Movement Operations after Syntax

David Embick
Rolf Noyer

We develop a theory of movement operations that occur after the syntactic derivation, in the PF component, within the framework of Distributed Morphology. The theory is an extension of what was called *Morphological Merger* in Marantz 1984 and subsequent work. A primary result is that the locality properties of a Merger operation are determined by the stage in the derivation at which the operation takes place: specifically, Merger that takes place before Vocabulary Insertion, on hierarchical structures, differs from Merger that takes place post–Vocabulary Insertion/linearization. Specific predictions of the model are tested in numerous case studies. Analyses showing the interaction of syntactic movement, PF movement, and rescue operations are provided as well, including a treatment of English *do*-support.

Keywords: morphology, syntax, Morphological Merger, adjacency, PF movement, Distributed Morphology

The properties of syntactic movement have been studied extensively in linguistic theory, both in terms of locality conditions and in terms of the types of constituents affected (phrases, subparts of phrases, heads). Despite differences in particular analyses or frameworks, the locality conditions on movement operations are a central concern of current research. Here we address movement operations as well, but operations of a different type. In particular, we examine and analyze movement operations that occur after the syntactic derivation, in the PF component, and provide a theory that makes proposals concerning (a) the locality conditions on such movements, (b) the types of constituents they affect, and (c) the position of such operations in the sequential derivation from the output of syntax to phonologically instantiated expressions.

   From a somewhat abstract perspective, the fact on which we base our study is that not all structures and strings are the result of operations that occur exclusively in the syntactic component of the grammar; this observation stems from a body of prior research investigating the relationship between syntactic structure and phonological form. The observation covers two domains: one dealing with linear sequences that are syntactically opaque, the other with movement operations. In the first domain it has been demonstrated that the internal ordering of clitic clusters cannot

follow from syntactic principles (see Perlmutter 1971; also see Bonet 1991 and Noyer, to appear, for explicit discussion in the framework assumed here). In the second domain, which we explore here, it has also been recognized that syntactic movement cannot be responsible for certain movement operations. One of the most familiar comes from the inflectional system of English. While it has long been recognized that English main verbs do not move to T(ense) in the syntactic derivation (Emonds 1978, Pollock 1989), it is nevertheless the case that tense morphology appears on the verb in the surface string: *John kick-ed the ball to Mary.* The positioning of tense morphology on the verb has been attributed to Lowering, a movement operation that ultimately derives from the Affix Hopping transformation of early generative grammar. Subsequent attempts to identify and analyze ''mismatches'' between morphology and syntax can be found in the work of Marantz (1984, 1988) and Sadock (1991). Our goal in this article is to develop a more comprehensive theory of the types of morphological movement operations in the grammar and to situate these operations within an explicit architecture for the PF derivation. The focus is on cases in which some sort of displacement must apply to generate the proper phonological form from an identifiable syntactic structure. We thus exclude from consideration cases in which, for example, the syntactic distribution of clitic clusters is exactly what one would expect given the proper syntactic analysis.[1]

1 Syntactic versus Postsyntactic

Our initial discussion of movement in PF has two components. The first concerns why postsyntactic displacements are needed in addition to syntactic movement. The second addresses the idea that syntactic movements of the more familiar sort are part of the PF derivation as well.

1.1 Clitic Placement

The need for nonsyntactic movements has been clearest in the domain of clitic placement—in particular, in the analysis of second-position clitics. In some cases the question that was posed was whether or not syntactic movement could possibly account for patterns of clitic placement, or in particular second-position phenomena. We take this question to be ill formed. Syntax is a generative system, and assuming that one is willing to loosen many of the constraints on syntactic movement, the ability of such a system to capture certain linear orders should never have been in question. Rather, the question that we take to be central is whether or not it is desirable to have syntax perform such operations. The two positions that we wish to contrast, along with the means by which each approach captures apparent postsyntactic movements, are as follows:

(1) a. *Syntax only:* Syntax performs operations that are explicitly executed so as to resolve a morphophonological problem. Patterns of apparent postsyntactic movement are reducible to the effects of these ''special'' syntactic processes.

   b. *PF movement:* Syntax generates and moves terminals according to its own principles

---

[1] A third type of difference in structure between PF and syntax proper involves the addition of morphemes at PF to meet language-particular requirements; this will be outlined below.

and is oblivious to morphophonological concerns. PF takes the output of syntax and resolves morphophonological dependencies according to its own principles.

The position we adopt endorses the latter possibility.[2] In essence, the idea in the domain of clitic placement is that unless syntax incidentally provides a host for a clitic, PF can perform movement operations to satisfy a clitic dependency (see, e.g., Marantz 1984, 1988, Halpern 1992b, Schütze 1994, Embick and Izvorski 1995). Although the discussion of this section might seem somewhat peremptory, the literature on cliticization is vast and cannot be addressed here. Arguments against syntactic treatments of various clitic placement phenomena are abundant in the literature. In the body of the article we will not make a ''not syntactic'' argument for each case study we present, although such arguments could certainly be derived from the examples we analyze. Rather than focusing on this aspect of the phenomena, we will provide a theory of the locality conditions on postsyntactic readjustments of the type outlined above.

1.2 Syntax in PF?

Recent developments in syntactic theory, particularly those associated with the Minimalist Program, attempt to circumscribe the operations that syntax proper is supposed to perform. Although we do not adopt some of the more extreme versions of this view, such as Chomsky's (2001) position that head movement does not take place in syntax, we find the general picture provided by such theoretical contexts compelling, particularly to the extent that they acknowledge movement operations on the PF branch. This having been said, the nature of the movements that we intend to discuss must be clarified somewhat. Chomsky (2001) takes the more extreme position that a great deal of apparently phrasal movement also takes place in the phonological component (in some cases this is what has been referred to as ''stylistic movement,'' in other cases not). Unlike the movement operations to be studied here, which have an immediately local character and which are motivated by the satisfaction of primarily morphological or morphophonological requirements, the movements Chomsky relegates to PF seem to have many of the properties of straightforward syntactic movement.

We take the position that the grammar includes only one syntactic component: that is, everything that looks like syntactic composition or movement takes place in syntax; movement of this type is not distributed across PF as well. In part this position is motivated by parsimony: two modularly distinct syntactic systems should not be posited unless absolutely necessary. Until it has been conclusively demonstrated that a syntaxlike movement system is required at PF, we will assume the more restrictive option.

2 Background Assumptions

In this section we sketch our background assumptions about the structure of the grammar. We assume a theory in which morphology interprets the output of the syntactic derivation (Distributed

---

[2] Much of the discussion of these issues centers around second-position cliticization effects, especially in the Slavic languages. Franks and Holloway King 2000 contains many relevant references to the literature.

Morphology; Halle 1990, Halle and Marantz 1993, 1994, Noyer 1997, and related work). The basic elements of the syntactic computation are abstract features, which appear in bundles as terminal nodes. Universal as well as language-specific well-formedness conditions determine in what manner these features may combine to form syntactic categories, the atoms of syntactic representation, which we call here *morphemes.* We reserve the term *morpheme* in this model to denote terminal elements in syntactic or morphosyntactic representations; we use the term *exponent* to denote the phonological expression(s) of a morpheme. *Overt syntax* denotes those operations that assemble and manipulate this collection of morphemes into a hierarchical structure that is the input to computations concerned with morphological and phonological expression (PF) and aspects of semantic interpretation (LF).

The kinds of operations that take a representation from the PF/LF branching to its phonological form comprise the *(PF) Spell-Out* of that representation; the module of grammar responsible for Spell-Out is *Morphology.* That is, we use *Morphology* here as a cover term for a series of operations that occur on the PF branch following the point at which the syntactic derivation splits between PF and LF. There is no Lexicon in this model of grammar; word formation takes place either in syntax or through postsyntactic operations during Morphology.

2.1 Morphemes and Exponents

A number of independent operations occur on the PF branch, and some of these are of direct relevance to the present study. To begin with, not all morphemes relevant to pronunciation are present in syntax prior to Spell-Out and Morphology. In other words, not all word constituents are syntactic entities; many are not and are purely morphological (Harris 1991, Noyer 1997). Certain structural positions within words and perhaps phrases are inserted in Morphology subject to various conditions. For example, many languages require noun and adjective stems to be augmented by case morphemes that are not themselves syntactic projections. These morphemes must be added postsyntactically during Morphology, as in (2).

(2) Noun → [Noun + $Case_{Noun}$]

In the terminology of Embick 1997, such inserted morphemes are called *dissociated,* since the information their signalization conveys is partly separated from the original locus of that information in the phrase marker. Typical dissociated morphemes include case and agreement morphemes in at least some languages (see, e.g., Marantz 1992): these morphemes reflect certain syntactic properties (or configurations) but do not in any sense contribute these properties to syntax. Dissociated morphemes are not interpreted at LF, since they are inserted only at Spell-Out.

Following Halle and Marantz (1993), we adopt the term *Vocabulary* to denote the list of phonological exponents and their privileges of occurrence. Each *Vocabulary item* is a phonological representation, paired with a set of conditions on its insertion. Vocabulary items are inserted into terminal nodes following the syntactic derivation; because terminals are only provided with specific Vocabulary items postsyntactically, this is referred to as *Late Insertion.*

We use the term *morphemes* or, equivalently, *heads* to refer to the basic atoms of phrase structure, which consist of abstract morphemes–that is, bundles of features. A variety of operations, including head adjunction in syntax, morpheme insertion in Morphology, and the postsyntactic Mergers to be studied below, can produce X^0 elements with internal structure such as in (3).

(3) *Z adjoined to Y; Z+Y adjoined to X*
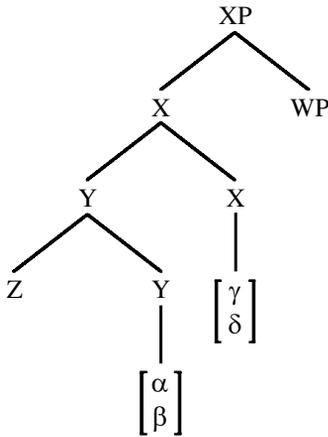
When Vocabulary Insertion occurs, the Vocabulary is searched for items to be inserted into the structure. For certain morphemes, Vocabulary Insertion is deterministic and only one choice is possible in any given context. Following Harley and Noyer (1998), we will call such morphemes *f-morphemes:* typically such morphemes correspond to ''functional'' projections in syntax. For f-morphemes, the Vocabulary item with the largest subset of the features present on the terminal node is inserted.[3] For other morphemes, there exists a choice as to which may be inserted; we call such morphemes *Roots,* symbolized with the notation $\sqrt{\text{ROOT}}$ (see Pesetsky 1995). Unlike the exponents inserted into f-morphemes, the Roots are not in competition with each other and any Root licensed in a given environment may be inserted.[4]

More concretely, suppose that in (3) Z = Noun, Y = Number:dual and X = Case:instrumental.[5] In the Vocabulary of Mansi, a Uralic language, the most specific Vocabulary items for Number:dual and Case:instrumental will be əɣ and təl, respectively (Kálmán 1965). For the Root position there exist many choices, naturally, but the following forms exemplify possible outcomes:

(4) a. pūt-əɣ-təl
      kettle-DUAL-INST
      'by means of two kettles'

---

[3] See Halle 1997; but certain complexities arise in defining the precedence relations among competing Vocabulary items (see Harley and Noyer 1999:5 for discussion).

[4] For different perspectives on the Late Insertion of Roots, see Halle 1990, Marantz 1995, Harley and Noyer 1999, and Embick 2000.

[5] Whether or not the hierarchical structure presented in (3) is the one that is needed for this case depends upon further assumptions about Number and Case, which need not be addressed at this point.

    b. ērɣ-əɣ-təl
       song-DUAL-INST
       'by means of two songs'

    The architecture of the theory establishes a direct connection between syntax and morphology. In the default case the structure interpreted in Morphology will simply be the output of the syntactic derivation. As is well known, however, the PF branch has its own properties, and, simply as a matter of fact, there are sometimes apparent mismatches between morphological and syntactic structures. Distributed Morphology accounts for such mismatches in terms of specific operations that occur in the PF derivation. For instance, the operation of Fission (Noyer 1992, Halle 1997) produces two terminal nodes from a single terminal node. The status of such operations, and the conditions on their application, is the subject of an ongoing research program. The project of this article is to focus on one specific type of morphology/syntax mismatch, involving PF movement; it is important to emphasize, however, that the present research is situated in a theoretical framework in which morphological structure is, unless further operations apply at PF, simply syntactic structure.

