides, as our definition applies to any symbolic representation in the mind-brain, it would be unnecessarily restrictive to mention specifically linguistic elements in the definition: we just apply transfer from one module to another when in M_1 a fully interpretable object for M_2 is assembled. Within FL, however, even though conceptually our definition is dynamic, against Grohmann's *static* conception, the empirical results are surprisingly similar in *most* cases. However, there are a number of differences that we have to take into account. For us, the three domains are defined as *quantum collapse areas*, providing *locative*, *eventive* (either agentive or not) or *temporal-aspectual-modal* information to the semantic interface. Even though the inclusion of Mod within the same domain as T and Asp may be objected to as Mod is rather related with so-called *discourse-driven* processes (and, thus, with the Ω-domain), we argue that those apparent processes are really post-syntactic, related with the concepts of *explicature* and *implicature*. Rizzi's movements to the Left Periphery nodes TopP and FocP in order to represent shared and new information, to put an example, cannot be feature-motivated in our framework. Let us put aside the question whether those movements take place in the syntax proper[8] or not. They have nothing to do with "discourse driven processes", as Movement, according to what we have seen so far is only motivated by interface reasons, namely, the need to collapse quantum features. If these last-resort operations have an effect on the interface such as the generation of an implicature is something irrelevant for the study of syntax. Only the explicature-building conditions are of our interest, and all they need is that quantum dimensions be collapsed. The necessity of a Ω-domain is not clear, at this point, because the information it would convey does not exist as such in the syntax. What we have done is precisely turn Rizzi's picture upside down: instead of syntactic features ([Top], [Foc]) driving discourse-related movements, we have convergence-driven movement that has "accidental" semantic consequences. Mod is a node that participates actively (and, sometimes, independently of Asp and T) in the definition of the reference of nominal constructions

[8] Manuel Leonetti, p.c.

as we have showed in Krivochen (2010a), and therefore, makes an essential contribution to the explicature in terms of referent assignment.

In Grohmann's model, *movement* is restricted in two ways: *locality* and *antilocality*. **Locality** establishes that an element must move cyclically, either inter- or intra-clausally, following these rules:

- *Intra-Clausal Movement Generalization*
  $[_{\beta\Delta}$ XP … $[_{\alpha\Delta}$ … ~~XP~~ …]], where β >> α

Intra-clausal movement takes place between immediately dominating domains within a clause. Cyclicity means thus an intermediate landing point in each PD.

- *Inter-Clausal Movement Generalization*
  $[_{\alpha\Delta}$ XP … ‡ … $[_{\alpha\Delta}$ … ~~XP~~ …]], where ‡ = clause boundary

Inter-clausal movement takes place between identical domains in different clauses. Cyclicity means thus landing sites in positions in identical PDs across clause boundaries, i.e., once a Ω-domain is complete.

Anti-locality establishes a restriction with respect to the occurrences of a SO within a PD, expressed in the *Condition on Domain Exclusivity* (Grohmann, 2003:107):

For a given Prolific Domain ΠΔ, an object O in the phrase-marker must receive an exclusive interpretation at the interfaces, unless duplicity of O yields a drastic effect on the output of that ΠΔ.

This means that there can only be a single occurrence of a given object within a PD (either the highest or the lowest, there is no restriction to it), unless Copy-Spell Out rule applies afterwards thus yielding the aforementioned "drastic effect on the output" (in PF terms). Therefore, movement *within* a PD is heavily restricted.
Even though we agree with Grohmann's generalizations and CDE, because they are both theoretically elegant and empirically adequate, we have already presented out attempt to derive both Locality and Anti-Locality from interface conditions, making them *principled* and conceptually necessary, and not rules that empirically apply but whose *justification* (in our technical sense) is obscure.

