

Structure, Architecture, and Blocking

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Embick and Marantz (2008) present an analysis of the Danish definiteness alternation involving a postsyntactic rule of Local Dislocation (an operation sensitive to linear adjacency but not hierarchical structure). Examination of a fuller range of data reveals that the alternation cannot be determined strictly in terms of adjacency; rather, it depends on the structural relation between the D and the N. We propose to treat the alternation as an instance of conditioned allomorphy, the suffixal form appearing when D is sister to a minimal N, and the free article elsewhere. This alternation is, then, a case of “blocking” in the sense accepted by Embick and Marantz: the result of competition between Vocabulary items for the expression of a morpheme. Assuming that the condition for wordhood is being a complex head, we argue that the distinction between free and bound morphemes, and whether bound morphemes are prefixes or suffixes, must be encoded in the Vocabulary items spelling out the morphemes.

Keywords: allomorphy, Bare Phrase Structure, blocking, Danish, definiteness, Distributed Morphology, linearization, wordhood

1 Introduction

Poser (1992) describes a set of alternations between analytic and synthetic expression of a grammatical category, where “the acceptability of the periphrastic forms is inversely related to that of the lexical forms” (p. 121). One of Poser’s examples is English comparative formation, as illustrated by the behavior of the adjectives *small* and *childish* in (1) (from Poser 1992:122, (24)).

(1) <i>Base</i>	<i>Lexical</i>	<i>Periphrastic</i>
small	smaller	*more small
childish	*childisher	more childish

Poser ascribes this pattern to *blocking* of the periphrastic form **more small* by the lexical form *smaller*, extending Aronoff’s (1976) proposal that listed lexical forms, like *glory*, block regular morphological forms, like **gloriosity*. Since *childish* has no lexical comparative, the periphrastic *more childish* is well-formed. Analogously, the regular form *curiosity* is well-formed, because there is no listed noun **cury*. Subsequent work, especially in Distributed Morphology (DM), has

We thank Nate Arnett, Lev Blumenfeld, Vera Griбанова, Mark Norris, Bern Samko, Anie Thompson, and Clara Sherley-Appel, two *LI* reviewers, and members of the UCSC Morphology Seminar, Fall 2015, for valuable input on the material presented here.

argued against blocking analyses of such data, the most articulated critique being that of Embick and Marantz (2008). Embick and Marantz (henceforth E&M) make three interrelated claims:

- (2) a. Blocking is analytically reducible to competition for Vocabulary Insertion (VI).
- b. The Danish definiteness alternation is due to a Local Dislocation rule that operates under linear adjacency, not structural sisterhood (contra Hankamer and Mikkelsen 2002, 2005). (E&M 2008:40–44)
- c. There are no cases where a structural configuration induces blocking irrespective of the linear order of the syntactic elements relative to the terminal node for which multiple Vocabulary items compete for insertion. (E&M 2008:50)

The first claim is based on E&M's DM reanalysis of benchmark blocking cases from the literature, such as Aronoff's account of **gloriosity*. The second claim is based on a reexamination of blocking accounts of Danish definiteness and English comparative and superlative formation, all of which exhibit Poser alternation between lexical and periphrastic forms.

In section 2, we present the core facts of Danish definiteness marking and show how these facts are accounted for under our structural DM analysis (Hankamer and Mikkelsen (H&M) 2005), and under E&M's linear adjacency analysis. In section 3, we examine definiteness marking in DPs containing relative clauses and complement clauses and show that these patterns require a structural analysis, contra (2b). Thus, we demonstrate that (2b) is empirically false; and while we accept (2a) as plausible, we argue in section 4 that (2c) does not follow from (2a): if competition for VI is permitted to be sensitive to syntactic structure, there is no architectural reason why linear order must be implicated, though of course it may be in individual cases of blocking, if linearization takes place at VI. This, we argue, is a good outcome on empirical grounds. The Danish definiteness alternation provides a clear illustration of a case of blocking where the crucial condition for VI of the restricted allomorph is purely structural: the syntactic sister of the terminal node hosting the definiteness feature must be a minimal N. If the sister node is syntactically complex and contains syntactic elements other than N, the restricted morph cannot be inserted. It does not matter whether the extra material linearly intervenes between N and the terminal node undergoing VI. Thus, we need to acknowledge the existence of competition for VI that is insensitive to linear order and only sensitive to syntactic structure. As we see it, that is in fact exactly what the architecture proposed by E&M would lead us to expect. We therefore conclude that the Danish definiteness alternation supports E&M's central claim that blocking is reducible to competition for VI.