2.2 Dependent Elements

The breakdown of morphemes, exponents, and operations sketched above provides the basic inventory for the theory we will develop here. However, further comments are in order concerning how the ontology of our approach relates to distinctions found elsewhere in the literature. The elements involved in the movement operations that we examine are often classified as *clitics* or as *affixes,* depending upon certain criteria. Most salient is the distinction proposed in Zwicky and Pullum 1983 and related work, in which a number of properties are proposed in order to define these two types of objects. According to a line of reasoning prevalent in Lexicalist theoretical frameworks, clitics must be placed by syntax, whereas affixes are placed on their hosts via Lexical rules. In the context of the present theory, the modular distinction between clitics and affixes cannot be maintained. That is, there is no Lexical mode of derivation in the present theory, so such a distinction loses much of its importance. Instead, elements that appear bound to others on the surface have heterogeneous derivational histories, with *clitic* and *affix* being descriptive terms for some of these. The important factor in any particular analysis is therefore not whether an element is a clitic or an affix. Rather, one must identify (a) the provenance of the morpheme (syntactic or dissociated) and its distribution, and, correspondingly, (b) the means by which it comes to be attached to its host. Although we assume a non-Lexicalist model and believe the incorrectness of Lexicalism to have been amply demonstrated in the literature, we will have occasion to illustrate the inadequacy of the *clitic/affix = syntactic/Lexical* equation in our case study of the Bulgarian DP below.

2.3 Morphological Merger

Morphological Merger, as first proposed by Marantz, was originally a principle of well-formedness between levels of representation in syntax; in Marantz 1988:261 Merger is generalized as follows:

(5) *Morphological Merger*

At any level of syntactic analysis (D-Structure, S-Structure, phonological structure), a relation between X and Y may be replaced by (expressed by) the affixation of the lexical head of X to the lexical head of Y.

In this formulation Merger essentially ''trades'' or ''exchanges'' a structural relation between two elements at one level of representation for a different structural relation between the ''heads'' of these elements at a subsequent level. Exactly what relations may be traded is, on this conception, dependent upon the levels of the grammar related by the operation. In one case the relevant notion of headedness in terms of which the operation applies is defined linearly; in another, in terms of structure.

The theory that we present here follows the insight that Merger is an operation with different domains of application. This view is situated in a theory in which Mergers taking place at different stages in a sequential PF derivation have different locality properties. The proposal is that there are in fact at least two varieties of Merger, depending upon whether Merger occurs (a) in Morphology before Vocabulary Insertion or (b) in Morphology after or concomitant with Vocabulary Insertion.[6] The Merger of type (a) is *Lowering*; it operates in terms of hierarchical structure. The Merger of type (b), *Local Dislocation,* operates in terms of linear adjacency.

3 Lowering versus Local Dislocation

We turn now to initial definitions and illustrations of our movement operations. For expository purposes, we will include a marker *t* to indicate the position of origin of an element affected by Merger. This is not intended to represent a trace (or a copy) in the technical sense in which traces behave in syntactic theory. Rather, its purpose is merely to illustrate the nature of our movement operations, which occur after syntax and therefore do not leave traces or their equivalents.

3.1 Lowering

Because we adopt the view that phonological expression of complex words is determined by information provided by the syntactic derivation, in certain instances Lowering movement will be required to unite syntactic terminals that are phonologically spelled together but not joined in overt syntax (by Raising). Here, the head X lowers to Y, the head of its complement.[7]

(6) *Lowering of X^0 to Y^0*

$[_{XP} X^0 \ldots [_{YP} \ldots Y^0 \ldots]] \rightarrow [_{XP} \ldots [_{YP} \ldots [_Y \circ Y^0 + X^0] \ldots]]$

In English, as opposed to a number of other languages, V does not move to T in overt syntax.

---

[6] Another potential type of Merger, *Prosodic Inversion* (Halpern 1992b), involves the trading of relations at the level of prosodic domains, such as Phonological Word and Phonological Phrase. We will not be discussing Prosodic Inversion in detail here, but it is easily incorporated within our proposals as a variety of Merger operating immediately before Phonology.

[7] A possible refinement to this definition of Lowering will be suggested in section 7.2.

However, T is realized on V morphologically (except when negation appears, or when T-to-C movement has occurred). English T thus lowers to V, the head of its complement.[8]

(7) a.   Mary [$_{TP}$ t_1 [$_{vP}$ loudly play-ed$_1$ the trumpet]]
    b.   *Mary did loudly play the trumpet.

Because Lowering involves adjunction of a head to a head, and these heads need not necessarily be linearly adjacent, Lowering has a (potentially) nonlocal, that is, nonadjacent, character. As Bobaljik (1994) discusses, an intervening adjoined adverb such as *loudly* in (7a) does not prevent T from lowering to V. In sum, this postsyntactic operation is one that skips potentially intervening adjuncts and adjoins T to the head of its complement (i.e., v).

3.2 Local Dislocation

A second variety of Merger, which we term *Local Dislocation,* occurs after Vocabulary Insertion. In Local Dislocation the relation relevant for ''affixation'' is not hierarchical, but rather linear precedence and adjacency. By hypothesis, linear ordering is not a property of syntactic representations but is imposed at PF in virtue of the requirement that speech be instantiated in time (see Sproat 1985). It is therefore natural to assume that linear ordering is imposed on a phrase marker at the point in the derivation when phonological information is inserted, that is, at Vocabulary Insertion.

(8) *The Late Linearization Hypothesis*
    The elements of a phrase marker are linearized at Vocabulary Insertion.

Our idea that Local Dislocation is a variety of Merger distinct from Lowering is based on Marantz's (1988) position that the notion ''head of a constituent'' relevant to Merger is defined differently at different levels of the grammar. The implementation of this position here is that the properties of Merger differ depending upon whether Merger applies on a linearized or unlinearized structure. Specifically, before linear order is imposed on a phrase marker, headedness is defined in terms of structure: where a constituent C $=$ X(P), then the head of C is X^0. After linearization, this no longer holds and the head is defined in terms of peripherality within the constituent. To see how this is so, consider the following hierarchical structure:

(9) [$_{XP}$ X [$_{YP}$ [$_{ZP}$ Z] Y]]

Here X takes YP $=$ [ZP Y] as its complement, where ZP is either a complement to Y or an adjunct to YP. We will use the notation $a * b$ to denote a requirement that a must linearly precede b and be adjacent to b. A potential linearization of this structure is this:

(10) [X $*$ [Z $*$ Y]]

---

[8] On a strict Lexicalist theory such as that assumed in Chomsky 1995, *play-ed* is fully inflected before syntax in the Lexicon; its tense features need not be checked until LF. When Spell-Out occurs, *play-ed* already has the inflectional material with it. However, Distributed Morphology admits no Lexicon in which *play-ed* might be constructed before syntax.

Here X must immediately precede [Z * Y] and Z must immediately precede Y. In the syntactic structure (9) from which (10) originates, Y is the ''head'' of the constituent that X takes as its complement. In syntax Y could raise to X; likewise, X could lower to Y across ZP. But Local Dislocation does not refer to (9); rather, it refers to (10). The relationship that is relevant is now one of linear precedence and adjacency (*). Specifically, Local Dislocation can convert (10) to (11).

(11) $[[_{Z^0} Z + X] * Y]$

In (11) X's * relation to [Z * Y] has been exchanged for a relation of adjunction to the left-peripheral element of [Z * Y], namely, Z. (11) is a legitimate transformation of (10) because both * relations in (10) have been either respected or properly converted by Local Dislocation.[9] In (10) Y must immediately follow and be adjacent to Z. In (11) this relationship is maintained because Y still follows Z^0, which is now however internally complex as Z + X.

As Marantz (1988) shows, the idea that Local Dislocation Merger exchanges relations of adjacency for those of adjunction places restrictions on the structures in which two elements can be inverted in the string. Our interpretation of these restrictions is as follows: if X is an element peripheral in some constituent C, X will not be able to invert with an element Y that is outside of the constituent C (12b), although leaning is possible (12c). Consider the following cases:

(12) a. [. . . Y] * [$_C$ X * Z]
     b. [. . . X + Y] * [$_C$ Z]   impossible inversion
     c. [. . . Y + X] * [$_C$ Z]   possible leaning

Given a pre–Local Dislocation structure such as (12a), X cannot ''escape'' the constituent C to invert with Y as in (12b), since in so doing X would not properly maintain its requirement of (left-)adjacency with Z. This should be contrasted with the derivation of (11), where X inverts with an element (Z) that is *contained within* the constituent that X is originally peripheral in.

As we will illustrate throughout the article, the domain in which these Mergers apply is not limited to absolute sentence-peripheral position, as originally envisioned by Marantz. Rather, Mergers apply within particular domains (e.g., DPs), such that peripheral elements within such domains undergo Merger with other elements in that domain. In such cases it appears that material outside the domain is irrelevant. In (13), for example, X may undergo Merger with Y, such that the (cross-domain) relationship Z * X is violated (domain boundary illustrated with | for clarity).

(13) Z * | [$_{XP}$ X * Y * W] → Z * | [$_{XP}$ Y + X * W]

The same type of effect is found with Lowering. Thus, for instance, the head of DP may lower to its complement, as we show below, without incurring any violation from having removed its relationship with a dominating verb. Whether or not these domains correspond to (or should correspond to) syntactically motivated subunits of structure, such as the phases introduced in Chomsky 2000, 2001, is an open question of substantial interest.

[9] The affixation of X to Y might first involve rebracketing under adjacency, such that [X * [Z * Y]] becomes [[X * Z] * Y] prior to inversion of X. For more on rebracketing, see below.

On the other hand, string-vacuous (i.e., noninverting) Local Dislocation is not subject to these same locality conditions (although of course it affects only string-adjacent elements). Essentially, string-vacuous ''rebracketing'' is freely permitted, much as proposed by Sproat (1985). For example, in (12c) X may ''escape'' the constituent C that it was originally peripheral within, since it will still maintain a left-adjacency relation to Z.

To reiterate, there is an important difference between Lowering Merger and Local Dislocation Merger. Lowering is sensitive to syntactic headedness and can therefore affect elements that are not string adjacent. Local Dislocation, however, is sensitive to relations of adjacency and precedence between constituents, and not to syntactic headedness directly. Thus, Local Dislocation must always be *local,* as its name suggests; it cannot skip any adjoined elements, as Lowering can. Only adjacent elements can be reordered by the operation, and an intervening (syntactic) adjunct cannot be ignored.

The formation of English comparatives and superlatives of the type *tall-er, tall-est* provides a clear case in which a Vocabulary-specific operation is constrained to apply under linear adjacency. To begin with, we take the syntactic structure to be one in which the comparative or superlative features dominate the position of the adjective (Abney 1987). The realization of these morphemes is dependent upon whether or not they combine with the adjective they dominate. As is well known, there is a prosodic condition on the host; the comparative/superlative morpheme can combine only with an adjective with one metrical syllable.

(14) a.   John is smart-er than Bill.
     b.   John is mo-re intelligent than Bill.
     c.   *John is intelligent-er than Bill.
     d. ?*John is mo-re smart than Bill.

The correlation that we establish here is simple: the suffixation of the comparative/superlative morpheme is dependent upon the prosodic shape of the host and therefore happens after the insertion of specific adjectives. The information that is required for the process to occur is Vocabulary specific; and, because structures are linearized by Vocabulary Insertion, the process is defined over a linearized structure. Accordingly, the comparative/superlative morpheme cannot appear on the adjective when there is an intervening adverbial; this is seen clearly with the superlative.[10]

---

[10] The point can also be illustrated with the comparative, but with greater difficulty. The reason for this is that with the comparative there are two distinct scopal readings for the adverb; one in which it takes scope over the entire comparative-adjective, and one in which it intervenes between the comparative morpheme and the adjective. Thus, (i) is grammatical, but only on a reading in which the adverb takes scope over the comparative.

   (i) The DuPonts are amazingly *t* rich-er than the Smiths.

That is, the degree to which the DuPonts are richer is amazing. The syntactic structure is thus one in which the adverb dominates the comparative morpheme. This may be compared with a case in which the adverb does not take scope over the comparative; in such cases no combination of adjective and comparative morpheme is possible.

   (ii) The DuPonts are mo-re amazingly rich than the Gettys.

That is, both families are amazingly rich, but the DuPonts are more so. The reason for this is that with the combined comparative form the only structure available is the one in which the adverb does not intervene between the position of the comparative morpheme and the potential host adjective.

(15) a.   Mary is the mo-st amazingly smart person . . .

b.   *Mary is the *t* amazingly smart-est person . . .

When *amazing* appears as a modifier of *smart,* it is structurally between the position of the comparative/superlative morpheme and the adjective. Accordingly, it is linearized between these two elements. Its presence in this position prohibits superlative *-st* from being merged with *smart* (15b), forcing the presence of *mo-st.*

This analysis here treats adjacency as a necessary but not sufficient condition for the formation of a synthetic form. That is, if the comparative/superlative morpheme is to combine with the adjective, then they must be adjacent. But the converse does not hold. If the two are linearly adjacent, a synthetic form will not necessarily result. Other factors, some of them structural, will determine whether or not Local Dislocation takes place.

4 A Model

The device of Morphological Merger as developed by Marantz (1988) captures the generalization that clitics are of essentially two types: ''peripheral'' clitics, which are either at the edge of a maximal projection or in peninitial or penultimate ''second'' position within that phrase, and ''head'' clitics, which adjoin to the head of a phrase.[11] The insight is that the notions ''head'' and ''periphery'' are derivative of the type of Merger that applies, and that the type of Merger that applies is different depending on the stage of the PF derivation at which the operation takes place. Figure 1 illustrates the PF branch of the grammar as we envision it. The architecture of this model—in particular, the ordering of events within the derivation—makes particular predictions about what can and cannot happen in Morphology. In this section we make these predictions precise; the remainder of the article exemplifies and defends these ideas.

