The road to PF

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Abstract

This paper addresses the path from the syntactic derivation to the phonological output Phonetic Form. Within a dynamic model of the computation, this issue arises once the operation Spell Out is taken into consideration. The main thrust of this contribution is, aside from laying out a possible implementation of dynamics in syntax, to formally dissociate the operation Transfer from Spell Out. Within the dynamic model adopted, each Prolific Domain is a point at which Transfer applies; successive Transferring of structure then yields a single phonological structure to be Spelled Out (after additional morpho-phonological operations have taken place, which are not discussed).

Keywords: dynamic computation, Spell Out, Transfer, Prolific Domains, architecture, levels of representation, prosodic component

1. Introduction

In the context of the minimalist program as laid out in Chomsky (1995), levels of representation that do not follow from either "(virtual) conceptual necessity" or "bare output conditions" are rejected. This, Chomsky argues, eliminates D- and S-structure and renders Logical Form (LF) and Phonetic Form (PF) as the sole levels of representation fed by the computational system — in particular, the syntactic derivation at the point of application of the operation Spell Out. The issues which will be briefly addressed in this contribution revolve around the questions formulated in (1)-(3):

(1) How exactly are LF and PF accessed after (or fed by) the operation Spell Out?
(2) Is there evidence for a more complex PF-component or articulated PF-branch?
(3) For an affirmative answer, what can be said about the computation toward PF?

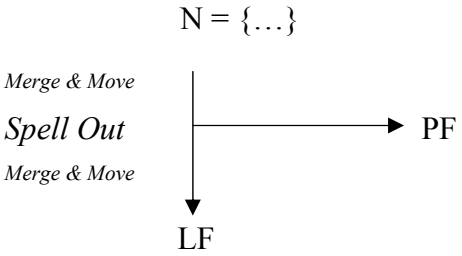
In order to reach conclusive, or at least indicative, answers to these questions, I will present the main thesis of Grohmann (2003), a particular implementation of a dynamic syntax, and discuss some recent proposals that might help us pin down the nature of PF as relevant for the syntactic computation, before outlining one possible approach to a complex PF-branch and concluding with further pointers. First, however, I will provide a very brief overview of some introductory issues related to the role of PF.

2. The architecture of the grammar

Ultimately, this paper is a conceptual exercise in coming to grips with the architecture of the grammar — in particular, the (inverted) T-model of minimalism and a (complex) view of the PF-branch.

As a starting point, let us take Chomsky's (1995: 219) T-model of the grammar:

(4)

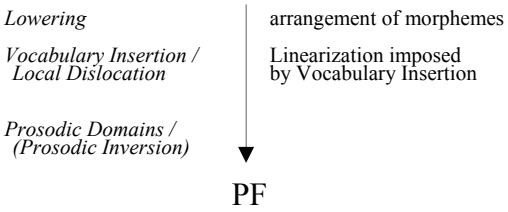


Through the core operations Merge and Move, the syntactic component manipulates lexical items which have previously been selected into a numeration N (or lexical array) until a semantically interpretable output is obtained (LF); at one point in the derivation, the structure undergoes the operation Spell Out and gets phonetically interpreted (PF).

Under this conception, PF and LF are the sole levels of representation, or interface components (possibly at most: Chomsky (2004) denies a separate LF-component altogether). Further principles and operations that are assumed to apply to the grammar, or any other additions to the grammatical system, must be motivated by what Chomsky terms "(virtual) conceptual necessity" (motivated a priori) or "bare output conditions" (which have a direct impact for or at the interfaces, LF and PF). While much more can be said about the mechanics, this must suffice as a summary of traditional minimalist architecture. In the following, I will be concerned with fleshing out some of the mechanics under a slightly different perspective, which I will clarify as we go along.

First, however, I want to briefly introduce another potential ingredient of the post-syntactic processes involved. In the context of Distributed Morphology (of Halle & Marantz 1993 and much subsequent work), Embick & Noyer explore a complex PF-branch which incorporates, or rather replaces, traditional morphology. PF-operations are ordered with respect to each other. Their architectural proposal of the resulting PF-branch is reproduced here (after Embick & Noyer 2001: 566):

(5)



This kind of research explicitly explores a complex PF-branch, and I want to motivate a similar view to be taken from a minimalist syntactician's perspective.