2 Danish Definiteness: Core Data and Competing Analyses

In the discussion ahead, it will be important to distinguish Poser alternation, an empirical phenomenon, from Poser blocking as an analytic mechanism.¹

¹ The definition in (4) is Embick and Marantz's generalized Poser blocking, which covers Poser blocking involving the expression of a grammatical category (such as definiteness marking) as well as the more controversial cases of lexical-semantic Poser blocking (as in *mare* blocking *female horse*). We are only concerned with the former in this article, because we don't believe that the latter exists.

(3) *Poser alternation*

In the expression of a grammatical category, the acceptability of periphrastic forms is inversely related to that of lexical forms. (based on Poser 1992:121)

(4) *Poser blocking*

For each node in the syntactic structure, scan the lexicon for a word that expresses the same features. If such a word exists, use the word in place of the phrase. (E&M 2008: 38)

E&M acknowledge the existence of Poser alternations, but deny the need for a mechanism such as Poser blocking. We agree on both of these points, though we will argue that if “blocking” is the result of Vocabulary item competition, there are indeed Poser alternations that qualify as “blocking.”

2.1 *Empirical Starting Point*

Like other Scandinavian languages, Danish has two definiteness markers: a prenominal definite article and a definite suffix.² Where Swedish and Norwegian exhibit a pattern of definiteness agreement, the two are in complementary distribution in Danish (Delsing 1993:113–138). In the literature, this is commonly illustrated with reference to the pattern in (5)–(7).³

- (5) a. kant-en
 edge-DEF
 ‘the edge’
 b. *den kant
 DEF edge
 Intended: ‘the edge’
- (6) a. *skarpe kant-en
 sharp edge-DEF
 Intended: ‘the sharp edge’
 b. den skarpe kant
 DEF sharp edge
 ‘the sharp edge’

² The prenominal article is marginal in Icelandic, and there is some dialectal variation in the distribution of the two definiteness markers across the Scandinavian languages (see, e.g., Delsing 1993:113–127, Dahl 2004). All data discussed below are from standard Danish.

³ Glossing conventions are *DEF* for *definite* and *GEN* for *genitive*.

The definite article is homophonous with the demonstrative determiner, except that the latter is invariantly stressed. Stress is not marked orthographically. The strings in (5b) and (7b) are grammatical on a demonstrative reading. The form of the definiteness markers is sensitive to number and gender; throughout, we illustrate with the singular common gender forms *-en* and *den*. The singular neuter forms are *-et* and *det* and the plural forms are *-ne* and *de*. (Gender is neutralized in the plural.)

- (7) a. kant-en af hylden
 edge-DEF of shelf.DEF
 ‘the edge of the shelf’
 b. *den kant af hylden
 DEF edge of shelf.DEF
 Intended: ‘the edge of the shelf’

In the absence of any modifiers, as in (5), definiteness is realized as a suffix (5a) and the prenominal article is ungrammatical (5b). When an attributive adjective is present as in (6), the lexical form is ungrammatical (6a) and the prenominal article must be used (6b). The opposite pattern is found with a postnominal PP, as in (7): here the definite article is impossible (7b) and the definite suffix must be used, whether the PP is a complement (as in (7a)) or a modifier.