4.1 The Local Dislocation Hypothesis

By the Late Linearization Hypothesis (8), linear order is imposed on a string only at Vocabulary Insertion, and after linearization Local Dislocation Merger can manipulate only string-adjacent elements. From this premise it follows that if a movement operation is sensitive to properties that are supplied at Vocabulary Insertion, it will necessarily apply only to string-adjacent elements. Properties supplied at Vocabulary Insertion include the specific identity of Vocabulary items (i.e., whether *beech* has been inserted into a morpheme, as opposed to *elm* or *poplar*), including any idiosyncratic properties of the inserted item, such as its phonological features or its inflectional or other diacritical class features. If a movement operation is sensitive to such properties of

---

[11] On our view, Prosodic Inversion, defined by Halpern (1992b) as operating in terms of prosodic subcategorization, would only apply to sentence-peripheral elements. That is, if a clitic has a dependency that is purely prosodic, it would, all other things being equal, simply *lean* on a host rather than undergoing Merger. Whether or not purely prosodic operations of this type are necessary beyond the types of Merger that we have proposed is not clear, however.

(Syntactic derivation)
↓
PF/LF BRANCHING

Lowering	← Hierarchical arrangement of morphemes	**M O R**
Vocabulary Insertion /*Local Dislocation*	← Linearization imposed by Vocabulary Insertion	**P H O L**
Building of prosodic domains /*(Prosodic Inversion)*		**O G Y**

**PHONOLOGICAL
FORM**
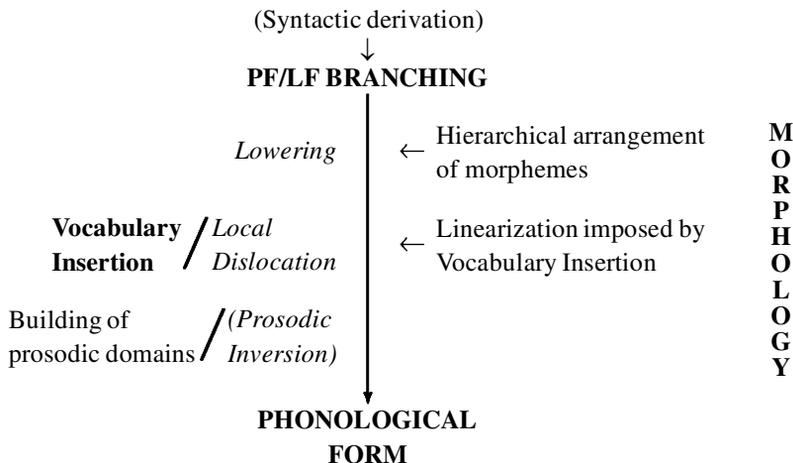
Figure 1
The PF branch of the grammar

Vocabulary items, we call it *Vocabulary sensitive.* The *Local Dislocation Hypothesis* can then be stated as follows:[12]

(16) *The Local Dislocation Hypothesis*
    If a movement operation is Vocabulary sensitive, it involves only string-adjacent items.

For example, suppose A, B, and C are terminal nodes.

(17) [A B C] ↛ [B C + A] or [B A + C]

If the movement of A to C depends on the specific Vocabulary items inserted into A or C and not solely on syntactic or abstract feature properties of A and C, then the movement is blocked where some other element B intervenes.

Effectively, the Local Dislocation Hypothesis establishes an important correlation between the locality of a movement operation and what would have been called the ''selectional'' properties of the clitic in the Lexicalist approach of Klavans (1985, 1995) or the Autolexical Syntax theory of Sadock (1991). Where a clitic demands a host having a particular identity, such as inflectional class, morphological category, or phonological weight, then in our terms the operation is Vocabu-

---

[12] It would also be possible to state a condition like (16) in terms of sensitivity to phonology. Thus, the generalization that is captured here could be captured as well in a theory in which Roots are not inserted late (e.g., Halle 1990; see Embick 2000 and Chomsky 2001 for related discussion). In principle, Vocabulary-sensitive and phonology-sensitive operations could be distinct, but we will not pursue this line of inquiry here.

lary sensitive and the clitic and the host must be string adjacent prior to Merger. Inversely, where the clitic element is indifferent to the Vocabulary item that fills its host morpheme, but perhaps sensitive to the features on a node, then it is possible (although not necessary) for the clitic to reach its host by undergoing Raising or Lowering, operations that are permitted to cross syntactic adjuncts.

4.2 Late Lowering

While the Local Dislocation Hypothesis is the main focus of the present investigation, we will also point to several other predictions made by the model depicted in figure 1. As shown there, Lowering occurs in Morphology, after any application of syntactic movement. It follows from this that while syntactic movement may remove the environment for Lowering to apply, the opposite can never hold.

(18) *The Late Lowering Hypothesis*
All Lowering in Morphology follows all movement in syntax. Lowering can never remove an environment for syntactic movement.

In other words, Lowering operates only on the structure that is the output of syntax, that is, the structure after all overt syntactic operations have occurred. For example, English Lowering of T to v cannot apply where vP has been fronted to a position higher than T (see also Bobaljik 1995).[13]

(19) a. Mary said she would quietly play her trumpet, and [$_{vP}$ quietly play her trumpet]$_1$ she did t_1.
   b. *Mary said she would quietly play her trumpet, and [$_{vP}$ quietly play-ed$_2$ her trumpet]$_1$ she t_2 t_1.

In (19a) vP fronting makes it impossible for postsyntactic Lowering to move T to v; (19b) shows what would result if Lowering could precede vP fronting. We predict that no language should permit lowering of a head Y into an XP that subsequently raises above Y.

4.3 Summary

The stages in the model that we have discussed above are part of a larger conception of the PF branch, which seeks to find the operations that are required in deriving a phonetic expression from a hierarchical arrangement of syntactic terminals. The model is assumed to be explicitly transformational. Stages in the derivation involve the addition or manipulation of structures or features that are input from a prior stage. Unless otherwise indicated, this amounts to the addition of information; that is, structural distinctions from syntax will still be visible at the stage of the derivation at which, for example, Vocabulary Insertion and Local Dislocation apply.

---

[13] The argument here is valid on the assumption that the *do* in the clause with ellipsis is not emphatic *do*.

5 Lowering in Bulgarian DPs and the Clitic/Affix Distinction

Bulgarian shows a ''suffixed'' definite article, here abbreviated *Def,* which has a cliticlike distribution within the DP (see, e.g., Elson 1976, Scatton 1980, Sadock 1991, Halpern 1992a, Tomić 1996, Börjars 1998, Caink 2000, Franks 2001). We demonstrate in section 5.1 that the distribution of Def within the Bulgarian DP is the result of its being the head of D, and subject to Lowering as we have defined it above.[14] In section 5.2 we provide further facts about the Bulgarian Def, concentrating on morphophonology. In particular, Def shows a number of properties that are characteristic of *affixes* in Lexicalist theories in which affixes and clitics are syntactic and lexical entities, respectively (see, e.g., Zwicky and Pullum 1983 and much subsequent work that assumes the validity of this distinction). We demonstrate that the distribution of Def has to be stated in syntactic terms and that the syntactic/lexical split underlying the clitic/affix distinction is incorrect.

5.1 Lowering of Def

The definiteness element Def in Bulgarian appears suffixed to nominals, or, when these are modified by adjectives, suffixed to the first adjective in a sequence.

(20) a. kniga-ta   book-DEF
      b. xubava-ta kniga   nice-DEF book
      c. Adj-Def . . . (Adj) N   (general pattern)

The so-called suffixed article contrasts with the overt demonstrative, which appears in the expected place, on the (standard) assumption that the DP has the structure in (22) and that demonstratives appear in the specifier of DP.[15]

(21) tazi kniga
      this book

In cases with prenominal modifiers such as adjectives, the structure of the DP is assumed to be along the lines proposed by Abney (1987), in which adjectives are heads taking NP arguments. In this structure, shown in (22), the A head is the target of Lowering from D (the operation takes place on an abstract structure; Vocabulary items are shown here for clarity).[16]

---

[14] Arguments against purely movement-based treatments are made by Caink (2000) and Franks (2001), who give very different treatments of Def elements.

[15] Typically, demonstratives are in complementary distribution with Def. Caink (2000), citing Arnaudova (1998), notes that the two can cooccur in colloquial Bulgarian.

[16] With possessive pronouns, Def appears suffixed to the pronominal element.

(i) moja-ta xubava kniga
     my-DEF nice   book

We take these possessives to be possessive adjectives, and structurally in the same position as the adjective in (22) (see Delsing 1993). The syntactic distribution of the possessive adjectives puts them structurally higher than other adjectives, and the suffixation of Def to this head follows automatically.

(22) *Adj/Noun*

```
              DP
             /  \
            /    \
            \     D
             \   / \
              \ /   \
               t     AP
                    /  \
                   /    \
                  A      NP
                 / \      |
                /   \     |
               A     D    N
               |     |    |
               |     |    |
             xubava  ta  kniga
```
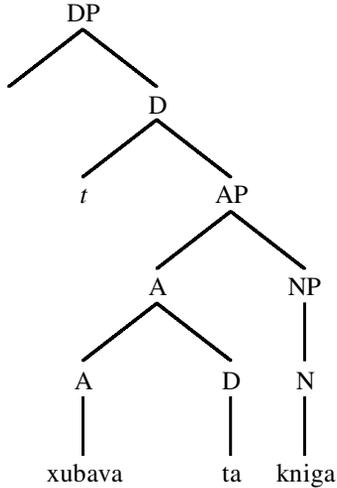
When other elements, such as adverbs, appear between the NP and D, a different pattern results. Adverbs may not host Def (23a), nor do they block Merger (23b).

(23) a. *mnog-ət star teatər
          very-DEF old theater
          'the very old theater'
     b. mnogo starij-ə teatər
     c. dosta glupava-ta zabeležka (Franks and Holloway King 2000)
         quite stupid-DEF remark

The pattern displayed above fits well with the idea of Merger at the level of category (i.e., Lowering), which skips intervening adverbs. Def lowers across intervening material to the immediately dominated head. The fact that Def does not appear on the adverb is then purely structural; when Def undergoes Merger, it targets the head of its complement, stated in terms of syntactic headedness. The adverb, being an adjunct, cannot be the target of this operation, and structurally is invisible for it.[17]

---

[17] Notice that a syntactic approach to the positioning of Def faces several difficulties. The fact that adverbs and adjectives appear together before Def shows that a simple head movement analysis of A- or N-movement to D cannot be adequate. The only alternative would be to raise entire APs. On the assumption that AP is the complement of D, this move requires that lower material, such as the head noun, be scrambled out of the NP complement to AP before the AP is raised to the pre-D position. This stipulation in syntax is avoided altogether on our Lowering solution.

Other attempts to treat the pattern syntactically, assuming a different phrase structure for the DP, have also been proposed. See Caink 2000 for a critique.

5.2 Bulgarian DPs and the Clitic/Affix Distinction

We now turn to an illustration of the incorrectness of the distinction between clitics and affixes that stems from Zwicky and Pullum 1983 and much subsequent work. Our treatment stems from the discussion, but not the analysis, in Franks 2000.[18] The pattern shown by Def proceeds in conjunction with an examination of possessive clitics. As an illustration, consider the following phrase:

(24) kniga-ta vi
       book-DEF your.CL
       'your book'

Franks argues that while the clitics are syntactic in nature, Def is affixal and therefore generated on its host through a lexical process. In our view, however, this attempt to maintain the modular distinction between affixation and cliticization misses essential generalizations.

Franks's arguments for a lexical treatment of Def involve a variety of phenomena which, in Lexicalist theoretical frameworks, have been taken to diagnose lexical as opposed to syntactic derivation. One argument, for instance, is that the phonological form of Def is dependent upon a combination of phonological and morphological properties of the host. In a Lexicalist model, in which individual lexical items are the initial terminals in a syntactic structure, this conditioning of the Def form by its host is problematic unless the two are put together in the Lexicon.

In addition, Def participates in word-level phonological processes. Word-final devoicing is one such process.[19]

(25) bratovčed [bratofče*t*] 'cousin'
       maž [ma*š*] 'husband'

This process is bled when these words appear with Def.

(26) bratovčed-ət [bratofče*d*ət] 'the cousin'
       maž-ot [mažot] 'the husband'

On the Lexicalist assumption that this kind of phonological interaction can be found only in objects created in the Lexicon, Def's behavior forces the conclusion that it is attached via a lexical derivation, that is, that it is an affix.

A further argument for the ''affixal'' status of Def comes from apparent lexical idiosyncrasies, following the idea that affixation is lexical and therefore subject to unpredictability. The argument is based on the fact that certain kinship terms in Bulgarian have a special appearance in definite form. To begin with, Bulgarian has a possessive clitic within the DP, which is used only in definite environments. The kinship terms in question show no definite marker.

---

[18] Franks bases his analysis on a number of prior discussions of the morphophonology of Bulgarian definites, including those of Scatton (1980), Halpern (1992b), and Tomić (1996).

[19] A similar argument is adduced from the interaction of liquid metathesis/schwa epenthesis and syllabification.