In general terms, the ideas pursued here follow recent "dynamic" approaches to the computation. Relevant works of dynamic explorations include Epstein et al. (1998), where each application of Merge creates an interface object, Uriagereka (1999), where left branches form Spell Out domains, and Chomsky (2000), for example, where the Spell Out domains are phases, which are identified (at least on the clausal level) as *v*P and CP (see also Chomsky 2001, 2004, 2005, to appear, and a host of other current research). See Grohmann (to appear) for a more detailed overview.

To briefly mention an additional recent dynamic approach to the computational system — the one adopted here, which will be laid out and explored further below — Grohmann (2003) proposes that the syntactic part of the computation feeds the interface components cyclically through chunks of Prolific Domains. Some PFfy effects can be detected prior to PF proper.

3. A Dynamic Approach to the Computation

To illustrate the relevance of the particular dynamic implementation of Grohmann (2003), consider the development of clause structure over the past forty years or so. In Extended Standard Theory (EST, Chomsky 1965), the assumed structure of the clause was roughly as in (6) and replaced in the Barriers-framework (Chomsky 1986) by (7):

(6) $[_{S'}$ Comp $[_{S}$ NP (Aux/Infl) VP]]

(7) $[_{CP}$ XP C^0 $[_{IP}$ XP I^0 $[_{VP}$ (XP) V^0 …]]]

In late GB (Chomsky 1989, and especially, Larson 1988; Pollock 1989; Belletti 1990, and work by others) and early minimalism (Chomsky 1993), with X'-Theory well in place for the representation phrase structure, functional projection gained importance for a number of reasons. More can be said on the development and the particular proposals put forward in this period, but some consensus could be found on a clause structure like (8). Here VP was enlarged to incorporate the predicate-internal subject hypothesis and a light verb, and dedicated positions offer room for arguments moved out of their base-generated thematic position, for example:

(8) $[_{CP}$ XP C^0 $[_{AgrSP}$ XP $AgrS^0$ $[_{TP}$ XP T^0 $[_{AgrOP}$ XP $AgrO^0$ $[_{vP}$ XP v^0 … VP]]]]]

At this point, mapping clause (and nominal) structure became a serious undertaking: evidence was sought from adverbial positions, morpheme compatibility and hierarchies (Cinque 1999 and research inspired by it), verb movement, word order and reordering, and so forth. Additional work aimed at mapping out the left periphery of the clause, splitting CP into independent functional projections (Rizzi 1997, and many others).

Extending the structure in (8) considerably leads into a large array of functional projections that seems to blur the original intuition behind clause structure. I take this to be (informally) that sentences consist of a subject and a predicate, that the predicate maps the thematic relations and the subject enters into close relation with the finite verb, and that this kernel sentence may be embedded under a complementizer and/or a left-peripheral phrase (a moved *wh*-element or the first constituent in a V2 structure, for example). In other words, what the proliferation of functional projection hides is an intuitive tripartition of the clause — that even an extended cartography of clause structure builds on (by extending) a clear GB-result: clauses consist of a thematic domain which is embedded under an agreement lay which, in turn, is dominated by a left periphery. This can be captured as follows (functional projections only indicative):

(9a) CP ≈ ForceP > TopP* > FocP > (TopP* >) FinP
(9b) IP ≈ AgrSP > TP > NegP > AgrIOP > AgrDOP > AspP
(9c) VP ≈ *v*P > VP (or any other implementation of VP-shells)

Most recent work in minimalism "returns to basic" in a sense (CP > TP > *v*P > VP), but it allows some flexibility on the Barriers-structure — through multiple specifiers, for example, or the (re-)introduction of phases (see Boeckx & Grohmann, to appear, on the "re"). The phase-based framework of Chomsky (2000, 2001, 2004, 2005, to appear) assumes two strong phase heads, *v* and C, and the dynamics of the system derives from the interaction of these phases, the derivational computation, and the operation Spell

Out. In its most basic form, the clause structure in current minimalism can be represented as below, in concordance with the structures provided above:

(10) $[_{CP}$ XP* C^0 $[_{TP}$ XP* T^0 $[_{vP}$ XP* v^0 $[_{VP}$ XP* V^0 …]]]]
PHASE *PHASE*

I will now throw in a brief intermezzo in my quick review of (the relevance of) phrase structure representations, but immediately afterwards I will return to some of the issues addressed above. With Chomsky (1995), there is one clear desideratum of a minimalist theory: the structure of the grammar is determined by (virtual) conceptual necessity. As a consequence, much of GB-machinery should be reconsidered (as argued by Hornstein 2001). Regarding the ungrammaticality of expressions like (11a-c),