In addition to the syntactically governed alternations in (5)–(7), several classes of nouns resist the definite suffix (Mikkelsen 1998:61–62, 135–138, H&M 2005:97–103). With such nouns, the definite article is used irrespective of syntactic context (8b–d).⁴

- (8) a. *studerende-en
 student-DEF
 Intended: ‘the student’
 b. den studerende
 DEF student
 ‘the student’
 c. den nye studerende
 DEF new student
 ‘the new student’
 d. den studerende med de bedste muligheder
 DEF student with the best opportunities
 ‘the student with the best opportunities’

The pattern in (5)–(8) qualifies as a Poser alternation in that the grammaticality of the periphrastic construction (*den* N) is inversely correlated with the grammaticality of the lexical form (N-*en*).

2.2 Structure-Based Analyses

In H&M 2002:160–161, we developed an analysis of the basic definiteness-marking facts in Danish, in which Poser blocking as a mechanism played a crucial role. It is this analysis that E&M (2008) take issue with, as it is incompatible with their general claim that all blocking

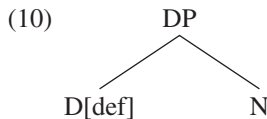
⁴ The class of common gender nouns derived in *-ende*, here exemplified by *studerende* ‘student’, is generally resistant to affixation. In addition to not occurring with the definite suffix, these nouns do not occur with the plural suffix.

phenomena are reducible to competition for VI and do not involve any global search for alternatives. But in H&M 2005:103–107, we developed a DM analysis of the Danish definiteness alternation that reduces it to competition for VI. In that analysis, there are two Vocabulary items for definite D: a suffixal element, which is inserted when the definite D is a sister of minimal N, and a free form that is inserted elsewhere. We will call this the *Sisterhood Condition*, which can be summarized as follows:⁵

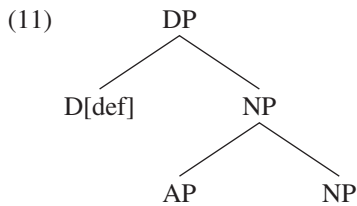
(9) *The Sisterhood Condition*

A definite D, D[def], is realized as a suffix if and only if it is a sister to a minimal N. Otherwise, D[def] is realized as a freestanding article.

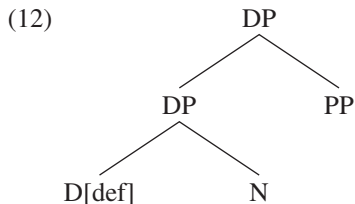
To see how the Sisterhood Condition applies to the data in (5)–(7), consider the syntactic structures involved. In (5), there are no modifiers and thus D[def] is a sister to a minimal N, as shown in (10).



By the Sisterhood Condition, D[def] is realized as a suffix. In (6), there is an AP adjoined to the NP sister of D[def], as shown in (11).



Consequently, the sister of D[def] is not a minimal N and the suffix cannot be inserted. Instead, the elsewhere form is used. Finally, we assume that PPs adjoin to DP so that (7) has the structure in (12).



⁵ See the text surrounding (13) for the analysis of morphological gaps in the distribution of the definite suffix.

Given the high attachment of the PP, the sister of D[def] is a minimal N and, by the Sisterhood Condition, D[def] is realized as a suffix.⁶

Thus, the apparent blocking of phrasal forms by lexical forms is reduced to a Pāṇinian interaction between a restricted form and an elsewhere form, producing a case of conditioned allomorphy.

Importantly, there is an assumption hidden in this analysis, which we thought innocuous but turns out to have interesting consequences. That assumption is that a Vocabulary item can have as part of its specification the stipulation that the form to be inserted is an affix (indeed, a prefix or a suffix) or a free form, and that this may be contextually determined. We will discuss this assumption further in section 4.