(27) a. majka mu
         mother his.CL
         'his mother'
    b. *majka-ta mu

(28) a. brat   í
         brother her.CL
         'her brother'
    b. *brata-a/ət í

The syntactic environment is clearly definite, however, as is clear from cases with adjectives.

(29) xubava-ta mu   majka
     pretty-DEF his.CL mother
     'his pretty mother'

Furthermore, other kinship terms do in fact show Def.

(30) djado-to   mu
     grandfather-DEF his.CL
     'his grandfather'

The differences here between, for example, 'mother' and 'grandfather' are taken to be hallmarks of lexical idiosyncrasy. Following the idea that affixes are lexical while clitics are syntactic, this pattern is taken as an argument for the affixhood of Def. Combined with the prior arguments, the conclusion is that it must therefore be affixal, that is, lexically derived.

Franks contrasts affixal Def with the possessive clitics seen throughout the prior examples. Phonologically, the possessive clitics form a Phonological Word with their hosts to the left, but do not interact with the phonological process discussed above, to the extent that this can be clearly determined. Thus, following the assumptions enforcing the clitic/affix distinction, it must be the case that the clitics are syntactic elements, that is, not affixes and not lexical. However, as Franks notes, this leads to an apparent paradox having to do with the distributions of Def and the possessive clitics. Caink (2000) and Franks (2000) demonstrate clearly that the possessive clitic has a distribution that mirrors precisely the distribution of Def (Def and the possessive clitic italicized).

(31) a. kniga-*ta vi*
         book-DEF your
         'your book'
    b. xubava-*ta vi*   kniga
        nice-DEF   your book
        'your nice book'
    c. mnogo-*to ti*   novi knigi
        many-DEF your new books
        'your many new books'

    d. večno   mlada-*ta ni* stolica
       perpetually young-DEF our capital
       'our perpetually young capital'

The problem is that Franks's treatment of the distribution of Def is essentially lexical; that is, it appears where it does by virtue of a lexical operation. By distributional reasoning, the clitic, which has the same distribution, should be treated identically. But, according to the tenets of Lexicalism, this is a contradiction; clitics are syntactic and hence cannot be generated lexically.

This paradox does not arise in the non-Lexicalist framework outlined above. Assume that Cl(itic) is attracted to definite D (see Cardinaletti 1998 and Schoorlemmer 1998 for this connection, albeit in different structural terms), such that syntax outputs a structure in which it is adjoined to this head (the first tree in (32)). The Lowering operation responsible for the distribution of Def affects D and will then automatically carry Cl along with Def when it applies. When Cl is attached to $D_{[def]}$, Lowering moves the entire D, which is internally complex.[20] In the trees in (32), illustrating this process, actual Vocabulary items appear in terminal nodes for expository purposes only; as the movement is Lowering, the actual content of these nodes is abstract.[21]

(32) *Clitic and Def*
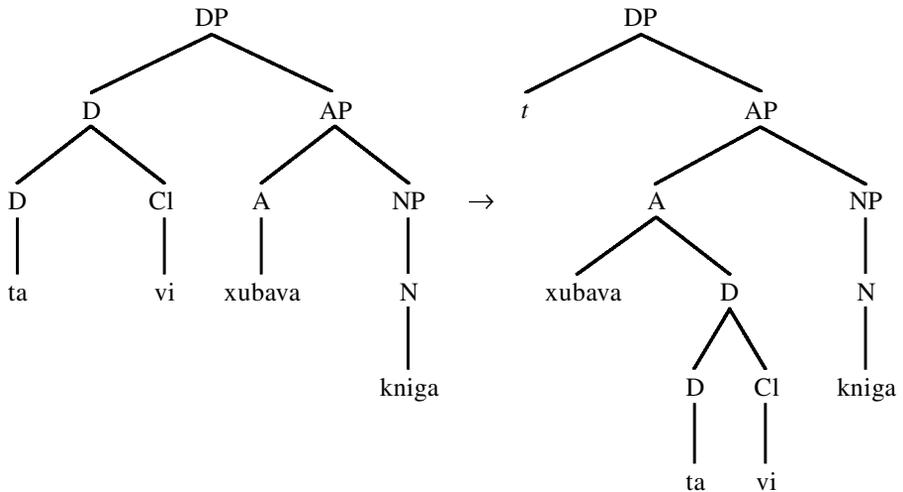
This treatment captures the identical distribution of Def and the possessive clitics directly. $D_{[def]}$ is placed by Lowering with the DP. Cl, when present, is obligatorily attached to $D_{[def]}$ in syntax prior to the stage at which Lowering occurs; thus, cliticization onto D feeds the later Lowering process.

---

[20] See section 6 for structural refinements about the objects affected by Merger.
[21] In cases in which there is an overt demonstrative and a clitic, nothing further needs to be said. The demonstrative is in the specifier of DP. The clitic has been attracted to $D_{[def]}$, which does not contain Def and hence does not need to undergo Lowering.

Franks considers various ''hybrid'' treatments of the identity in distribution, analyses motivated by the idea that Def has to be lexical while clitic placement has to be syntactic. There is, however, no need to resort to a hybrid treatment in the first place. The facts illustrated above provide further evidence that elements whose distribution or provenance must be essentially syntactic can occasionally interact with ''lexical'' phonological processes (see Embick 1995 for this type of argument). Additional cases of this type are presented in Hayes 1990. The point is simply that different modes of phonological interaction do not argue for a lexical versus syntactic mode of composition. All composition is syntactic, and cases like Bulgarian Def make this point clearly. Something must be said about the connection between structures like those resulting from the lowering of Def and the word-level phonological interactions illustrated earlier, but a treatment of such facts is beyond the scope of the present discussion.

The other properties of Def that were taken as evidence for ''lexical'' derivation can be handled directly on our treatment. The positioning of Def happens prior to Vocabulary Insertion. Thus, what is being lowered is $D_{[def]}$, that is, a node with features. The fact that the phonological form of Def varies according to properties of the host is unsurprising; it is merely contextual allomorphy in Def's Spell-Out. In addition, the apparently exceptional cases of kinship terms, with no overt Def, could perhaps be treated as involving nouns that take a special zero allomorph of Def. This contextual allomorphy for Def occurs only when it is adjoined to one of the nouns in question. This accounts straightforwardly for Def's ''reappearance'' when, say, *majka* 'mother' is premodified by an adjective. In such cases Def is adjoined to the adjective and spelled out overtly accordingly.[22]

5.3 Conclusions

Within the Bulgarian DP, Def lowers to the head of its complement, illustrating clearly one of the types of PF movement. The more general conclusion of the discussion concerns the utility of the distinction ''clitic versus affix.'' Without the modular distinction ''lexical versus syntactic,'' this distinction becomes a matter of terminology, without theoretical consequences.

6 Refinements of the Model: Morphosyntactic Words and Subwords

The preceding sections have illustrated the contrast between Lowering and Local Dislocation and have shown how the locality conditions of each are identified with distinct stages of the model of grammar we espouse. In this section we refine our definitions of the elements that undergo

---

[22] Two remarks are in order here.

First, the manner in which Def is spelled out based on the host it attaches to has a parallel in English T, which is subject to host-dependent allomorphy when it undergoes Lowering to v.

Second, Caink (2000), developing the notion of *alternative realization* found in Emonds 1987, proposes that Def and the possessive clitic may appear somewhere inside the extended projection in which they occur. According to our account, in which the clitic is moved to D syntactically, and Def undergoes Lowering after syntax, the range of places in which Def could be found is sharply circumscribed: it can only appear on the head of D's complement. We take this to be a more restrictive account of postsyntactic movements.

Merger. We introduce a distinction between two types of objects in Morphology, which we call *morphosyntactic words* and *subwords,* and demonstrate that movement of each by Merger obeys distinct locality effects.

6.1 Definitions

First, we define the *morphosyntactic word* as follows:[23]

(33) At the input to Morphology, a node X^0 is (by definition) a *morphosyntactic word* (MWd) iff X^0 is the highest segment of an X^0 not contained in another X^0.

For example, consider the structure in (34).

(34) *Z adjoined to Y; Z+Y adjoined to X*
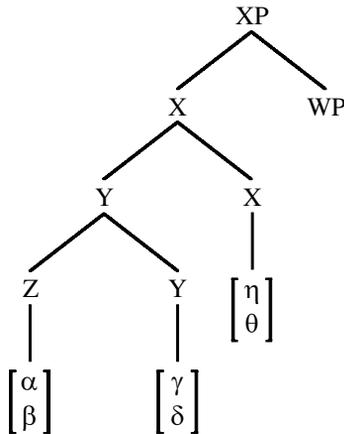
In (34) $X^0 = Z + Y + X$ constitutes an MWd but $Y^0 = Z + Y$ does not (at least after adjunction to X^0), since Y^0 is dominated by X^0.

Second, we define *subword* as follows:

(35) A node X^0 is a *subword* (SWd) if X^0 is a terminal node and not an MWd.

In (34) Z^0, the lower segment of Y^0, and the lowest segment of X^0 are all SWds. Thus, an SWd is always a terminal consisting of a feature bundle, or, if node labels are required, an X immediately dominating a feature bundle and nothing else, while being itself dominated. In the case in which a node immediately dominates a single feature bundle, this will be by definition an MWd, and not an SWd.[24]

In sum, any terminal that has undergone head movement in syntax to adjoin to another head,

---

[23] This definition seems to correspond to what Chomsky (1995) calls H^{0max}.

[24] In addition, intermediate levels of structure, such as the Y dominating Z and Y, are neither MWds nor SWds. Whether or not such structural units have a particular status in movement operations is an open question; we know of no cases in which they play a role.

or any dissociated morpheme adjoined to another head in Morphology, will count as an SWd. As we will demonstrate, MWds and SWds are the basic atoms of postsyntactic movement operations, and these distinct objects impose important restrictions on the types of possible Mergers.

6.2 Two Kinds of Local Dislocation

Both MWds and SWds can be moved by Local Dislocation.[25] We propose that when an MWd is moved by Local Dislocation, it adjoins to an adjacent MWd, and when an SWd is moved by Local Dislocation, it adjoins to an adjacent SWd. This type of restriction mirrors the commonly held assumption that syntactic movement treats heads and phrases differently. We first review an example of each type and then consider the formal properties of Merger that lead to this restriction.

6.2.1 Local Dislocation of Morphological Words   The Latin enclitic *-que,* used in conjunction and roughly equivalent to *and,* appears after the first word of the second of the two conjuncts it appears with.

(36) *Input:* ($_{\text{Conjunct 1}}$ X Y) -que ($_{\text{Conjunct 2}}$ W Z)
      Surface: ($_{\text{Conjunct 1}}$ X Y) *t* ($_{\text{Conjunct 2}}$ W-que Z)

In addition, *-que,* which is itself an MWd, attaches not to the first SWd of its complement, but to the first MWd of its complement (see Marantz 1988).

(37) a.   [[bon + ī   puer + ī]   [-que [bon + ae   puell + ae]]] →
            good + NOM.PL boy + NOM.PL   and   good + NOM.PL girl + NOM.PL
      b.   (after Merger): bon + ī puer + ī bon + ae + que puell + ae
            'good boys and good girls'
      c.   *bon + ī puer + ī bon-que + ae puell + ae

Here *-que* does not interpolate inside the MWd *bon + ae,* even though this word is internally complex. In other words, given the structure in (38), X an MWd, only (39a) is a legitimate transformation of (38); (39b) is not.

(38) [X * [[$_W$ W + Y] * Z]]

(39) a.   *Possible:* [[$_W$ [$_W$ W + Y] + X] * Z]
      b.   *Impossible:* [[$_W$ [$_W$ W + X] + Y] * Z]

The appearance of *-que* when it occurs with prepositional phrases adds a slight complication to this picture. With disyllabic prepositions *-que* typically attaches to the P itself; but with many monosyllabic prepositions it attaches to the complement of P (Ernout and Thomas 1951:120).[26]

---

[25] Our proposal does not, however, allow subconstituents of MWds to move by Raising (Excorporation) or Lowering.
[26] Ernout and Thomas identify exceptions to this pattern, which are categorized into a few groups: (a) certain fixed phrases, (b) cases in which the complement of the preposition is either a demonstrative or a form of the 3rd person pronoun *is,* and (c) cases in which the preposition is repeated in each conjunct. In general, the process does not seem to be obligatory.

(40) a. i. circum-que ea   loca
             around-and those places
             'and around those places'
         ii. contrā-que lēgem
             against-and law
             'and against the law'
     b. i. in rēbus-que
             in things-and
             'and in things'
         ii. dē   prōvinciā-que
             from province-and
             'and from the province'

In such cases a string-vacuous variety of Local Dislocation can apply to phonologically light (monosyllabic) prepositions and their complement, uniting them into a single SWd.[27]

(41) -que * [in * rē + bus] → que * [in + rē + bus]

Subsequent to this, Local Dislocation of -*que* places it after the P + N unit, ignoring the preposition, much as the adjectival desinence is ignored in the example in (37).