(11a) *John likes.
(11b) *Him kissed her.
(11c) *Who, Mary detests?

we should thus be motivated to explore an alternative explanation — one that does not evoke filters of sorts or other GB-specific theoretical constructs (such as Affect Criteria which have been evoked to force a particular structural representation between a particularly marked XP and a correspondingly marked X^0). The key term to bear in mind is bare output conditions, i.e. the conjecture that only such conditions should be integrated into a minimalist grammar that have a direct impact on the (LF or PF) output (if not virtually conceptually necessary, such as the operation Merge, for example).

Under the copy theory of movement (Chomsky 1995), and ignoring GB-driven explanations of the ungrammaticalities, take (12) to represent sample, appropriate (i.e. technically derivable) structures at the relevant points:

(12a) #$[_{vP}$ John v^0 $[_{VP}$ likes-V^0 ~~John~~]]
(12b) #$[_{TP}$ him T^0 $[_{AgrOP}$ ~~him~~ $AgrO^0$ $[_{vP}$ softly $[_{vP}$ ~~him~~ v^0 $[_{VP}$ kissed-V^0 her]]]]]
(12c) #$[_{TopP}$ who Top^0 $[_{FocP}$ ~~who~~ Foc^0 $[_{TP}$ Mary T^0 detests … ~~who~~]]]

The hash marks indicate ill-formedness. Given the above introductions to such data, one would then like to know why these derivations should be ruled out to begin with under minimalist (and non-GB) considerations.

The starting point for a purely syntactic explanation of said ungrammaticalities, from Grohmann (2003), is the Anti-Locality Hypothesis:

(13) *Anti-Locality Hypothesis* (Grohmann 2003: 26)
Movement must not be too local.
(14) $[_{ZP|\alpha|}$ XP $Z^0{}_{|\alpha|}$ … $[_{YP|\alpha|}$ ~~XP~~ …]]
*

To handle the relevant contextual information, let me introduce the notion of a Prolific Domain:

(15) *Prolific Domain* (adapted from Grohmann 2003: 75)
A Prolific Domain is a contextually defined part of the computational system,
i. which provides the interfaces with the information relevant to the context and

ii. which consists of internal structure, interacting with derivational operations.

A natural implementation of contextual information would be clausal tripartition into three Prolific Domains: a thematic, an agreement, and a discourse domain (see also Platzack 2001 for related ideas and much current work building on this intuition, which I alluded to at the beginning of this section already).

(16) *Clausal Tripartition* (adapted from Grohmann 2003: 74)
i. Θ-Domain: part of the derivation where thematic relations are created
ii. Φ-Domain: part of the derivation where agreement properties are licensed
iii. Ω-Domain: part of the derivation where discourse information is established

This understanding of the clause structure is very similar to the tripartition offered in (9) above — in fact, it is one possible consequence of making sense out of the proliferation of functional projections in the clause (and, by analogy, in the nominal layer; see, e.g. Abney 1987; Bernstein 2001, and references cited) on one hand, and the fundamental intuition underlying any "representation" of clause structure. Thus, the Θ-Domain would correspond to *v*P, the Φ-Domain to TP, and the Ω-Domain to CP.

In addition, it would allow a dynamic approach to the computation vis-à-vis multiple Spell Out (Uriagereka 1999) — with the concrete proposal, put forth in Grohmann (2000, 2003), that each Prolific Domain forms a part of the derivation to which the operation Spell Out applies, shipping information to the PF- and LF-interface components (in spirit very similar to phases of Chomsky 2000 and subsequent work).

To foster such a (potential) dynamic implementation, I proposed the Condition on Domain Exclusivity (CDE), whose final version up to this point is given below:

(17) *Condition on Domain Exclusivity (CDE)* (Grohmann 2003:78)
An object O in a phrase marker must have an exclusive Address Identification AI per Prolific Domain ΠΔ, unless duplicity yields a drastic effect on the output.
i. An AI of O in a given ΠΔ is an occurrence of O in that ΠΔ at LF.
ii. A drastic effect on the output is a different realization of O at PF.