Let us summarize the different possibilities for Spell-Out timing that we have seen so far[9]:

Spell-Out applies for a term K:

[9] For detailed discussion, see Krivochen (2010b).

a) At the merger of the *closest phase head* proceeding in a bottom-up fashion (PIC_1)
b) At the merger of the *next phase head* proceeding in a bottom-up fashion (PIC_2)
c) At the completion of the *Prolific Domain* to which K belongs (Grohmann, 2003, 2004)
d) Whenever a *fully interpretable object* for the interfaces (containing K) is assembled by means of free, unbounded Merge (Krivochen, 2010b, 2011b).
e) When the *Command Unit* in which K is merged is completed (Uriagereka, 1999, 2002).
f) Within a *transformational cycle* affecting K (Epstein & Seeley, 2002).

Notice that our definition is the only one that requires no additional notions or stipulations, it only appeals to the concept of interface conditions, which are conceptually necessary in a massively modular mind-brain. This is what we understand as *radical minimalism*.

2.2.4 Reconstruction procedures at the Interface Levels:

What about the different occurrences of an object? Put differently, how does the interpretative component (i.e., C-I, the inferential module in Relevance Theory) put together the information that has been provided to it by multiple Transfer? There must be, apparently, some connection between phases, and that connection would be the role of "phase edges" (Boeckx, 2010; Gallego, 2010). However, that only makes sense if we posit that phases are *endocentric* and that labels exist in the syntax. If we do not distinguish between X' and XP, there is no point in talking about edges (i.e., Specs.), at least in the traditional sense. Phase edges are said to have relevance to reconstruction processes, that is, we can trace back the derivational path of a certain element by looking at its previous positions in the periphery of the phases it had to move through to get to its final destination. In our model, however, things are analyzed differently. To begin with, our phases are not endocentric, but defined in terms of *convergence*, as the ***minimal term*** *in a certain level fully interpretable by the next component* (Krivochen, 2010b). If we combine this with a radically "bare phrase structure" (Krivochen, 2011b), what we get is a picture in which there is neither real "phrase structure" (X-bar theory) nor "phase structure" (Boeckx, 2008), but only *structure*. That is, *there are no phrases in the syntax, there is no projection or labeling either, only free applications of Merge and Transfer of fully interpretable units*. The role of edges, and the existence of edges themselves only makes sense if there is something that is not an edge, and that is simply absurd in our framework. Of course there are reconstruction effects at the interface levels, both PF and LF (as we have analyzed in Krivochen, 2010b), and, in fact, dependencies across phases are *only relevant in the interface levels*, since those dependencies are interpretative, and syntax is a "blind" generative component. Therefore, the only requirement for reconstruction to take place is to give the interpretative component some clue that what we used to call a *chain* ($X_i \ldots h_i$) must actually be expressed in terms of *tokens*. Movement and copy erasing is expressible

in terms of *multiple occurrences of the same token* of an element, motivated by the (interface-driven) need to create a structural configuration for collapsing. This way we can also explain the Spell-Out of only one of the tokens, in standard cases: if we move an element, we would like to maintain the index (in traditional binding terms) across the derivational path, and the simplest way to do this is by materializing only the copy whose structural position leads the system to optimal relevance. For example (assuming Grohmann's 2003, 2004 analysis):

a) John wants ~~John~~ to leave. *Optimally relevant, LF sees both occurrences of [John] as different occurrences of the same token, i.e., they are "coindexed" for explicature purposes.*

b) John wants John to leave. *Only optimally relevant if disjunct reference is understood. The Spell-Out of both [John] is interpreted as two different tokens, and the coindexation cannot take place.*

If we Spell-Out an element, that is apparently more costly than leaving it as a null copy (not in terms of computation, but in more concrete terms of "linguistic machinery"). The generalization would be "if you can leave something covert, do so. If you make it overt, then you must have a powerful reason for that (e.g., you want to generate some positive cognitive effect that could not have been generated with the covert option)", that reason being very much in the spirit of Grohmann's (2003, 2004) *Condition on Domain Exclusivity* "drastic effect on the output". However, even if we Spell-Out *both* occurrences, the system looks for an interpretation, since there is a presumption of optimal relevance that makes the system analyze all the possible interpretations serially until relevance expectations are fulfilled. Copy-erasing would be a clue, like many others (e.g., procedural categories), that leads the inferential system to the intended interpretation.