(42) -que * [in + rē + bus] → [in + rē + bus + que]

Examples of this type illustrate two important points. First, Local Dislocation applies twice, operating from the more deeply embedded structure outward, that is, cyclically: first the string-vacuous application, uniting P and its complement, and then the outer application, placing -*que* with respect to this derived unit. Second, the MWd status of -*que* determines where it is placed in a derived object consisting of more than one SWd: it is placed after the entire derived MWd, not after the adjacent SWd.

6.2.2 Local Dislocation of Subwords   On the other hand, where Local Dislocation targets SWds, it adjoins them to adjacent SWds. For example, in Huave (Huavean, spoken in Mexico), the reflexive affix -*ay* appears directly before the final inflectional affix of a verb, if any. Consider the following examples (Stairs and Hollenbach 1981; reflexive affix italicized):

(43) a. s-a-kohč-*ay*
          1-TH-cut-REFL
          'I cut myself'
     b. s-a-kohč-*ay*-on
          1-TH-cut-REFL-PL
          'we cut ourselves'

---

[27] Support for this position, which makes these prepositions proclitic on their complements, is found in Latin orthography, which occasionally treated monosyllabic prepositions as part of the same word as the complement (see Sommer 1914:294, Leumann, Hofmann, and Szantyr 1963:241).

(44) a.   t-e-kohč-*ay*-os
           PAST-TH-cut-REFL-1
           'I cut (past) myself'

      b.   *t-e-kohč-as-*ay*
           PAST-TH-cut-1-REFL

(45) a.   t-e-kohč-as-*ay*-on
           PAST-TH-cut-1-REFL-PL
           'we cut (past) ourselves'

      b.   *t-e-kohč-*ay*-os-on
           PAST-TH-cut-REFL-1-PL

Although *-ay* 'reflexive' directly follows the Root and precedes *-Vs* '1st person' in (44a), it follows *-Vs* '1st person' in (45a).[28] We can account for these facts by assuming that *-ay* is structurally peripheral to the verb + inflection complex, but undergoes Local Dislocation to left-adjoin to the rightmost inflectional affix.

(46) a.   [[s-a-kohč]on]*ay* → [[s-a-kohč]*ay* + on]
      b.   [[[s-a-kohč]as]on]*ay* → [[[s-a-kohč]as]*ay* + on]

6.2.3 Discussion   The Huave examples (43)–(45) establish that Local Dislocation cannot be restricted to MWds. Dislocation of SWds must also be permitted. But movement of an MWd to adjoin to an SWd, or of an SWd to adjoin to an MWd, as in (39b), is apparently impossible. To obtain the correct restriction on inversion operations, it suffices to require that

(47) If a Merger operation moves an element A to a target B, then A and the head of B are either both MWds or both SWds.

Clearly the same restriction is standardly assumed to hold when the operation in question is syntactic movement: XPs adjoin to XPs and X^0s adjoin to X^0s (see Baltin 1991 for some discussion).

For the purposes of exposition, it will be convenient to distinguish notationally between instances of Merger of an MWd and Merger of an SWd. To make explicit whether a particular instance of Local Dislocation moves an MWd or an SWd, we will use the symbol ⊕ to denote adjunction of one SWd to another. The symbol + will continue to denote other types of adjunction, as is standard.

The theory predicts certain interactions concerning domains that are accessible for Merger operations and concerning the relative ordering of operations. First, a complex X^0 created in syntax (or by Lowering) cannot be infixed within another X^0 during Morphology. In other words, ''second'' position for an MWd is after (or before) the first (last) MWd in a phrase and nowhere else.[29]

---

[28] The 1st person suffix shows an alternation: *-as/-os/-iəs*.

[29] Klavans (1995) and Halpern (1992b) (among others) discuss cases in which second position appears to be either after the first word or after the first phrase. On the present proposal, positioning after the first phrase cannot arise from

(48) X * [$_Y$∘ Y * Z] $\nrightarrow$ [$_Y$∘ Y + X Z], where X is an MWd

Second, an SWd (i.e., a terminal node within a complex X^0 created by Raising or through the insertion of dissociated morphemes in Morphology) can never adjoin to an element outside that X^0. Schematically:

(49) X * [$_Y$∘ Y * Z] $\nrightarrow$ Y + X [$_Y$∘ Z], where X is an MWd and Y is an SWd

The latter point is of particular interest in light of the analysis of Bulgarian Def above. Lowering in the Bulgarian DP moves an MWd, D, to the head of its complement. When a clitic has attached to the D in the syntax, Def cannot be lowered independently of the clitic, as this would be a case of lowering an SWd to an MWd, which is prohibited on our approach. The process thus affects the MWd D dominating both [Def] features and Cl, with the result that the possessive clitic and Def have an identical distribution.

6.3 The Lithuanian Reflexive

The behavior of the reflexive morpheme -si in Standard Lithuanian (Senn 1966, Nevis and Joseph 1992) provides an important showcase for the interaction of Local Dislocations at the SWd level. In simple verbs such as (50a), -si appears as a suffix to the complex of verb stem + tense and agreement inflection (50b). In verbs with certain ''preverb'' prefixes, historically derived from adverbs, -si appears not after the verb + inflection but between the prefix and the verb (51b).

(50) a. laikaũ 'I consider, maintain'
     b. laikaũ-si 'I get along'

(51) a. iš-laikaũ 'I preserve, withstand'
     b. iš-si-laikaũ 'I hold my stand'

When two such prefixes appear before the verb, the reflexive morpheme appears between them.

(52) a. pa-žinti 'to know [someone], to recognize'
     b. su-si-pa-žinti 'to become acquainted with'

Furthermore, when a verb is negated by the prefix ne-, the negation prefix appears before any preverbs, and reflexive -si is immediately to its right (examples from Dambriūnas, Klimas, and Schmalstieg 1972).

(53) a. àš lenkiù 'I bend'
     b. àš lenkiúo-si 'I bow' (lit. 'I bend myself')
     c. àš ne-si-lenkiù 'I do not bow'

Local Dislocation. It must be the case that the initial XP in question has raised (e.g., by a topicalization fronting) to sentence-initial position. Whether or not a prosodic operation is needed in addition to movement for cases in which an XP precedes a clitic is an open question.

The generalization emerging from these data is that -*si* appears as a suffix to the first prefix (of a certain type) on the verb; where there is no prefix, -*si* suffixes to the verb + inflection. In terms of Local Dislocation, -*si* has moved from a position as a prefix to the verb complex to second position, where, crucially, the verb + inflection together count as a single ''position.'' Like Latin -*que,* Lithuanian -*si* cannot be positioned between the stem and an inflectional suffix; but unlike -*que,* -*si* can be positioned inside an MWd, namely, between a prefix and a following stem or prefix.

Our analysis of these facts is as follows. We assume that in Lithuanian Pr(everb)s are adjoined to V, and this complex moves to Neg if present, and further to T.

(54) $[_{TP}[Neg_1 + [Pr + Pr + V]_2] + T [_{NegP} t_1 [_{VP} \dots t_2]]]$

We take -*si* to be a dissociated morpheme inserted in Morphology, left-adjoined to the highest segment of the MWd of which v is a member, that is, to the entire [. . . V] + T complex in the cases under discussion.[30] From this position, it undergoes Local Dislocation. As an SWd and not an MWd itself, -*si* trades its relation of left-adjacency to the [. . . V] + T complex for a relation of (right-)adjunction to the left-peripheral SWd within this complex, namely, the leftmost prefix.[31]

(55) $[\text{-}si * [Pr \dots V * T]] \rightarrow [[Pr \oplus si \dots V * T]]$

This procedure gives the correct results whenever the verb has a prefix or is negated. However, since both V and (the lower segment of) T are SWds, we incorrectly predict that -*si* will dislocate to between V and T in a verb with neither negation nor a prefix.

(56) $[\text{-}si * [V * T]] \rightarrow [[V \oplus si * T]]$

The reason this does not happen, evidently, is that V and T form a unit impenetrable to Local Dislocation. This fact reflects another: namely, that in most Indo-European languages suffixes form closer phonological domains with stems than do prefixes: prefixes are more ''loosely'' attached than suffixes, and suffixes show more pronounced allomorphy conditioned by the stem

---

[30] The *si* under discussion here is classified as ''reflexive'' for convenience only. In fact, it appears in a number of different verbal types in Lithuanian, many of which are not actually reflexive. This pattern is typical of voice morphology that does not actually instantiate a syntactic terminal, although we cannot undertake a detailed analysis showing that this is the case here (see Embick 1997). For full distribution of this element in Lithuanian see Geniušienė 1987.

The statement of the process in terms of ''highest MWd'' is intended to cover cases in which the v has combined with Asp but not with T, that is, participles. The pattern of -*si* in these cases parallels its pattern in the domain of tensed verbs.

[31] The position of -*si* is not constant across Lithuanian dialects. Endzelīns (1971) provides data from a dialect in which -*si* is suffixed to the verb + inflection complex even when there is a preverb.

(i) su-praña-si
PR-understand-REFL
'(they) understand each other'

In such dialects -*si* is presumably right-adjoined to (the highest segment of) T⁰ and does not undergo any dislocation. Doubling of reflexives also takes place in certain dialects; Senn (1966:sec. 401) reports that in Lower Lithuanian (*Niederlitauisch*) *s(i)* appears after the verb when negation is present, but after verbal prefixes when these are present; in the latter cases doubling is also possible, with a second *s(i)* appearing after the verb. We do not attempt a full analysis of such forms here, but see section 7.1 for some discussion of doubling.

than do prefixes.[32] Where the suffix in question is T, this closer phonological affinity to the stem is directly at odds with the syntactic derivation, where, by hypothesis, T has attached last during syntactic head raising (54).

To express this restructuring, we propose that T in Lithuanian always undergoes string-vacuous Local Dislocation, adjoining to its left neighbor V.

(57) $[V * T] \rightarrow [[_V \circ V \oplus T]]$

Recall now that Local Dislocation manipulates SWds, where these are defined as the terminal elements within an MWd. Because SWd status is defined before Local Dislocation, if the SWd T^0 ⊕-adjoins to the SWd V^0 as in (57), the result is a single complex SWd and not two SWds. It follows that subsequent Local Dislocation will treat the $[V \oplus T]$ unit as a single "position." This is indeed what we find, since -si dislocates to the left of $[V \oplus T]$ as a whole.

The ordering of the two hypothesized Local Dislocations is not arbitrary: it is predicted by the principle of cyclic application. Since -si is adjoined to T, and T is adjoined to [. . . V], then any dislocation operating over T and V will precede any dislocation operating over -si and T.[33]

7 Interactions and Requirements

7.1 Swedish Determiners and Definiteness Marking

The distribution of definiteness marking in the Swedish DP provides a case study for the interaction of requirements, movement operations, and support processes. There is an extensive literature on the topic; for relevant references, see Börjars 1998.

A definiteness marker in Swedish appears suffixed to the noun, when there is nothing else in the DP.

(58) mus-en
      mouse-DEF
      'the mouse'

Overt determiners cooccur with definiteness marking on nominals when, for instance, an adjective precedes the head noun, resulting in a type of doubling.[34]

---

[32] Evidently the formation of definite adjectives in Old Lithuanian shows a similar pattern with respect to the status of prefixes. An element that was historically pronominal (the *io-stem pronoun) appears between prefixes attached to definite adjectives and the stem, although some doubling of this element in postadjectival position seems to occur as well. See Stang 1966:70 and Zinkevičius 1957:7ff. for discussion.

[33] See Minkoff 1994 for a discussion of cyclicity and Merger in the case of Caribbean Spanish clitics.

[34] A different situation obtains with overt determiners/demonstratives. Certain determiners require the presence of the definite marker, while others are unable to cooccur with it (no syntacticosemantic difference is known to distinguish the determiners that do and do not require "double definiteness"; we thank Anders Holmberg for discussion of this point).

(i) *Swedish: Det and Def*
    a. den gamla mus-en/*mus 'the/that old mouse-DEF'
    b. den mus-en/*mus 'that mouse'
    c. den här mus-en/*mus 'this mouse'
    d. denna mus/*mus-en 'this mouse'

(59) den gamla mus-en
     the old   mouse-DEF
     'the old mouse'

The apparent ''doubling,'' in which an overt determiner *den* cooccurs with a definiteness-marked noun, is obligatory. Structurally, the head noun is crucially at issue here. That is, it is not simply the case that a [def] element is phonologically associated with the right of an entire DP, as for instance the English possessive is (e.g., [*the guy on the left*]*'s dog*). This is clear in examples with postnominal modification (Börjars 1998).

(60) Gris-en med lang svans grymtade.
     pig-DEF with long tail   grunted
     'The pig with the long tail grunted.'

Thus, there is always definiteness marking on the head noun, whether or not prenominal modifiers appear. The fact that definiteness marking cooccurs with a number of overt determiners suggests that the definiteness marker on nouns in such cases is a dissociated morpheme rather than the realization of D, serving as a sort of agreement. Notice that the alternative to this is to complicate syntax unnecessarily, holding for instance that Swedish has two distinct D heads under certain circumstances but not others (Kester (1992) makes such a proposal; see the critique in Delsing 1993).