An interesting prediction of the CDE as formulated here is the following. If an anti-local dependency involves two different PF-matrices, the dependency should be well-formed. In other words, if we understand the CDE as a PF-condition (as explicitly done in the definition), we get the following "informal filter" (meaning not to take (18)) as a formal filter as was commonly assumed in EST and GB), where Copy Spell Out refers to rendering a lower copy PF-distinct from a higher one (in the sense of (17ii)).

(18) *CDE @ PF*
*[$_{\Pi\Delta}$ XP … ~~XP~~], unless Copy Spell Out applies to ~~XP~~.

As it turns out, a paradigmatic example supporting this prediction is so-called contrastive left dislocation (CLD) found in West Germanic (with data from German):

(19a) [Seinen$_i$ Vater], den mag jeder$_i$ Junge.
his.$_{ACC}$ father RP.$_{ACC}$ likes every boy
'His father, every boy likes.'
(19b) [$_{CP}$ seinen Vater C^0 [$_{TopP}$ den mag-Top^0 [$_{TP}$ jeder Junge T^0 …]]]

Under a reasonable analysis (see work beginning, in some sense, with Vat 1981), the

CLDed XP *seinen Vater* 'his father' and the resuming demonstrative *den* 'him' are in the same Prolific Domain (Ω-Domain). Moreover, (19) allows a bound variable reading and aside from such absence of Weak Crossover effects, CLD displays other signs of reconstruction of the CLDed phrase (e.g. presence/absence of Condition A/C effects, idiom chunks, etc.). (As a matter of fact, so does the provided translation for English, as topicalization, in opposition to a resumptive strategy, such as **His father, every boy likes him*.) By the CDE, this difference can be understood as the result of Copy Spell Out, represented by '➲' below, in CLD, an operation that changes the PF-matrix of the lower of the two copies that are in the same Prolific Domain. (This is the "drastic effect" of (17), for which simple deletion as usual is arguably not enough, an issue yet to be addressed in more detail.) The relevant part of the derivation is thus as follows:

(20) $[_{CP}$ seinen Vater C^0 $[_{TopP}$ ~~seinen V.~~ ➲ den mag-Top^0 $[_{TP}$ jeder Junge T^0…]]]

The discussions in previous (partially co-authored) work cover a wider range of cases in support of a Copy Spell Out analysis, including local reflexives and reciprocals in double object constructions, ECM-structures, clitic left dislocation (all Grohmann 2003), an application of these to small clauses (Grohmann 2001, 2003), prenominal possessive doubling (Grohmann & Haegeman 2003; Grohmann 2003), and demonstrative doubling (Grohmann & Panagiotidis 2005). All this might be barking up the wrong tree, but I still take it as a potentially interesting alternative to other analyses that may come to mind — predominantly because the Copy Spell Out analysis captures a multitude of phenomena and subsumes them under one property of the grammar.

There are other properties of the model laid out in Grohmann (2003) which I will not discuss any further in this paper. For example, this approach structures the constitution of the clause quite differently from other models: (i) cyclic, multiple Spell Out applies *at* a given sub-structure, not *after* (as in the phase-based framework; for discussion, see Boeckx & Grohmann, to appear); (ii) proliferation of (functional) projections is compatible with the framework, but successive movement through is not (such as subjects moving through [Spec,TP] to [Spec,AgrSP], for example, as argued for some languages by Bobaljik & Thráinsson (1998)); (iii) a "Bare X'-Phrase Structure Theory" could be envisioned (based on "Natural Relations" in Grohmann 2003).

It's also clear that phonological material is inserted after the syntax (in line with a late insertion view): the PF-matrix determines the phonetic shape of syntactic material — as well as syntactically present but phonetically null material. (See the analysis of what we dub 'demonstrative doubling' in Greek in Grohmann & Panagiotidis 2005.) It is this aspect that I want to zoom in on in the remainder of my contribution.

4. Towards PF

At this point, the Spell-Out-per-Prolific-Domain approach faces a (number of related but) serious architectural question(s): What is Spell(ed) Out when…? In other words, in order to deal with the architectural issue, we should ask: (i) when does Spell Out apply, (ii) what exactly does it, and (iii) where, or what to exactly, does it apply?