To account for the lack of suffixal definiteness marking on certain nouns, including *studerende* ‘student’ as shown in (8), we place an additional requirement on the insertion of the definite suffix, namely, that the exponent of N not be *studerende* or any other noun that resists the definite suffix (represented by . . . in (13a)). Putting the parts together, the structure-based DM analysis consists of (a) the assumption that PP complements or modifiers of N adjoin to DP in Danish, and (b) the Vocabulary items in (13). (We continue to abstract away from number-gender distinctions on D; see H&M 2005:104 for the fully specified Vocabulary items.)

- (13) a. *-en* ↔ [D, def] if sister to a minimal N whose exponent is not *studerende*, . . .
 b. *den* ↔ [D, def] elsewhere.

The Vocabulary items in (13) implement the Sisterhood Condition from (9). The definite suffix in (13a) is the restricted morph, which can only be inserted when D[def] is a sister to N. The definite article in (13b) is the unrestricted morph, which is inserted elsewhere. In H&M 2005:105, we extend Halle’s (1997:428) Subset Principle to include syntactic restrictions on insertion

⁶ A reviewer questions the structure in (12) on the grounds that a reflexive pronoun inside PP can be licensed by a possessor.

- (i) *hendes_i opfattelse af sig selv_i*
 her perception of REFL self
 ‘her perception of herself’

The issue is whether the possessor *hendes* c-commands the reflexive in (i), as required by standard binding theory. Under the proposed structure in (12), the issue is structurally analogous to binding into PP adjuncts to VP by a VP-internal DP, as in Reinhart’s (1976) classic example in (ii).

- (ii) *I met him_i in Ben’s_i office.
 (Reinhart 1976:147)

If we assume that the possessor *hendes* is in the specifier of the DP to which PP adjoins, as in (iii), and if we adopt Reinhart’s definition of c-command in (iv), the possessor indeed c-commands the reflexive, accounting for the felicity of (i).

- (iii) [_{DP} [_{DP₂} [_{DP} *hendes_i*] [_{D'} D[def] *opfattelse*]] [_{PP} *af sig selv_i*]]

- (iv) Node A c(onstituent)-commands node B iff the first branching node α_1 dominating A either dominates B or is immediately dominated by a node α_2 which dominates B, and α_2 is of the same category type as α_1 . (Reinhart 1976:148)

context, with the effect that the definite suffix will be inserted whenever it can be inserted, that is, whenever D[def] is a sister to N. The result is Poser alternation between lexical and periphrastic definite forms. This analysis is consistent with E&M's claim that all blocking is reducible to competition for VI.

Like the Poser blocking analysis, this DM analysis makes crucial reference to syntactic structure. In the Poser blocking analysis, D[def] and N must form a syntactic phrase to be considered for blocking by a lexical form; this in turn follows from the general characterization of Poser blocking in (4), which states that the search for an equivalent lexical form is triggered by "each node" (i.e., each phrase) in the syntactic structure. In the DM analysis, it is the Vocabulary item for the definite suffix that makes reference to syntactic structure, namely, that D[def] be a sister to N (i.e., that D[def] and N form a phrase). We will henceforth call this the *sisterhood analysis*.

2.3 Embick and Marantz's (2008) Linear Adjacency Analysis

E&M (2008) present an analysis of the core data that appears to have an advantage over the sisterhood analysis. Assuming that the assumption that PPs are adjoined higher than to NP is baseless, they suggest that the only factor determining the choice of free vs. bound allomorph of the definite determiner is linear adjacency to N: if D is linearly adjacent to N (and N is not one of the Ns that cannot bear the definite suffix), it will undergo a dislocation rule called D-suffixation (E&M 2008:43).

(14) *D-suffixation*

$$D[\text{def}] \frown N \rightarrow [[N]D[\text{def}]]$$

Subsequent Vocabulary items, not provided by E&M, will realize D[def] as either a suffix or an independent word, depending on its environment. Thus, presumably one Vocabulary item will insert the bound form of the D[def] morpheme when it is inside an N and another Vocabulary item will insert the free form otherwise (cf. E&M's (2008:46) discussion of the analogous case with the comparative morpheme in English).