Optimal relevance, a principle of human cognition (Sperber & Wilson, 1986; Wilson & Sperber, 2003), is useful when we want to provide a *principled* justification of phenomena, apart from their description and explanation. The description is the *what*, the explanation is the *how*, and finally, the justification is the *why*. The latter has been either taken for granted or done in a truly *non-minimalist* way (see Pesetsky & Torrego, 2000, 2004 for example). Our effort, then, has been focused on trying to set a *radically minimalist* alternative of justification, taking into account that a theory of language must address all three to be adequate at all levels. Attempting *justification* is what we understand as the ultimate goal of going "beyond explanatory adequacy".

2.3 The Theta Criterion and Quantum-driven movement:

Let us see how this conception of interface-driven movement interacts with Theta Theory. *Move α* and the Theta Criterion were related from the very beginning of GB theory. The trace at the bottom of a chain ($\alpha_i \ldots t_i$) was always in a θ-position, and movement *to* θ-positions was banned since, although an element could bear more than one theta-role in its base position (as Jackendoff pointed out), no theta-roles could be acquired in the course

of the syntactic derivation, a condition that in minimalist terms could be expressed through the *Inclusiveness Condition*. Let us work with a revised minimalist version of the Theta-Criterion in terms of *chains* (Lasnik, Uriagereka & Boeckx, 2005: 229), and then present our extremely simplified scenario[10]:

Given the structure S, there is a set K of chains obeying the format C = ($\alpha_1 \ldots \alpha_n$), such that:

i) If α is an argument of S, then there is a chain C in K such that a theta role is assigned to α_n, by exactly one position P.

ii) If P is a position of S marked with the theta-role R, then there is a C in K to which P assigns R.

This definition maintains the traditional conception of "no acquiring theta-roles in the course of the derivation", as a position P can only be theta-marked with *one* role. Besides, the fact that only the merge position receives a theta-role is included in the definition by saying that a role is assigned to α_n, the lowest member of the chain. It is a position in the syntax that is theta-marked by a lexical nucleus, not a particular DP.

The status of theta-roles remained quite unclear until the works of Hornstein (2000, 2003). His basic tenets are the following (2003:22):

a) Theta roles are features

b) There is no upper bound on the number of theta features that a DP can have

c) Movement is Greedy

d) Greed is understood as "enlightened self-interest" [i.e, *MOVE allows A to target K only if a feature of A **or** K is checked by the operation* (Hornstein, 2001)]

Given the fact that theta-roles are features, and all operations are allegedly feature-driven (Chomsky, 1998), it follows that theta roles can motivate movement and internal merge with a [-N] element. In theta-motivated movement, a DP moves in order to check a feature in both the [-N] element and itself. Of course, for (b) to be true, we would have to accept either (i) or (ii):

i) Theta-features are not deletable

ii) An element can move even after having checked all of its features if a higher probe K with a theta-feature attracts it and Minimality is respected (this is, there are no *freezing* effects).

[10] For a detailed discussion, see Krivochen (2010c).

If (i) is incorrect, then there is no way in which a feature can remain active after having been checked, therefore, the DP is frozen in the last θ-position. If (ii) is incorrect, on the other hand, we have the same results, Movement can apply at will, as long as "theta-assigners" are merged higher up.