In current multiple Spell Out models, the cyclic sub-part of the derivation that is sent to Spell Out and subsequently to PF (namely, every command unit, i.e. left branch, in Uriagereka (1999) and the complement of a strong phase head in Chomsky (2001)) is in fact frozen for further computation. This is clearly not wanted for Prolific Domains which are vacated *after* Spell Out in the model sketched above (and more detailed, in Grohmann 2003). The way the analysis is presented from (and explicitly understood in)

Grohmann (2003), I take Copy Spell Out to apply once a Prolific Domain is formed and sent to Spell Out, but without freezing the material contained in that Prolific Domain. For example, if local reflexives are the result of Copy Spell Out in the Θ-Domain (see also Hornstein (2001) on a variation of this theme), it should still be able to vacate it:

(21a) [$_{TP}$ John T^0 [$_{vP}$ [$_{vP}$ ~~John~~ v^0 [$_{VP}$ likes ~~John~~ ➲ himself]] very much]].
(21b) Himself, John likes very much.

More generally, the same goes for *any* material that moves from one Prolific Domain to the next — this movement steps take place *after* the Prolific Domain of origin is formed but before the next higher Prolific Domain is formed or complete (as the movement of *John* from [Spec,*v*P] to [Spec,TP] above). It looks as if some refinement on the operation Spell Out is needed, or more specifically, of the fate of a Prolific Domain once it is formed — with respect to the further syntactic derivation on one, and the feeding of the interfaces (in particular, PF) on the other hand.

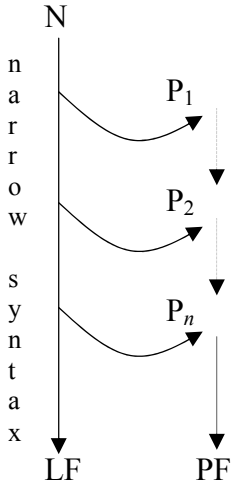
I would thus like to suggest the beginnings of a solution to Prolific Domains 'spelling out' based on a commentary to Chomsky (2001) by Juan Uriagereka:

> Another important technical paragraph states how Spell Out removes LF material which is uninterpretable and transfers the relevant object (WITH the uninterpretable stuff) to the phonological component. Fn. 8 of the M-version [= Chomsky (1999)] discusses the technical reason pointed out in MI of why this sort of system is necessary (overt syntax eliminates uninterpretable features, but they still have to have an effect on PF, thus the distinction in the Minimalist Program between 'deletion' and 'erasure'). Technically this is somewhat curious, I think, in that you need two representations of the relevant object K: one which is sent intact to PF, and one which is sent to LF without uninterpretable stuff.
>
> (Uriagereka 2000: 7-8)

Chomsky (1999, 2001) introduces the notion of Transfer as a technical term for an operation that could be construed to be different from Spell Out. In fact, in later work he clarifies the notion somewhat (Chomsky 2004, to appear), apparently taking Transfer to be just another name for Spell Out (Chomsky, personal communication). However, rather than working with the refined understanding of the latter, I would like to suggest — in line with my original (mis-)reading — to dissociate Transfer from Spell Out. (Here I must acknowledge fruitful email communication with David Adger, Cedric Boeckx, Noam Chomsky, and Juan Uriagereka on the matter.) In the final paragraphs of this paper, I want to be a bit more explicit on this suggestion.