In terms of where the requirements responsible for the attested pattern are localized, Swedish provides an instance in which two elements, $D_{[def]}$ and the head N, force certain conditions to be met. As noted above, a head N in a definite DP in Swedish always shows marking for definiteness. Our interpretation of this is as follows. First, Swedish has a condition to the effect that N in the context of $D_{[def]}$ must be marked morphologically for definiteness in a kind of concord. This amounts to a well-formedness condition on N. At the same time there is also a morphophonological requirement on the syntactically projected $D_{[def]}$: it must have a host. Thus, when $D_{[def]}$ and the head N cannot be put together, *den* instantiates the D position (see Santelmann 1992). The two requirements are stated as follows:

(61) *Requirements (imposed at PF)*
     a. The head N must be marked with definiteness when D is [def].
     b. $D_{[def]}$ must have a host.

It is possible for the overt determiner to appear with a definiteness-marked noun without an adjective, as in *den mus-en*; the interpretation is that of a demonstrative.

A further quirk involves restrictive relative clauses. Börjars (1998) reports optionality here: either a suffixed noun or an overt determiner with a suffixed noun (with nonrestrictive relatives only the suffixed-noun version is possible).

(i) a. mus-en   som inte . . .
      mouse-DEF that not
   b. den mus   som inte . . .
      DET mouse that not

Notice that in requirement (61a) the condition may be triggered either by $D_{[def]}$ itself or by virtue of the presence of one of the other demonstrative elements noted above that require definiteness.

These requirements are directly affected by what has taken place in the syntactic derivation. In the case in which nouns without preceding modifiers appear suffixed with the definiteness marker, the simplest analysis is to invoke head movement to D; in this we follow Taraldsen (1990) and Delsing (1993). That is:[35]

(62) N moves to D if possible.

When N-to-D movement occurs, each of the requirements in (61) is satisfied. The N is marked with definiteness, and $D_{[def]}$ has a host, the incorporated N. At the same time, however, (62) is restricted to N and will not occur if N is dominated by a modifier.[36] When syntactic movement does not occur, the two requirements in (61) have not been met, and further PF processes must apply. In such cases we take the output of syntax for an example like (59) to be (63), where A and N Roots are inserted for clarity.

(63) *Output of syntax*

---
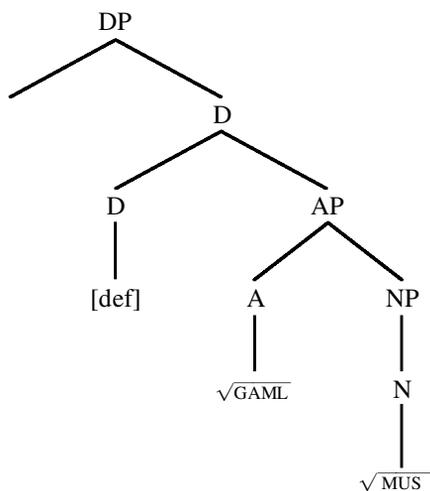
[35] In line with a specific treatment of derivational morphology within Distributed Morphology, we take *N* here as shorthand for a functional head n, analogue of the v of the verbal system (see Marantz 2000).

[36] Sandström and Holmberg (1994) note an interesting pattern in northern Swedish, in which adjectives and nouns together in a type of compound structure appear suffixed as a whole with the definiteness marker: for example, compare northern Swedish *gamm-svart-kjol-n* 'old-black-skirt-DEF' with Standard Swedish *den gamla svarta kjol-en*.

(64) *Processes*

```
                         DP
                        /  \
                         \   \
                          \   D
                           \ /  \
                            /     \
                           D       AP
                          / \      / \
                         /   \    /   \
                        d-  [def] A    NP
                                 |      |
                                 |      |
                               √GAML    N
                                       / \
                                      /   \
                                   √ MUS  [def]
```
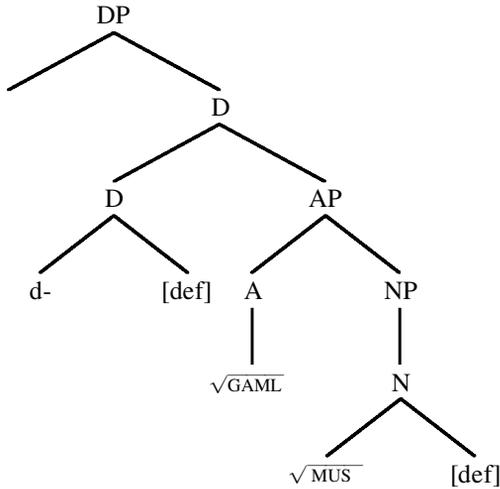
As we discussed at the outset, the assignment of dissociated morphemes occurs at PF in accordance with language-specific requirements. In the present case requirement (61) triggers the assignment of a dissociated morpheme to N, in what could be viewed as a type of concord. That is, much as features of, say, subject DPs are copied onto Agr nodes on T for subject-verb agreement, or much as features in a DP like [number] appear on A nodes within a DP, Swedish has a requirement to the effect that Ns in [def] environments reflect the [def] feature via concord. The process that brings about this ''agreement'' is as follows:

(65) Assign [def] to the head N in a DP with the [def] property.

This process takes place in PF, that is, after syntax. Moreover, it applies only when necessary. In cases in which N moves to D, syntax will output a structure in which [N Def] are a unit. This will meet requirement (61a). Thus, (65) will not apply. Syntax therefore can bleed the application of the PF process. Syntax may also satisfy the second requirement, (61b). The other component of the Swedish determiner system involves the support of stranded $D_{[def]}$, requirement (61b). As noted above, we follow Santelmann (1992) in regarding this as a case of support by *d-* of stranded $D_{[def]}$. Once again, this process may be bled if N-to-D movement has occurred in syntax.

The first point illustrated by this case study concerns the multiple requirements that may be involved in PF well-formedness, and their interaction with the syntactic derivation. Because of the existence of requirement (61a) in Swedish morphology, we find the doubling of a head that is relevant to LF interpretation; but there is no doubling at the syntacticosemantic level, because the feature [def] is only copied in PF. The interaction of requirements here also paves the way for our study of the complicated array of syntactic derivations, morphological and morphosyntactic requirements, rescue operations, and Lowering movement that must be acknowledged in the English verbal system, the topic of section 7.2.

The second point is that our analysis captures the essential properties of the Swedish DP without introducing a complication into the syntactic component. The importance of this position is clear when we look at additional patterns from the Scandinavian languages. The situation in Swedish forms a minimal contrast with the distribution of definiteness marking in Danish. The article in Danish (definite or indefinite) occurs in complementary distribution with all overt determiners when it appears suffixed to a noun.

(66) *Danish*
   a.   mand-en 'man-DEF'
   b.   den unge mand
   c.   *den unge mand-en 'the young man'

We take the difference between Danish and Swedish to be localized in Morphology. Specifically, Danish has requirement (61b), but not (61a). It therefore requires $D_{[def]}$ to be supported, but it crucially does not require the type of agreement that results in the doubling of [def] in Swedish. In terms of our analysis, Swedish and Danish are quite similar syntactically; the difference between them is found at PF. The alternative to this, which is to say that Swedish and Danish differ significantly in terms of where D is located in the DP and in terms of the types of movement operations they allow, complicates the syntax unnecessarily in comparison with our treatment, which analyzes the phenomena as arising from the independent requirements of syntax and PF.

7.2 T and v in English

Earlier we noted, following previous treatments, that T attaches to V in English by Lowering. We now turn to a further question, concerning the nature of the requirements surrounding Lowering in English, concentrating in particular on the interaction of Lowering with *do*-support.

The first point we consider is one discussed by Bobaljik (1995): the Lowering of T to V treats intervening adverbs as invisible.[37] In order to establish this point clearly, however, we must address a specific point concerning the relative positions of T, V, and intervening adverbs. The distribution of certain adverbs with respect to TP and VP varies, as shown by the following examples:

(67) a. John always has read a lot of books.
     b. John has always read a lot of books.

In cases in which *always* is supposed to be invisible for Lowering, it cannot be known

---

[37] Bobaljik argues that *adjacency* is relevant for the process that we treat as Lowering here. The major difference between the two approaches is that by defining Lowering structurally, we have a clear reason why adverbs do not interfere with the process. Lowering relates T with the head that it immediately dominates, v. Other material that intervenes linearly between these two positions simply does not count for the process, unless there is additional syntactic structure (i.e., NegP). Note that this difference holds only if we assume that adverbs do not always appear in the specifier position of accompanying functional heads. If this were the case, it would be necessary to stipulate a reason why the heads in question do not count for the purposes of Lowering.

without further argument whether it is adjoined to TP instead of VP. That is, the structure of (68a) with Lowering might be that in (68b).

(68) a. John always reads.
    b. John [$_{TP}$ always [$_{TP}$ T [$_{VP}$ reads]]]

We believe that the invisibility of adverbs for Lowering can be established by adverb phrases that can appear only on VP, not on TP, and that do not block Lowering.[38] Taking the presence of an overt auxiliary to show the position of T, the following examples illustrate this pattern with the adverb *completely*.

(69) a.   John has *completely* destroyed the opposition.
    b. *?John *completely* has destroyed the opposition.
    c.   John *t completely* destroy-ed the opposition.

Lowering in English is driven by a morphological requirement on finite T. Structurally, the invisibility of adverbs is expected given a Lowering analysis of T-to-V movement. To this point, then, the English system is unremarkable. However, examples involving constituent negation show that the relationship between Lowering and *do*-support in English is more complicated than the analysis above would indicate.[39] Consider first the following examples with constituent negation; sentential negation is provided in (70b) for clarity.

(70) a. John can always not agree.
    b. John can't always not agree.

The relevant examples show that in cases without the modal, there is no grammatical declarative version, either with Lowering or with *do*-support.

(71) a. *John always not agrees.
    b. *John does always not agree.

The generalizations arising from these examples are that Lowering is impossible and that *do*-support fails as well if T remains in situ. For instance, when T-to-C movement occurs, it is in fact possible to realize T with *do*.

(72) Did he always not agree?

What this shows is that when T is removed from the structural domain in which Lowering occurs, *do*-support is not blocked. Similarly, when Lowering is precluded by the presence of normal negation, *do*-support is once again possible.

(73) He didn't always not agree.

These examples are crucial for understanding the factors that interact in English to yield *do*-support phenomena. Before this can be seen, however, the basic elements of *do*-support must be presented. At first glance this appears to be a morphophonological rescue strategy, that is, an

---

[38] Additional diachronic evidence for the invisibility is presented in Kroch 1989.
[39] We thank Tony Kroch for bringing these cases to our attention.

operation aimed solely at resolving the dependency of an otherwise stranded T. Two considerations suggest that this is not correct. The first is based on the examples with constituent negation above. They show that *do*-support cannot apply when constituent negation is present. If *do*-support were simply the insertion of a dummy stem in Morphology, this fact would be entirely unexplained; there is no reason why the presence of constituent negation should preclude the insertion of *do*. The second argument is based upon the distribution of features and feature types in the grammar. We assume that *do,* as a light verb, is essentially the default Spell-Out of the head v. Viewed from this perspective, in order for *do*-support to take place, there must be a position into which the forms of *do* are inserted, that is, a v; however, the cases in which *do*-support applies in English are those in which v cannot combine with T. Thus, *do*-support must involve two steps: first, the addition of v to T; and, second, the realization of this v as *do.* This is the basis for the second argument against treating *do*-support as purely morphological. The head v is a syntacticosemantic object. On the assumption that Morphology interprets the output of syntax, v is simply not the type of object that Morphology can insert. A consequence of Late Insertion called *Feature Disjointness* in Embick 1997, 2000, is that purely morphological/phonological features are not present in syntax, and syntacticosemantic features are not introduced in Morphology. Reintroducing a v in Morphology, as is required by the morphological support analysis of dummy *do,* contradicts this basic and architecturally motivated position concerning features in the grammar.[40]

The conclusion drawn from these arguments is that *do*-support must be essentially syntactic. We therefore propose to treat *do*-support as occurring in syntax; that is, there is a specific structural environment in which T is provided with v in syntax.[41] The motivation for this is a syntactic locality condition governing the relationship between T and v.

(74) T must be in an immediately local relationship with v.

Here we take *immediately local* to mean that T must either have a vP sister or be in an MWd with v. This amounts to a strict selectional requirement on T, to the effect that it must be local to v. So, for instance, when auxiliaries move to T, the requirement is satisfied because T is in a complex head with v. This is a manifestation of a more general principle according to which a requirement of this type can be met by a head X, or the XP projected from X, in a theory in which notions like ''X'' and ''XP'' are derivative of structure.

If at any stage in the derivation the requirement in (74) cannot be met, a syntactic process must occur to meet the locality condition on T.[42]

(75) v is *syntactically* merged onto T when T does not have a vP complement.

This covers two cases: simple negation, in which T immediately dominates NegP, or more precisely ΣP, in the sense of Laka (1990); and T-to-C movement environments, in which T has

---

[40] For potential complications, see the discussion in Embick 2000.

[41] The case of support with *d-* in Swedish could also be examined in greater detail in light of our claim that some support phenomena are syntactic.