Note that D-suffixation accomplishes two things: it places D[def] to the right of N (which is a rightward movement, assuming that the input to the rule is already linearized⁷), and it adjoins D[def] to N. It is presumably this latter bit that causes the D[def] morpheme to appear as an affix.

In an unmodified DP structure like (10), D is linearized immediately to the left of N. Thus, D-suffixation applies and, as a result, the bound morph of D[def] is inserted at VI. In (11), D[def] is not linearly adjacent to N; the adjective intervenes. Thus, D-suffixation does not apply and, as a result, the free D[def] morph is inserted at VI. Finally, PPs follow N, as shown in (7), and therefore do not disturb the linear adjacency of D[def] and N. Consequently, D-suffixation applies

⁷ E&M do not explicitly say that the symbol \frown implies linear order, as they characterize D-suffixation as sensitive to "adjacency"; but, for their analysis to work as intended, D will have to be linearized to the left of its complement at the time D-suffixation applies, to guarantee that it is adjacent to N.

and produces the insertion context for the definite suffix. From now on, we will call this the *adjacency analysis*.

2.4 Summary and a Look Ahead

The immediate difference between the sisterhood and adjacency analyses lies in whether the selection of the bound allomorph is sensitive to structure (the Sisterhood Condition) or only to linear adjacency. In section 3, we present data that directly challenge the adjacency analysis on this point. A second difference lies in assumptions about the nature of Vocabulary items. In H&M 2005, we assume that a Vocabulary item can specify whether its exponent is a prefix, a suffix, or a free morpheme; E&M (2008) apparently do not assume that, although the standard DM practice of including directionality markers (hyphens) in Vocabulary items indicates that they should. See section 4.

The first difference is one that can be settled on empirical grounds, and we intend to settle it in section 3. The second difference is harder to settle, because it is rather architectural, having to do with assumptions about the nature of rules and representations. In section 4, we will discuss the remaining differences and conclude that such structurally sensitive allomorphy can in fact be a result of Vocabulary item competition, precisely of the kind that E&M say cannot exist.

3 Adjacency vs. Sisterhood: Beyond the Core Data

As E&M (2008) observe, the core definiteness-marking data exhibit a left-right asymmetry: prenominal material (i.e., a prenominal adjective) cooccurs with the definite article, whereas postnominal material (i.e., a postnominal PP complement or modifier) cooccurs with the definite suffix. Below we present two cases in which postnominal material gives rise to the definite article. The first involves restrictive relative clauses; the second, complement clauses to N. The D-suffixation rule in (14) wrongly predicts that both constructions should be realized with the definite suffix, since nothing intervenes linearly between D[def] and N.

The CP complement facts have yet to figure in the published literature, though they are discussed in Mikkelsen 1998 and in H&M 2009, 2012. The restrictive relative clause facts are part of the published literature (e.g., Delsing 1993:119, H&M 2002:144–145, 165–168, 2005:107–118, 2008:336–338). E&M (2008:44n29) acknowledge the existence of the relative clause facts, but they do not note that these facts are problematic for their analysis.

3.1 Restrictive Relative Clauses

Restrictive relative clauses cooccur with either prenominal (15) or suffixal (16) definiteness marking.

- (15) den stol som jeg sad på
 DEF chair that I sat on
 ‘the chair that I sat on’ [restrictive only]

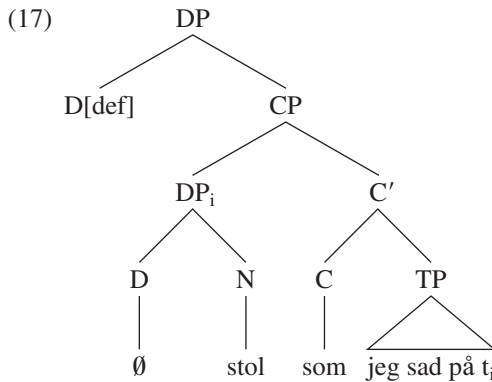
- (16) stol-en som jeg sad på
 chair-DEF that I sat on