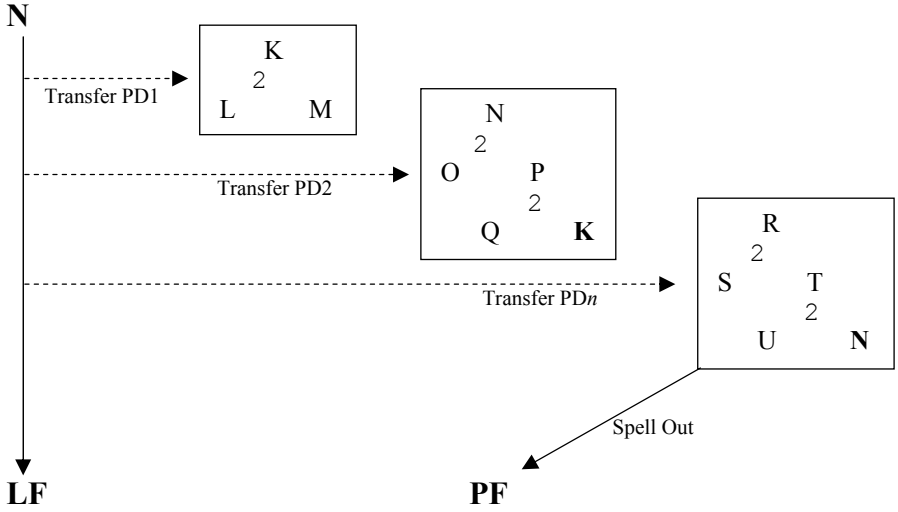
Under one view (as entertained by Grohmann & Putnam (2004), extending allusions in Grohmann (2003)), each Prolific Domain directly feeds the complex PF-branch. This could be interpreted similar in spirit to work by Zubizaretta (1998), but it would also introduce a new level of representation, a P(rosodic)-component. We tentatively proposed (22) as a revised architecture of the grammar (compare with (4) above). Here, each Prolific Domain spells out to the P-component, with the P-component building up until the final piece is reached before being sent off to PF "proper" — in other words, Prolific Domains are seen as the relevant chunks for prosodic manipulation which are then bundled somehow to derive a final, single PF-structure of the linguistic expression. Non-prosodic phonological manipulation would presumably apply to that single PF. (See Grohmann 2003: 296-301, for original discussion.)

(22) *Architecture of the Grammar?*



Instead, to close the paper with a novelty, I propose the following architecture:

(23) *Architecture of the Grammar!*



K, N, R in (23) would correspond to Uriagereka's (2000:8) remark that "you need two representations of the relevant object K: one which is sent intact to PF, and one which is sent to LF without uninterpretable stuff" (see the quote above). Indeed, K, N, R are the syntactic objects assembled in narrow syntax, each a Prolific Domain (Θ-, Φ-, and Ω-Domain or the relevant CP, TP, *v*P, for example, respectively). It is these objects that the operation Transfer applies to. Transferred N is "stacked" on top of K, R on N, and so on, and the PF-object corresponds one-to-one to the one derived in narrow syntax.

I propose to dissociate the operation Transfer from the operation Spell Out in that Transfer takes a sub-part of the derivation and ships it to PF cyclically (where operations like building prosodic domains apply), whereas Spell Out feeds the sensorimotor system once the PF-branch is complete, uniquely (i.e. once the derivation has assembled all Prolific Domains). This can be captured informally as follows:

(24) *Transfer*
Transfer cyclically sends the structure of each Prolific Domain to PF.

(25) *Spell Out*
Spell Out phonetically interprets the final PF output once.

Once this idea is fleshed out (which I hope to do in future work), the interfacing of syntax and phonology will have to receive more attention in one aspect in particular. On top of Embick & Noyer's (2001) ordered PF-operations, such as lowering before vocabulary insertion (cf. (5); see also Ackema & Neeleman 2004), an additional set of PF rules must be accommodated that regulates copy modification. For example, Copy Spell Out for two copies within the same Prolific Domains (Grohmann 2003) must be ordered before Chain Reduction or regular deletion of lower copies (Nunes 2004), which in turn must presumably follow special applications of the sort found in Copy Raising (Fuji 2005) or other instances where non-top copies are deleted (see e.g. Bobaljik 1995; Pesetsky 1998; Bošković 2002). Ideally, one would unify all these operations under the aforementioned rubric "copy modification" — arguably a prototypical interface between syntax and phonology.

A final note to close this paper. As far as I am aware, there is no consensus — or even clear picture — on what PF looks like exactly. Bresnan (1971) argued against the EST-view, but how much structure is at PF? It might be enough to just have some very rough phrase-marker (such as K "with stuff," N "with stuff," and R "with stuff" from (23) above) whose edges play then the vital role for prosodic operations. (Such operations are investigated within the present model in Grohmann & Putnam, to appear.) But just as likely, PF might contain a more precise phrase structure (where "with stuff" for K, N, R would have to be replaced by the full phrase structure derived in the narrow syntax). This could be relevant if phrase structure and hierarchical relations play a vital role for ultimate linearization (as in Kayne 1994; Moro 2000; Nunes 2004, for example). In other words, at this point it is not at all clear whether PF consists of little, bare structure or whether it offers a fully fledged phrase marker. Either outcome can easily be accommodated in the model sketched here. But for future investigations of syntax-phonology interactions, this question is not without flair.