[42] In cases in which auxiliaries move to T via Neg, as in *John isn't a chef,* T's requirement would have to be met by head movement rather than by *do*-support.

moved. In the former case the head Σ actually hosts either affirmative/emphatic features or [neg], in which case it is referred to as NegP. In either case, however, *do*-support is found. Negation is illustrated above; with the emphatic Σ *do*-support is also obligatory. We take *so* in examples like the following to be realized in the Σ projection:

(76) a. John did eat the apples. (emphatic)
     b. John did SO eat the apples.
     c. *John SO ate the apples.

When there is no ΣP, or no T-to-C movement, there is no *do*-support. The combination of T and v then comes about in Morphology, via Lowering. The derivation is sketched in trees (77) and (78). When T is not in an immediately local relationship with v, the requirement in (74) must be syntactically satisfied by merging a v with T.[43]

(77) *T does not dominate v: requirement of T not met*
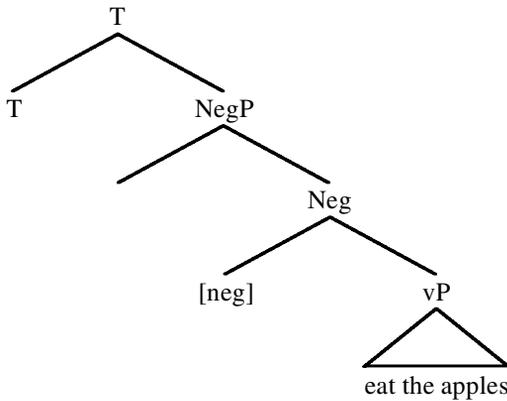
(78) Do-*support in the syntax: default v satisfies requirement*

---
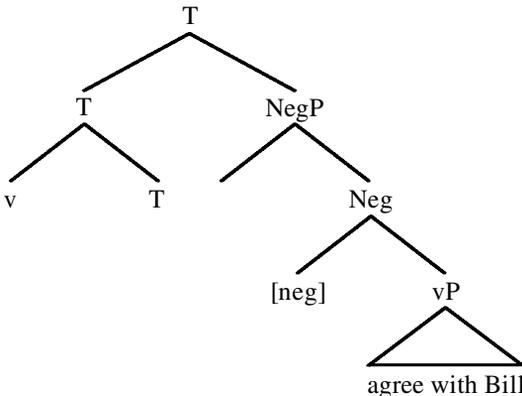
[43] Stated derivationally, in cases in which there is T-to-C movement, or ΣP, but there is no auxiliary verb or v attached to T, the derivation crashes.

The remaining complication to this picture concerns the ungrammaticality of both *do*-support and Lowering in sentences with constituent negation. We propose to account for this case of ineffability in structural terms. In outline, the idea is that the syntactic requirement of T is met when constituent negation modifies the vP; that is, T continues to dominate the vP, unlike what happens when a full NegP is present. Following the (licit) syntactic derivation, Morphology is then provided with a case in which Lowering must occur to place T on v. However, when constituent negation is present, the structural head of T's complement is no longer v; rather, it is Neg, headed by constituent negation. The postsyntactic derivation cannot yield an acceptable outcome via Lowering in this case. And because *do*-support is syntactic, as demonstrated above, there is no morphophonological rescue strategy.

Constituent negation is a head adjoined to a phrase in the examples we are considering. In general, we take constituent negation to be essentially the same [neg] feature that is found with normal negation. In the ''normal'' case [neg] is a feature on Σ, and the ΣP is referred to as NegP. Beyond this, however, Neg can adjoin to other syntactic elements. When Neg is adjoined to some phrase (or head; see below) and does not head Σ, it is called *constituent negation*. But despite the difference in syntactic distribution, the same feature underlies so-called normal negation.[44]

A further question regards what precisely it means for constituent negation to be a head adjoined to a phrase. We will explicate this within a version of bare phrase structure (Chomsky 1994). When Neg is adjoined to a phrase, it does not project further. Thus, it is potentially simultaneously maximal and minimal, a possibility discussed in some detail in Chomsky 1995. In order to show how this structure for constituent negation interacts with Lowering, we must first examine the nature of the Lowering operation in greater detail. On the definition we have been employing, Lowering relates a head to the head of its complement. In the cases we have examined in previous sections, the XP into which Lowering occurs is headed by an MWd X, as in (79).

(79) $[_{XP}$ (ZP) $[_X$ X (YP)]]

When constituent negation occurs, Neg is adjoined to the vP. As noted, as a head adjoined to a phrase it has the properties of both a head and a phrase. The fact that it counts as a minimal projection (i.e., an X^0) in the relevant configuration is crucial. The vP that is the complement of the T to be lowered has the following structure:

(80) $[_{vP}$ DP $[_{vP}$ Neg $[_v$ v $\sqrt{}$P]]]

In the typical case, illustrated in (79), the closest MWd of the XP is identical to the syntactic

---

[44] This accounts for the semantic similarities of the two and for the fact that both ''normal'' and ''constituent'' negation can license negative polarity items, given the correct structure.

head of the projection, X. By *closest* MWd here, we mean the structurally highest MWd attached within the complement of the Lowering head. In (79) and (80) no head Y within ZP or DP will be structurally close in this sense, as it is embedded within an adjoined projection that is (unambiguously) phrasal.[45] The intuition we will pursue is that Lowering in fact targets not the head of its complement, but the closest MWd (as defined above) of the complement. Under normal circumstances "head of complement" and "closest MWd of complement" will pick out the same object, as in (79). In (80), however, there is an MWd Neg that is hierarchically higher than the head v, such that the MWd targeted by Lowering (Neg) and the MWd heading the projection (v) are different heads. In particular, with constituent Neg adjoined to vP the closest MWd in the complement of T is Neg itself, and this prohibits successful Lowering. We illustrate this analysis in greater detail in comparison with adverbs like *completely*.

In the cases under consideration, Neg is adjoined to the vP. However, it is not adjoined as an Adverb Phrase (AdvP) would be. AdvPs do not block Lowering or lead to a crash. This is structural. Adverbs such as *completely* appear in AdvPs that are adjoined to the vP (the subject DP is omitted here for simplicity).

(81) *Invisibility of the adverb*
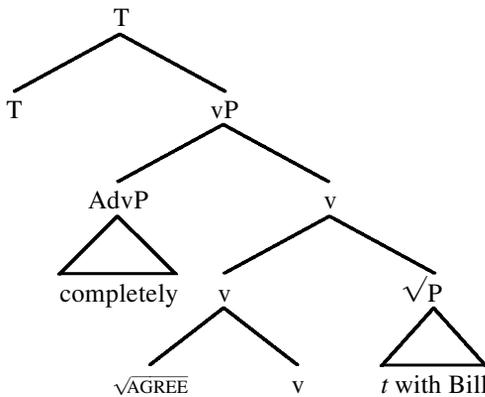
In this case the structural head of T's complement is v, and Lowering applies to yield the grammatical outcome. In the case of constituent negation, it is simply the head containing [neg] that is adjoined to the phrase. Tree (82) shows [neg]'s adjunction to the vP.

---

[45] This type of restriction parallels the case of head movement, which allows movement to an immediately dominating head, not for example movement from an adjoined XP to a higher head outside that XP.

(82) *Constituent negation: syntactic requirement of T met*

```
                        T
                 _____|_____
                T             vP
                        _____|_____
                       DP             v
                       /\        _____|_____
                     John    [neg]          v
                              |         _____|_____
                             not       v          √P
                                    ___|___        /\
                                   √AGREE  v    t with Bill
```
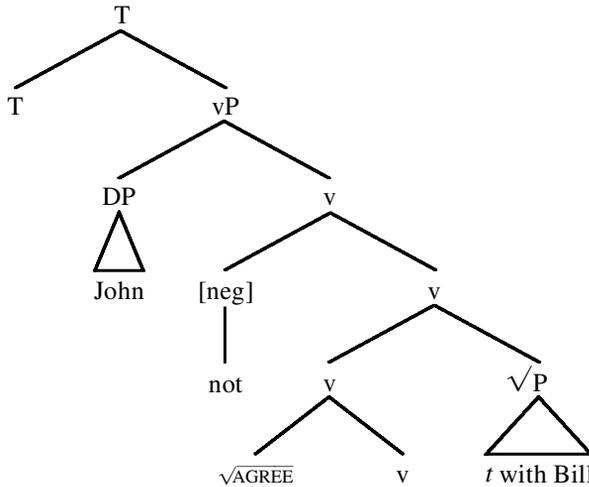
Unlike in (78), in which T has a NegP complement and thus has a default v merged with it, in (82) T still has a vP complement. Thus, *do*-support (i.e., merging default v with T) is not triggered. The structure is thus legitimate and is shipped to the PF component as is. At PF, T is not joined with v, with the result that Lowering must apply. In this case, however, the target visible for Lowering is Neg, not v, as Neg is the closest MWd of T's complement. Thus, Lowering cannot apply; or, if it applies blindly, it yields the morphologically illegitimate object Neg-T. On either scenario the result is ungrammatical. In this way the analysis captures the intuition that the ineffability of these examples with constituent negation follows from the distinct requirements of two modules of the grammar.[46]

Part of the solution to the constituent negation problem involves the idea that this element is a head adjoined to a *phrase.* Our account thus predicts that the attachment of a Neg element into the MWd in which the verb appears should not create a problem. As the facts show, the cases with constituent negation and the structural anomaly that it induces contrast sharply with examples involving prefixes like *dis-.*

(83) John *t* quickly dis-agree-d with Bill.

This follows directly from structural differences between constituent negation and *dis-*. We take the latter to attach directly to the Root, which, in the verbal example, then moves to v as a unit as shown in (84).[47]

---

[46] An alternative to the treatment proposed in the text is found in Flagg 2000. The analysis ties the crash in question directly to the effects of phases in a cyclic derivation, but is similar in other respects to our treatment. While the structure-based and phase-based treatments make different predictions, we will not explore these differences here.

   Ultimately, the predictive power of the approach developed in the text will have to be examined with further case studies of Lowering.

[47] We indicate the features underlying *dis-* here as X, as they are not identical to Neg.

(84) *dis-agree*

```
                    v
                   / \
                  /   \
               √P      v
              /  \
             /    \
            X     √P
            |      |
            |      |
           dis   √AGREE
```
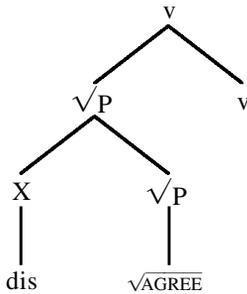
In this structure the head of T's complement is the (internally complex) v, which is the target for Lowering. The grammaticality of (83) follows, because the target of T is a legitimate morphological host for it.[48]

The case studies presented in this section highlight the interaction of syntactic and postsyntactic movement processes with support phenomena, and illustrate the combination of syntactic and morphological requirements underlying the Swedish determiner system and the English tense system. In particular, we provided an account of *do*-support according to which this process is syntactic, allowing the ineffability found in cases with constituent negation to be accounted for directly.

8 Conclusions

This article is intended as a contribution to a general theory of the Morphology component, which provides phonological expression to abstract syntactic structures. We have assumed that Morphology has recourse to a restricted range of readjustment operations modifying syntactic structures, where such readjustments in some cases lead to surface effects commonly termed ''morphosyntactic mismatches.'' Included in these readjustments is a mechanism for movement, identified here with Morphological Merger as introduced by Marantz (1988). Our proposals, based on case studies from a range of languages, make explicit these operations and the primitives of constituent structure that they manipulate, substantially extending earlier formulations of Merger.

First, we have identified two species of Merger, *Lowering* and *Local Dislocation,* and have shown that where the conditions on the operation of the Merger make reference to particular Vocabulary items, the operation is purely local, operating under string adjacency only. This prediction, the *Local Dislocation Hypothesis,* follows automatically from the architecture of gram-

---

[48] Something similar appears to be marginally possible for some speakers, with constituent negation replacing *dis-*. The affixation of Neg inside the MWd of the V can be diagnosed morphophonologically.

    (i) a. nót agrée
       b. nót agrèe

In (ia) *not* is attached to the vP, while in (ib) it is attached to the MWd containing the verb, much as is *dis-*; the phonology is more characteristic of a compound in (ib) than in (ia). In (ib) Neg attaches very low, perhaps in the same way that the feature realized by *dis-* is adjoined to the Root.

mar proposed here and, we believe, represents a novel empirical observation that alternative models of grammar cannot encode without stipulation. Second, we have formally defined the categories *morphological word* and *subword* as the primitive constituents of Morphological movement operations. Further constraints on potential syntax/morphology mismatches are defined in terms of these fundamental categories. The distinction between *clitics* and *affixes,* on the other hand, has no place in our non-Lexicalist approach: we have shown that this cumbersome artifact of Lexicalism obscures rather than clarifies basic aspects of the syntax-morphology interface. Third, we illustrated the interaction of postsyntactic requirements with syntactic movement and concord phenomena. In clarifying how multiple requirements across two distinct components of the grammar can result in complex surface patterns, we have also introduced a novel treatment of English *do*-support.