All speakers: ‘the chair, which I sat on’ [nonrestrictive]

Some speakers: ‘the chair that I sat on’ [restrictive]

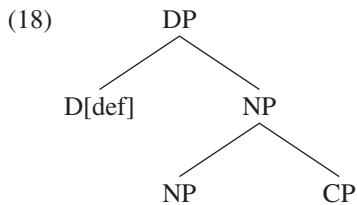
The prenominal version in (15) is acceptable to all speakers, whereas some speakers allow only a nonrestrictive reading for (16) (H&M 2002:166, Hansen and Heltoft 2011:1520). There is thus complexity in the data, which we discuss in detail in H&M 2005. The important point here is that on the adjacency view there shouldn’t be any complexity: the D and the N are adjacent, and the only possibility should be suffixation (as in (16)). The possibility of nonsuffixation in (15) demonstrates that the definite allomorphy is dependent on something other than linear adjacency.

According to the sisterhood analysis, the prenominal definite article is licensed whenever definite D is not a sister to a minimal N. Following Bianchi (1999), in H&M 2005 we propose a head-raising analysis of restrictive relative clauses, in which (15) has the structure shown in (17).



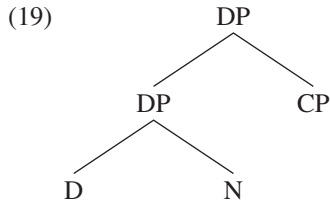
In (17), the relative clause CP is generated as a sister of D[def] and the DP that is the target of relativization moves to Spec,CP. Consequently, D[def] is not a sister to a minimal N—it is a sister to CP—and, by the Sisterhood Condition, D[def] is spelled out as a prenominal article.

It is worth noting that the same result follows under a more traditional adjunction analysis of the restrictive relative clause in (15) (H&M 2002).



In this structure, the adjunction of the relative clause renders the NP sister of D[def] nonminimal; hence, the insertion context for the definite suffix is not met, and D[def] is realized as a prenominal article.

In contrast, we assume that the structure underlying (16) has the relative clause adjoined higher, as in (19).



In this structure, the Sisterhood Condition will lead to the suffixed allomorph of D (as in (16)), assuming that there are no adjectives present. This, of course, is the structure standardly assumed for nonrestrictive relative clauses, and for those speakers for whom (16) has only a nonrestrictive reading, nothing more needs to be said. For those speakers who have an additional restrictive reading for (16), we suggested that

such speakers have access to a mechanism whereby a relative clause that is adjoined (at surface structure, or at the end of (overt) syntax) to DP can be interpreted as adjoined to NP for semantic purposes. In the ADM analysis [alternative DM analysis; i.e., the structural DM analysis of section 2.2 above], where Vocabulary Insertion is postsyntactic, this could be accomplished by assuming that the relative clause originates as an NP adjunct and moves (via a DP-internal extraposition operation) to adjoin to DP. Then at Vocabulary Insertion it would no longer be in a position to prevent the insertion of *-en*, while its interpretation as an NP modifier could occur via reconstruction. The syntactic extraposition mechanism would not do any good in the H&M analysis [i.e., the Poser blocking analysis of H&M 2002, also discussed in section 2.2 above], where Lexical Insertion is presyntactic. In that analysis, the relative clause would have to originate adjoined to DP (or higher) and be interpreted as restrictive via an interpretive mechanism such as that proposed by Bach and Cooper (1978). (H&M 2005:110)

The upshot of this section is that the use of prenominal definiteness marking with restrictive relative clauses stands as an unresolved problem for the adjacency analysis, whereas the sisterhood analysis accounts for this under either of two reasonable syntactic analyses of DPs containing restrictive relative clauses.