5. Conclusion

In this brief paper, I have reviewed my own proposal concerning a tripartition of the clause structure into Prolific Domains and a dynamic exploitation of such a step. The original proposal was to send each Prolific Domain to (cyclically applicable) Spell Out, an implementation that would then give rise to the modification of identical copies within the same Prolific Domain by way of a "drastic effect": Copy Spell Out.

Focusing on the timing and nature of Spell Out, I modified this picture somewhat in the present contribution. Dissociating the operation Transfer from Spell Out, I suggest that each Prolific Domain undergoes Transfer to a cyclically composed PF and that Spell Out then applies to the PF output. The final outcome is a single PF-interpretation (which gets Spelled Out to the sensorimotor system), just as various operations applying in covert syntax yield a single LF-interpretation of a linguistic expression — but the architecture is slightly modified over and possibly improved upon existing models.

I envision future research in this area to properly define the operations Transfer and Spell Out and fix some other issues left open in the Anti-Locality framework of my own work so far. A particularly interesting avenue of research, I believe, would be a unified study of "copy modification": the ways PF manipulates copies left behind by syntactic operations and the order in which such manipulation proceeds. Another obvious route to take is to see whether the cyclically assembled PF argued for here can be exploited for other domains of the grammar, such as the formation of prosodic domains.

References

Abney, S. (1987). *The English noun phrase in its sentential aspect*. Doctoral dissertation, MIT.

Ackema, P. & A. Neeleman (2004). *Beyond morphology*. Oxford: Oxford University Press.

Belletti, A. (1990). *Generalized verb movement*. Turin: Rosenberg & Sellier.

Bernstein, J. B. (2001). "The DP hypothesis: Identifying clausal properties in the nominal domain". In M. R. Baltin & C. Collins (eds), *The handbook of contemporary syntactic theory*. Oxford: Blackwell, 536-561.

Bobaljik, J. D. (1995). *Morphosyntax: The syntax of verbal inflection*. Doctoral dissertation, MIT.

Bobaljik, J. D. & H. Thráinsson (1998). "Two heads aren't always better than one". *Syntax* 1: 37-71.

Boeckx, C. & K. K. Grohmann (to appear). "Putting phases in perspective". *Syntax*.

Bošković, Ž. (2002). "On multiple *wh*-fronting". *Linguistic Inquiry* 33: 351-383.

Bresnan, J. (1971). "Sentence stress and syntactic transformations". *Language* 47: 257–281.

Chomsky, N. (1965). *Aspects of the Theory of Syntax*. Cambridge, Mass.: MIT Press.

Chomsky, N. (1986). *Barriers*. Cambridge, Mass.: MIT Press.

Chomsky, N. (1989). "Some notes on economy of derivation and representation". In R. Freidin (ed.), *Principles and parameters in generative grammar*. Cambridge, Mass.: MIT Press, 417-454. [Reprinted in Chomsky (1995), 129-166]

Chomsky, N. (1993). "A minimalist program for linguistic theory". In K. Hale & S. J. Keyser (eds), *The view from Building 20. Essays in honor of Sylvain Bromberger*. Cambridge, Mass.: MIT Press, 1-52. [Reprinted in Chomsky (1995), 167-217]

Chomsky, N. (1995). *The minimalist program*. Cambridge, Mass.: MIT Press.

Chomsky, N. (1999). "Derivation by phase". *MIT Occasional Papers in Linguistics* 18. [Revised as Chomsky (2001)]

Chomsky, N. (2000). "Minimalist inquiries: The framework". In R. Martin, D. Michaels & J. Uriagereka (eds), *Step by step: Essays on minimalist syntax in honor of Howard Lasnik*. Cambridge, Mass.: MIT Press, 89-155.

Chomsky, N. (2001). "Derivation by phase". In M. Kenstowicz (ed.), *Ken Hale. A life in language*. Cambridge, Mass.: MIT Press, 1-52.

Chomsky, N. (2004). "Beyond explanatory adequacy". In A. Belletti (ed.), *Structures and beyond: The cartography of syntactic structures, Vol.* 3. Oxford: Oxford University Press, 104-131.

Chomsky, N. (2005). "Three factors in language design". *Linguistic Inquiry* 36: 1-22.

Chomsky, N. (to appear). "On phases". In R. Freidin, C. P. Otero & M.–L. Zubizaretta (eds), *Foundational Issues in Linguistic Theory*. Cambridge, Mass.: MIT Press.