More generally, the interactions that we have analyzed highlight how our approach differs from other attempts to characterize syntax and its relationship to morphology. In each of the case studies presented above the analysis of morphological operations relies crucially on a syntactic structure. The intimate connection between syntax and morphology that underlies our approach is a basic assumption of the Distributed Morphology research program. The well-formedness of any particular surface string results from diverse requirements that are distributed across different parts of the grammar. In this way we reject the view that morphology is insulated from syntax or can be understood without reference to the grammar as a whole. Our proposals instead provide a specific framework in which deviations from a direct reflection of syntax in morphology can be isolated and understood.

References

Abney, Steven. 1987. The English noun phrase in its sentential aspect. Doctoral dissertation, MIT, Cambridge, Mass.

Arnaudova, Olga. 1998. Demonstratives and the structure of the Bulgarian DP. In *Papers from the Second Conference on Formal Approaches to South Slavic Languages,* 1–32. Trondheim Working Papers in Linguistics 31. Department of Linguistics, University of Trondheim.

Baltin, Mark. 1991. Head movement and Logical Form. *Linguistic Inquiry* 22:225–250.

Bobaljik, Jonathan David. 1994. What does adjacency do? In *MIT working papers in linguistics 21: The morphology-syntax connection,* 1–32. MITWPL, Department of Linguistics and Philosophy, MIT, Cambridge, Mass.

Bobaljik, Jonathan David. 1995. Morphosyntax: On the syntax of verbal inflection. Doctoral dissertation, MIT, Cambridge, Mass.

Bonet, Eulàlia. 1991. Morphology after syntax: Pronominal clitics in Romance. Doctoral dissertation, MIT, Cambridge, Mass.

Börjars, Kersti. 1998. *Feature distribution in Swedish noun phrases.* Oxford: Blackwell.

Caink, Andrew. 2000. In favour of a ''clitic cluster'' in the Bulgarian and Macedonian DP. In *Papers from the Third Conference on Formal Approaches to South Slavic and Balkan Languages,* 170–182. Trondheim Working Papers in Linguistics 34. Department of Linguistics, University of Trondheim.

Cardinaletti, Anna. 1998. On the deficient/strong opposition in possessive systems. In *Possessors, predicates and movement in the Determiner Phrase,* ed. Artemis Alexiadou and Chris Wilder, 17–54. Amsterdam: John Benjamins.

Chomsky, Noam. 1994. Bare phrase structure. MIT Occasional Papers in Linguistics 5. MITWPL, Department of Linguistics and Philosophy, MIT, Cambridge, Mass. [Published in *Government and Binding Theory and the Minimalist Program,* ed. Gert Webelhuth, 383–439. Oxford: Blackwell (1995).]

Chomsky, Noam. 1995. *The Minimalist Program.* Cambridge, Mass.: MIT Press.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by step: Essays on minimalist syntax in honor of Howard Lasnik,* ed. Roger Martin, David Michaels, and Juan Uriagereka, 89–155. Cambridge, Mass.: MIT Press. [Also available as MIT Occasional Papers in Linguistics 15, MITWPL, Department of Linguistics and Philosophy, MIT, Cambridge, Mass.]

Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A life in language,* ed. Michael Kenstowicz, 1–52. Cambridge, Mass.: MIT Press.

Dambriūnas, Leonardas, Antanas Klimas, and William R. Schmalstieg. 1972. *Introduction to modern Lithuanian.* New York: Franciscan Fathers.

Delsing, Lars-Olof. 1993. The internal structure of noun phrases in Scandinavian languages. Doctoral dissertation, University of Lund.

Elson, Mark. 1976. The definite article in Bulgarian and Macedonian. *Slavic and East European Journal* 20:273–279.

Embick, David. 1995. ''Mobile inflections'' in Polish. In *NELS 25,* 127–142. GLSA, University of Massachusetts, Amherst.

Embick, David. 1997. Voice and the interfaces of syntax. Doctoral dissertation, University of Pennsylvania, Philadelphia.

Embick, David. 2000. Features, syntax, and categories in the Latin perfect. *Linguistic Inquiry* 31:185–230.

Embick, David, and Roumyana Izvorski. 1996. Participle-auxiliary word-orders in Slavic. In *Formal Approaches to Slavic Linguistics: The Cornell Meeting,* 210–239. Michigan Slavic Publications, University of Michigan, Ann Arbor.

Emonds, Joseph. 1978. The verbal complex V′-V in French. *Linguistic Inquiry* 9:151–175.

Emonds, Joseph. 1987. The Invisible Category Principle. *Linguistic Inquiry* 18:613–632.

Endzelīns, Janis. 1971. *Comparative phonology and morphology of the Baltic languages.* Trans. by William R. Schmalstieg and Benjamiņš Jēgers. The Hague: Mouton.

Ernout, Alfred, and François Thomas. 1951. *Syntaxe latine.* Paris: Klincksieck.

Flagg, Elissa. 2000. Aspect and the syntax of English imperatives. Generals paper, MIT, Cambridge, Mass.

Franks, Steven. 2001. The internal structure of Slavic noun phrases, with special reference to Bulgarian. Ms., Indiana University, Bloomington.

Franks, Steven, and Tracy Holloway King. 2000. *A handbook of Slavic clitics.* Oxford: Oxford University Press.

Geniušienė, Emma. 1987. *The typology of reflexives.* Berlin: Mouton de Gruyter.

Halle, Morris. 1990. An approach to morphology. In *NELS 20,* 150–184. GLSA, University of Massachusetts, Amherst.

Halle, Morris. 1997. Distributed Morphology: Impoverishment and fission. In *MIT working papers in linguistics 30: PF—Papers at the interface,* 425–449. MITWPL, Department of Linguistics and Philosophy, MIT, Cambridge, Mass.

Halle, Morris, and Alec Marantz. 1993. Distributed Morphology and the pieces of inflection. In *The view from Building 20: Essays in linguistics in honor of Sylvain Bromberger,* ed. Kenneth Hale and Samuel Jay Keyser, 111–176. Cambridge, Mass.: MIT Press.

Halpern, Aaron. 1992a. The Balkan definite article and pseudo-second position. In *Proceedings of the Eighteenth Annual Meeting of the Berkeley Linguistics Society,* 338–349. Berkeley Linguistics Society, University of California, Berkeley.

Halpern, Aaron. 1992b. Topics in the placement and morphology of clitics. Doctoral dissertation, Stanford University, Stanford, Calif.

Harley, Heidi, and Rolf Noyer. 1998. Licensing in the non-Lexicalist lexicon: Nominalizations, Vocabulary items, and the encyclopaedia. In *MIT working papers in linguistics 32: Proceedings of the Penn/ MIT Roundtable on Argument Structure and Aspect,* 119–138. MITWPL, Department of Linguistics and Philosophy, MIT, Cambridge, Mass.

Harley, Heidi, and Rolf Noyer. 1999. Distributed Morphology. *Glot International* 4:3–9.

Harris, James. 1991. The exponence of gender in Spanish. *Linguistic Inquiry* 22:27–62.

Hayes, Bruce. 1990. Precompiled phrasal phonology. In *The syntax-phonology connection,* ed. Sharon Inkelas and Draga Zec, 85–108. Chicago: University of Chicago Press.

Kálmán, Béla. 1965. *Vogul chrestomathy.* Bloomington: Indiana University Press.

Kester, Ellen-Petra. 1992. Adjectival inflection and dummy affixation in Germanic and Romance languages. In *Papers from the Workshop on the Scandinavian Noun Phrase.* University of Umea.

Klavans, Judith. 1985. The independence of syntax and phonology in cliticization. *Language* 61:95–120.

Klavans, Judith. 1995. *On clitics and cliticization.* New York: Garland.

Kroch, Anthony. 1989. Function and grammar in the history of English: Periphrastic *do.* In *Language change and variation,* ed. Ralph W. Fasold and Deborah Schiffrin, 133–172. Philadelphia: John Benjamins.

Laka, Itziar. 1990. Negation in syntax: On the nature of functional categories and projections. Doctoral dissertation, MIT, Cambridge, Mass.

Leumann, Manu, Johann Baptist Hofmann, and Anton Szantyr. 1963. *Lateinische Grammatik auf der Grundlage des Werkes von Friedrich Stolz und Joseph Hermann Schmalz.* 1. Band, *Lateinische Laut- und Formenlehre.* Munich: Beck'sche Verlagsbuchhandlung.

Marantz, Alec. 1984. *On the nature of grammatical relations.* Cambridge, Mass.: MIT Press.

Marantz, Alec. 1988. Clitics, Morphological Merger, and the mapping to phonological structure. In *Theoretical morphology,* ed. Michael Hammond and Michael Noonan, 253–270. San Diego, Calif.: Academic Press.

Marantz, Alec. 1992. Case and licensing. In *ESCOL '91,* 234–253. CLC Publications, Cornell University, Ithaca, N.Y.

Marantz, Alec. 1995. A late note on Late Insertion. In *Explorations in generative grammar,* ed. Young-Sun Kim, 357–368. Seoul: Hankuk Publishing Co.

Marantz, Alec. 2000. Reconstruction of the lexical domain with a single generative engine. Handout of a talk presented at MIT, Cambridge, Mass.

Minkoff, Seth. 1994. Plurality, clitics, and Morphological Merger. In *MIT working papers in linguistics 20: Papers from the 5th Student Conference in Linguistics,* 177–192. MITWPL, Department of Linguistics and Philosophy, MIT, Cambridge, Mass.

Nevis, Joel A., and Brian D. Joseph. 1992. Wackernagel affixes: Evidence from Balto-Slavic. *Yearbook of Morphology* 3:93–111.

Noyer, Rolf. 1992. Features, positions, and affixes in autonomous morphological structure. Doctoral dissertation, MIT, Cambridge, Mass.

Noyer, Rolf. 1997. *Features, positions, and affixes in autonomous morphological structure.* New York: Garland.

Noyer, Rolf. To appear. Clitic sequences in Nunggubuyu and PF convergence. *Natural Language & Linguistic Theory.*

Perlmutter, David. 1971. *Deep and Surface Structure constraints in syntax.* New York: Holt, Rinehart and Winston.

Pesetsky, David. 1995. *Zero syntax: Experiencers and cascades.* Cambridge, Mass.: MIT Press.

Pollock, Jean-Yves. 1989. Verb movement, Universal Grammar, and the structure of IP. *Linguistic Inquiry* 20:365–424.

Sadock, Jerrold. 1991. *Autolexical Syntax: A theory of parallel grammatical representations.* Chicago: University of Chicago Press.

Sandström, Görel, and Anders Holmberg. 1994. Adjective incorporation and the syntax of the Scandinavian noun phrase. In *Reports from the Department of General Linguistics, University of Umea, 35,* 81–97. University of Umea.

Santelmann, Lynn. 1992. *Den*-support: An analysis of double determiners in Swedish. In *Papers from the Workshop on the Scandinavian Noun Phrase,* 100–118. University of Umea.

Scatton, Ernest. 1980. The shape of the Bulgarian definite article. In *Morphosyntax in Slavic,* ed. Catherine Chvany and Richard Brecht, 204–211. Columbus, Ohio: Slavica.

Schoorlemmer, Martin. 1998. Possessors, articles, and definiteness. In *Possessors, predicates and movement in the Determiner Phrase,* ed. Artemis Alexiadou and Chris Wilder, 55–86. Amsterdam: John Benjamins.

Schütze, Carson. 1994. Serbo-Croatian second position clitic placement and the phonology-syntax interface. In *MIT working papers in linguistics 21: Papers on phonology and morphology,* 373–473. MITWPL, Department of Linguistics and Philosophy, MIT, Cambridge, Mass.

Senn, Alfred. 1966. *Handbuch der litauischen Sprache.* Heidelberg: Carl Winters Universitätsverlag.

Sommer, Ferdinand. 1914. *Handbuch der lateinischen Laut- und Formenlehre.* Heidelberg: Carl Winters Universitätsbuchhandlung.

Sproat, Richard. 1985. On deriving the lexicon. Doctoral dissertation, MIT, Cambridge, Mass.

Stairs, Emily F., and Barbara E. Hollenbach. 1981. Gramática huave. In *Diccionario huave de San Mateo del Mar,* ed. G. A. S. Kreger and Emily F. Stairs, 283–391. Mexico City: SIL.

Stang, Christian S. 1966. *Vergleichende Grammatik der baltischen Sprache.* Oslo: Universitetsforlaget.

Taraldsen, Knut Tarald. 1990. D-projections and N-projections in Norwegian. In *Grammar in progress: GLOW essays for Henk van Riemsdijk,* ed. Joan Mascaró and Marina Nespor, 419–431. Dordrecht: Foris.

Tomić, Olga Mišeska. 1996. The Balkan Slavic nominal clitics. In *Approaching second: Second position clitics and related phenomena,* ed. Aaron Halpern and Arnold Zwicky, 511–536. Stanford, Calif.: CSLI Publications.

Zinkevičius, Zigmas. 1957. *Lietuvių kalbos įvardžiuotinių būdvardžių bruožai.* Vilnius: Valstybinė politinės ir mokslinės literatūros leidykla.

Zwicky, Arnold, and Geoffrey K. Pullum. 1983. Cliticization vs. inflection: English *n't. Language* 59: 502–513.

Department of Linguistics
619 Williams Hall
University of Pennsylvania
Philadelphia, Pennsylvania 19104–6305

embick@ling.upenn.edu
rnoyer@ling.upenn.edu