Both (i) and (ii) are optimally dispensable in a Radically Minimalist theory, as well as theta-roles as have been analyzed so far, both in GB (Chomsky, 1981, 1986) and in Minimalism (Hornstein, 2001, 2003; Grohmann, 2004). Our thesis in Krivochen (2010c) was that *the thematic system has to be subsumed to the Case system*, building on DeLancey's (2001, Lecture 3) claim that:

"(…) *suppose we could demonstrate that there are, say, exactly x universal semantic roles which can occur as core arguments in a clause in human language.* ***The most obvious language design would have x case markers, one for each underlying role****; every argument would simply be marked for its semantic role, which* ***could then be read directly off the surface morphosyntax*** (…)"

We distinguished three Case spheres, Nominative, Accusative and Dative. Within those spheres, we can find clear-cut examples of each Case and "interface uses" of a Case, examples in which the Spell-Out of a Case morpheme appears where we would normally expect a different expression (e.g., ECM structures, quirky Dative subjects, etc.). Despite Spell-Out issues, abstract Case is taken to be a quantum dimension, which *in abstracto* comprises all three possible outcomes but that collapses to one of them in a particular derivation, in a local relation with a procedural head or due to cumulative influence of procedural heads (Krivochen, 2011b). Theta roles have no entity of their own, that is, there is no independent system for theta roles: they are ***semantic functions read out by the inferential component from the syntactic configuration that is transferred*** [by phases] ***to the semantic interface*** (LF in terms of Relevance Theory). A *theta-role* is the configurational result of three factors (Krivochen, 2010c):

a) The underlying *semantic construal*, the structure made up from *generic concepts* merged in a pre-syntactic instance of C-I (see Mateu, 2000a, b; Krivochen, 2010b, d) that provides semantic instructions to syntax as regards what it has to generate, constrained by the Conservation Principle.

b) The outcome of the abstract Case dimension.

c) Spell-Out, interpreted in two different senses:

   i) Sub-morphemic Spell-Out (root, inner morphemes, Case morphemes)

   ii) Position in the linearized clausal structure

Taking this into account, these conclusions follow:

i) As theta roles are only relevant post-syntactically, they cannot be "features" as in Hornstein's model. Syntax only cares about merging two elements with the same format together. All semantic relations are post-syntactic, therefore, inferential.

ii) As a consequence of (i), even in a feature-driven model, *theta-driven movement* cannot exist.

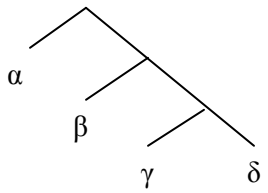
iii) There are no theta-positions (or A-positions and their respective counterparts, following this logic), there are *positions*, period. The interpretation of the structure is at the LF level, in other words, it is true that, as Mateu and Hale & Keyser claim, the structure is meaningful, but it makes no sense talking about meaning in the Computational System as it is a "dumb machine" ***purely generative, not interpretative***.

3. PF-driven movement: Moro (2000):

Moro (2000) follows Kayne's (1994) line, and claims that *movement* and *phrase structure* are related, against Chomsky's theory that movement is related to feature checking, and occurs in the syntax. Moro departs from Kayne's LCA:

α precedes β iff α asymmetrically c-commands β [α and β being terminals in a *bare phrase structure framework*]

Let us assume the following phrase marker:



α is linearizable with respect to the rest of the terminals. β, in turn, is linearizable with respect to γ and δ. The problem is that there is a ***point of symmetry*** between γ and δ, this is, they c-command each other, therefore, the derivation crashes at PF. The last resort to "save" the derivation is to move δ to a position above α (in order to respect the Extension Condition), and leave a *null copy* or *trace* in its merging place. As traces are not linearizable (or, rather, their linearization is trivial for interface purposes, as their phonological form is null), the phrase marker is a legitimate one, and the derivation converges[11]. According to Moro, then, *movement is a PF operation applied to get rid of symmetry points*, which are tolerated in the syntax but not in PF. He attempts to make it a principled operation, by taking features out of the equation and giving major relevance to interface

[11] We refer the reader to the discussion above with respect to the need for the last element in a phrase marker to be a trace for LCA to apply. See also Uriagereka, 1999 for an extensive discussion of LCA and the possibility of deriving it as a theorem.