Cinque, G. (1999). *Adverbs and functional heads: A cross-linguistic perspective*. Oxford: Oxford University Press.

Embick, D. & R. Noyer (2001). "Movement operations after syntax". *Linguistic Inquiry* 32: 555-595.

Epstein, S. D., E. M. Groat, R. Kawashima & H. Kitahara (1998). *A derivational approach to syntactic relations*. Oxford: Oxford University Press.

Fuji, T. (2005). *Cycle, linearization of chains, and multiple case checking*. Unpublished ms., University of Maryland, College Park.

Grohmann, K. K. (2000). *Prolific peripheries: A radical view from the left*. Doctoral dissertation, University of Maryland, College Park.

Grohmann, K. K. (2001). "On predication, derivation and anti-locality". *ZAS Papers in Linguistics* 26: 87-112.

Grohmann, K. K. (2003). *Prolific domains: On the anti-locality of movement dependencies*. Amsterdam: John Benjamins.

Grohmann, K. K. (to appear). "Introducing dynamic interfaces". *Linguistic Analysis* 36(2/3) (*Special issue on dynamic interfaces*, ed. K. K. Grohmann).

Grohmann, K. K. & L. Haegeman (2003). "Resuming reflexives". *Nordlyd* 31: 46-62.

Grohmann, K. K. & P. Panagiotidis (2005). *Demonstrative doubling*. Unpublished ms., University of Cyprus & Cyprus College, Nicosia.

Grohmann, K. K. & M. T. Putnam (2004). "Prosodic stress assignment in dynamic computations". Paper presented at the *Annual Meeting of the Michigan Linguistic Society*, University of Michigan, Flint, October 16.

Grohmann, K. K. & M. T. Putnam (to appear). "Prosodic stress assignment in dynamic computations". *Linguistic Analysis* 36(2/3) (*Special issue on dynamic interfaces*, ed. K. K. Grohmann).

Halle, M. & A. Marantz (1993). "Distributed morphology and the pieces of inflection". In K. Hale & S. J. Keyser (eds), *The view from Building 20. Essays in honor of Sylvain Bromberger*. Cambridge, Mass.: MIT Press, 111-176.

Hornstein, N. (2001). *Move! A minimalist theory of construal*. Oxford: Blackwell.

Kayne, R. S. (1994). *The antisymmetry of syntax*. Cambridge, Mass.: MIT Press.
Larson, R. K. (1988). "On the double object construction". *Linguistic Inquiry* 19: 335-392.
Moro, A. (2000). *Dynamic antisymmetry*. Cambridge, Mass.: MIT Press.
Nunes, J. (2004). *Linearization of chains and sideward movement*. Cambridge, Mass.: MIT Press.
Pesetsky, D. (1998). "Some optimality principles of sentence pronunciation". In P. Barbosa, D. Fox, P. Hagstrom, M. McGinnis & D. Pesetsky (eds), *Is the best good enough? Optimality and competition in syntax*. Cambridge, Mass.: MIT Press, 337-383.
Platzack, C. (2001). "Multiple interfaces". In U. Nikanne & E. van der Zee (eds), *Cognitive interfaces: Constraints on linking cognitive information*. Oxford: Oxford University Press, 21-53.
Pollock, J.-Y. (1989). "Verb movement, UG and the structure of IP". *Linguistic Inquiry* 20: 365-424.
Rizzi, L. (1997). "The fine structure of the left periphery". In L. Haegeman (ed.), *Elements of grammar: Handbook of generative syntax*. Dordrecht: Kluwer, 281-337.
Uriagereka, J. (1999). "Multiple spell out." In S. D. Epstein & N. Hornstein (eds), *Working minimalism*. Cambridge, Mass.: MIT Press, 251-282.
Uriagereka, J. (2000). *Comments on 'Derivation by phase'*. Unpublished manuscript, University of Maryland, College Park.
Vat, J. (1981). "Left dislocation, connectedness and reconstruction". *Groninger Arbeiten zur germanistischen Linguistik* 20: 80-103. [Reprinted in E. Anagnostopoulou, H. van Riemsdijk & F. Zwarts (1997, eds), *Materials on left dislocation*, Amsterdam: John Benjamins, 67-92.]
Zubizarreta, M.-L. (1998). *Prosody, focus and word order*. Cambridge, Mass.: MIT Press.