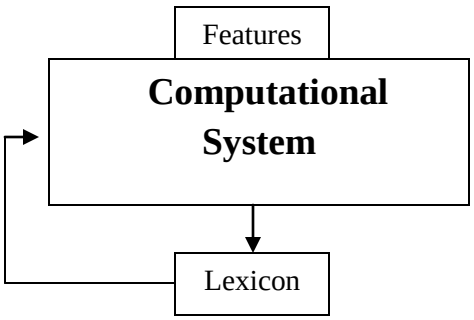
conditions. Moro's proposal can be incorporated in our Radical Minimalism *as long as* we do not claim that movement is *exclusively* PF-motivated. We will claim, instead, that there is a very small number of instances of movement, varying from language to language, that are PF-motivated (probably related to the availability of VI to Spell-Out sub-morphemic trees, as we will analyze in the following section). The reason is that, as we have already said, we believe in the pre-eminence of the semantic interface because the phonological interface is ***not essential for language***, as externalization is accidental to FL, whereas there could be no language without a semantic interface providing *generic concepts* to be instantiated as *roots* (following the *Conservation Principle*). The PF constraints must be thus carefully analyzed, since PF is much more a mysterious interface than LF, contrarily to the common belief among linguists. Jackendoff, Hale & Keyser, Mateu on the generativist side, and Sperber & Wilson, Leonetti, among many others have helped us have a fair idea of how an optimal syntax-semantics interface would work. We have taken those ideas and progressively adapted them in our previous papers (especially Krivochen, 2010d), so that a clear picture of the mind-brain emerges. Besides, and theoretically much more fundamental, it is not at all clear that LCA applies in our framework (though we are by no means ruling the possibility out). It is a topic for future research.

4. Movement in a sub-morphemic level?: Nanosyntax and Distributed Morphology:

In this section we would like to consider two proposals regarding movement apparently occurring within the boundaries of what is normally called a fully-fledged "lexical item". We will consider, in turn, the proposal of Starke (2010) on the Nanosyntax side and Embick & Noyer (2004) and Fábregas (2005) on the DM side.

4.1 Nanosyntax and movement:

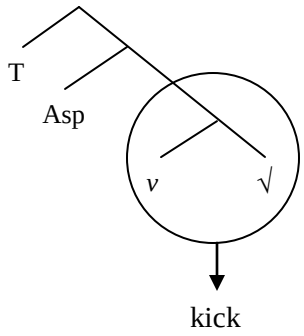
Nanosyntax operates with phonological matrices spelling out syntactic phrases made up of *free features*. It shares a syntactic conception of morphology with DM, but the operationalization is quite different. Apparently, there are "individual features", which are syntactically combined (i.e., merged in binary-branched structures) and then a lexical item spells out the amount of structure it is able to spell out, what is called the "size" of the lexical item. The architecture proposed by Starke (2010) is as follows:



The squared arrow signals a feedback loop from the Lexicon to the computational system, a loop we have somehow simplified with our *Morpheme Formation Constraint*, but it shares the spirit.

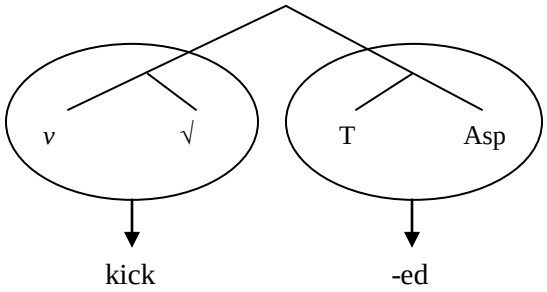
The gist of *Spell-Out driven movement* is as follows: if a tree cannot be spelled-out, a constituent of any size can "move out" so that a suitable configuration for Spell-Out it created, bearing in mind that the Lexicon constraints the derivation as regards the (sub) specification of lexical items. For example (adapted from Starke, 2010:11):

a)



This tree cannot be spelled-out, as there is no single lexical item that can Spell-Out all the terminals. The reader may have noticed the similitude between the notion of "a lexical item spelling out a structure of more or less size" and DM's *fusion*, which can affect as many terminals as the B-List allows (in our terms). As a last resource to "save" the derivation, part of the structure "moves out" so as to create an appropriate configuration for Spell-Out to apply as if we were dealing with Uriagereka's *Command Units*:

b)



All instances of movement are Spell-Out driven, according to Starke, following the same steps we have seen. The lexicon constraints the syntactic component in very much the same way as we have explained the MFC, and, in that sense, it *drives* the syntactic derivation of the feature trees. This Spell-Out driven movement differs significatively from Moro's approach, based on the LCA.

We have found some problems with this approach[12], from general architectural issues to more specific questions regarding movement and Spell-Out.

To begin with, it is not clear at all what "features" are, what their nature is and "where they are"[13]. Starke claims that Nanosyntax stands alone in the position of "there is no pre-syntactic lexicon", but there is a group of features, nevertheless. Is there a qualitative difference between that and DM's A-List (with roots and functional dimensions), or even a more traditional view, like Chomsky's (1995)? The *lexicon* is nothing more than the result of a one-time selection-and-grouping from a universal array [F] of features made available by UG (Chomsky, 1998, 2002). Therefore, the difference is not clear-cut at all. Individual features before syntax are simply architecturally impossible without thinking of a grouping or something of the sort. Otherwise, all of those free features (which are not specified) would be available for use at any faculty, an option against which we have argued. Therefore, against Starke's (2010) claim, Nanosyntax *has* two arrays, one of features and one of phonological matrices. Whether you call both "lexica" or not, it is merely a question of labels, irrelevant to the architecture.

The nature of the lexicon is equally obscure. It is something similar to DM's B-List, but there are some quite important differences. Apparently, idioms are lexically stored constituents, following the tradition that idioms are not analyzable in terms of their constituents in any level. Of course, we are strongly against that position, since our model includes a subpersonal-cognitive pragmatic theory, Relevance Theory. Idioms can be analyzed as *implicatures*, if the literal (which in this framework means nothing more than "the most accessible") interpretation of the LF that the syntax produces as output does not fulfill the expectations of relevance. The "lexicon" does not only contain atomic p(honological)-forms, but also structured lexical chunks, which are not necessarily a unit in phonological terms.

[12] We have only outlined some basic tenets of Nanosyntax, for detailed discussion, see Starke (2001, 2006, 2010), Caha (2009).

[13] Starke (p.c) says that "*there are only features that you need independently (tense, aspect, state, etc) and verbs are a spellout of those features (once the features are assembled into a syntactic tree)*." In this sense, it is not clear what do these features have scope over, since no mention to *roots* is made in Starke's articles. What defines a certain tree as a "verb"? Is it really important for the syntactic component in a Free Merge system?

Now, let us turn our attention to problems more related to the operation of Movement itself. We assume that no labels are used because they are of no relevance to PF, even though Starke says nothing about this. The problem we find is that the structural configuration created in (b) is not linearizable, even though it can apparently be spelled out: the problem is that there is a point of symmetry, and if we believe that linearization follows LCA, then this derivation will crash at PF. No claim is made in Starke (2006, 2010) about LCA, so this objection is merely speculative, and may not have validity in a LCA-free framework.

Another conflictive point in the argumentation is that a constituent "moves out" to adjoin the remnants, creating a structural configuration that can be spelled out. Even if our previous objection proves wrong, this operation is not clear at all. If Merge is free, then there is no reason why Move, being actually Merge, should not be as free. Our point is that there is no *a priori* justification for a term X adjoining a term Y and not the other way around. An even more basic question is that there is no principled justification for the need to spell-out a tree with a single lexical element. That is, Starke posits that (a) cannot be spelled out because there is no single lexical item that covers all the nodes. Our question is: why should there be one? What is this one tree-one lexical item correspondence based on? If Nanosyntax can dispense with LCA, then it would be conceptually possible to spell out {*v*, √} with a lexical item, {Asp, T} with another without the need for movement and then linearization would take place according coined or possible phonological matrices in the language in question. We will return to this when we analyze DM's conception of sub-morphemic movement.

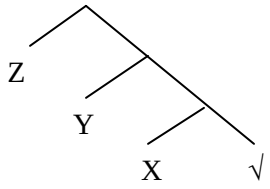
We have to say that the idea of a collection of very primitive dimensions syntactically combined really appeals to Radical Minimalism. Besides, the only PF constraint that we have posited, namely, MFC, is also formulated (in different terms) in NS. This leads us to use those elements from NS that can help simplifying our architecture and give our model more descriptive and explanatory adequacy.

4.2 Distributed Morphology and sub-morphemic movement:

Movement within DM is seen as a manifestation of *syntax-morphology mismatches*. PF is an interpretative component, and the rules that affect the syntactic nodes do not apply freely, but follow basic syntactic principles. We must bear in mind that there is no syntax-morphology strictly speaking, since morphology is really syntax, something that NS and DM share, and that is essential on both theories. Words are formed by Merge, despite the different approaches as regards the elements that enter that (l-)syntactic derivation[14]. There is always a root, and so-called f-morphemes, an umbrella term for inner morphemes, procedural nodes and other functional nodes.

[14] For different views on the topic, see Embick & Noyer (2004), Panagiotidis (2009, 2010), Krivochen (2010b, 2011), Boeckx (2010), although Boeckx is not really identifiable with DM (nor are we, strictly speaking).

The resultant configuration adopts the following form (adapted to a bare phrase structure diagram from Embick & Noyer, 2004: 10):



Let us assume that X, Y and Z stand for inner morphemes of whatever nature the reader prefers. It may be clear by now that we do not use "inner morpheme" in the sense of Panagiotidis (2010), as separate from categorizers and functional nodes, but to refer to any sub-morphemic terminal. These inner morphemes can ***surface*** as either prefixes or suffixes in the spelled-out word, but their position in the syntactic structure is important because the *scope relations that a node establishes with the root affects semantic interpretation*. If this is true, then it would mean that the semantic component has access to sub-morphemic relations, and, more generally, that the "word" is not an LF unit, contrary to Uriagereka's (1999) claim. Let us see an example (adapted from Fábregas, 2005):

The Spanish prefix [des-], can dominate the causative node (be it *v* or Voice) or be dominated by it, therefore determining two different interpretations:

i) *Reversative*: [CAUSE [NOT √X]] [Cause] dominates [des-]

ii) *Privative*: [NOT [CAUSE [√X]]] [des-] dominates [Cause]

The reason of these mismatches is the following: the linearization procedure in DM is *not LCA*. Linear order is a PF requirement, as in Kayne's theory, but the algorithm is quite different ($^{(*)}$ stands for "precedes"):

Lin [X Y] ⟶ (X*Y) or (Y*X)

DM's Lin procedure is more in tone with our *free Merge* policy. We will take that procedure and restate it in the following form:

Linearization Procedure:

Given two sub-morphemic terminals, X and Y; relations of phonological precedence will not be determined by syntactic principles but by the availability of Vocabulary Items to Spell Out those terminals.

However, Embick & Noyer relate syntax-morphology (or, rather, phonology) mismatches with *head to head movement*. That is, a terminal must move to a position in order to be spelled out as a prefix or a suffix. Taking into account the linearization procedure described above, it does not make much sense to us. There are two main

reasons for this: the first one is that, given that PF-branch constraints are related to the *availability of VI in a particular language* (what we have called the *Morpheme Formation Constraint*), it is a historical (therefore, extralinguistic) matter rather than a FL internal question. The second one is that given the Linearization Procedure outlined above, there is no need for syntactic head-to-head movement, as syntactic scope has no relevance for word-level Spell-Out. A VI can Spell-Out a structure if it matches the features in terminal nodes. The amount of nodes that it spells out depends on the degree of subspecification of the VI, and other processes (*fission*, *fusion*, *impoverishment*) that affect terminal nodes prior to the access to the B-List. In our (radically minimalist) terms, actually there is no need to posit specific PF operations that affect the syntactic structure, as there is no reason to think that linear order of morphemes follows from any syntactic relation, let alone movement.

Considering the comments we have made about NS; and DM's proposal on sub-morphemic movement, we stick to the idea that there is no such thing, taking that to be the simplest option. The morphological structures needs not mirror the syntactic "ordering" of morphemes, a claim that has already been made within orthodox DM. No stipulation needs to be made if one considers that many of the so-called "inner morphemes" are actually major syntactic nodes, spelled out within the boundaries of a (phonological) "word". In our theory, what is more, there is no need to posit a sub-morphemic level (very much in the spirit of NS): all we have are *roots* with a *quantum categorial dimension* that collapses in a local relation with a *functional-procedural head* and that is it. All other morphological constituents of the "word" are elements that cannot be spelled out by an autonomous (i.e., free) morpheme (in a given situation or in a given language) and therefore must look for the closest lexical root to attach themselves to. For example (just to illustrate our point, this is by no means complete. We beg the reader to find examples on his own):

Spanish: Polarity: des-, in- (Negative polarity)

Aspect: re- (iterative)

Passive: -ble

Location: in- (Place), trans- (Path), pro- (Path)

English: Polarity: un- (Negative)

Aspect: re-, en- (inchoative)

Passive: -ee

Location: in-, trans-

All the nodes we have mentioned (and the ones we have not considered) are part of the informational domains, in Hale & Kayser's terms, "s-syntactic" nodes. Most of them can be paraphrased by Adv, but if the language provides the means for a synthetic Spell-Out, it will be the default option, as it is less costly in PF terms. The same happens with the difference between Verb-Framed and Satellite-Framed languages (Mateu, 2000): if a language allows [Manner] and [Movement] to be Spelled-Out as a single VI, that derivation will be the default one. We have to bear in mind, besides, the fact that we have a PF condition that can be explicated as follows:

*If a language allows a feature to be spelled out, it **must** be spelled out, either synthetically or analytically.*

We take this to be one of the few (if not the only) specific PF condition. LF conditions are much more complex, since they involve inferential processes licensed by dimensions present in the syntactic configuration, which is also meaningful.

NS and DM share too many things to remain completely separate theories, and in Radical Minimalism we have taken a bit of both, as long as they have proved useful to gain insight on morphological (i.e., syntactic) processes.

5. Conclusion:

In this paper we tried to analyze Movement in three levels: *description*, *explanation* and *justification*. Whether we have been successful or not, is still to be proven. In this conclusion, we will sum up the main ideas of the paper:

i) All operations are interface-driven, and *every derivational step* must be justified in terms of generating a legible representation (*Dynamic Full Interpretation*).

ii) Movement can be *quantum-driven* or triggered by other semantic reasons, like *themehood*. All the same, we state the pre-eminence of the semantic component over the phonological component. Language, as a mental faculty, needs semantics (mainly, to have something to manipulate), but can perfectly dispense with phonology.

iii) PF-driven movement, even though not ruled out, has little place in our framework. Of course, this is a provisional conclusion, which could be proved wrong.

iv) Following (i), (ii) and (iii), we either have to find a semantic motivation for so-called PF movements and conditions upon them or directly prove that there is no movement at all. The former we have done

with Grohmann's CDE, the latter, with NS Spell-Out driven movement, DM's head-to-head movement and Moro's *dynamic antisymmetry*

Once again, we would like to conclude with the SRMT, which was our guiding line throughout the paper:

Strong Radically Minimalist thesis (SRMT):

All differences between physical systems are "superficial" and rely only on the characteristics of their basic units [i.e., the elements that are manipulated], *which require minimal adjustments in the* ***formulation*** *of operations and constraints* [that is, only notational issues]. *At a* ***principled level****, all physical systems are identical, make use of the same operations and respond to the same principles.*

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