3.2 CP Complements

As in English, certain abstract nouns allow for a CP complement clause inside DP. Strikingly, the realization of definiteness depends on whether the CP is encased in a prepositional phrase. In the presence of a preposition, definiteness is realized as a suffix (20).⁸ In the absence of a preposition, definiteness is realized as a prenominal article (21).⁹

⁸ The string in (20b) is grammatical on a demonstrative reading of *den*; see footnote 3.

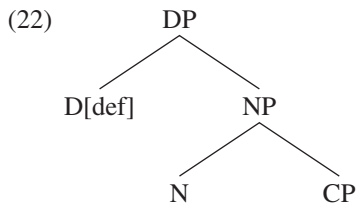
⁹ The string in (21b) is grammatical if the CP is separated from the definite noun by a prosodic break and given a parenthetical interpretation. We take this to be a case of apposition of DP and CP, thus involving a different structure than the one in (22). Specifically, apposition of DP and CP allows D[def] and N to be sisters, which is what licenses the definite suffix.

- (20) a. aftal-en **om** at vi lægger nøglen i skuret
 agreement-DEF about that we put key.DEF in shed.DEF
 ‘the agreement that we leave the key in the shed’
 b. *den aftale **om** at vi lægger nøglen i skuret
 DEF agreement about that we put key.DEF in shed.DEF
- (21) a. den aftale at vi lægger nøglen i skuret
 DEF agreement that we put key.DEF in shed.DEF
 ‘the agreement that we leave the key in the shed’
 b. *aftal-en at vi lægger nøglen i skuret
 agreement-DEF that we put key.DEF in shed.DEF

As discussed in H&M 2012, these two constructions differ in meaning and use. The prepositional construction in (20) presupposes existence and is used anaphorically. The bare CP construction in (21) asserts existence and is used to establish reference (in the sense of Hawkins 1978).

What’s important for present purposes is that we observe an alternation between suffixal and prenominal definiteness marking governed by postnominal material. This is what E&M (2008) claim never happens. The D-suffixation rule in (14) yields the correct outcome for the prepositional structure in (20). Since the PP is realized postnominally, nothing intervenes between D[def] and N and so, at linearization, D[def] and N are concatenated. Thus, the environment for D-suffixation is met and the rule applies, yielding the suffixed form in (20a). The trouble is with (21). Again, the CP is realized postnominally, and so D[def] and N are concatenated. Thus, the structural description for D-suffixation is met and, since rules apply when their structural description is met (E&M 2008:27), the adjacency analysis wrongly predicts suffixal definiteness marking in (21).

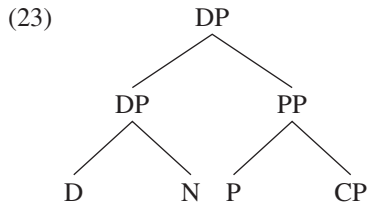
On the sisterhood analysis, the difference in definiteness marking corresponds to a difference in the syntactic position of the postnominal phrase. Starting with the bare CP complement in (21), the simplest possible analysis is that the CP is a complement to N, as in (22).



In this structure, D[def] is sister to an NP containing N and CP, and thus the insertion context for the definite suffix (D[def] is a sister to a minimal N) is not met and the definite article is inserted, accounting for the definiteness marking in (21).¹⁰

¹⁰ In H&M 2012, we develop a more abstract analysis in which the CP is a complement to D and D itself undergoes head raising to a higher functional head, on analogy with Larson’s (1988) V-shell analysis of ditransitives. That structure also produces the correct definiteness marking under the sisterhood analysis, since D[def] is not a sister to a minimal N.

Turning to the construction in (20) where the CP complement is encased in a PP, we propose that the use of suffixal definiteness marking follows from high attachment of DP-internal PPs in Danish—that is, attachment to DP, not to NP, as schematized in (23).



The high attachment of the PP leaves D and N as sisters, which in turn licenses suffixal definiteness marking; see the Vocabulary item in (13a).

3.3 Linear Adjacency Is Not Enough

The adjacency analysis takes as its starting point an apparent left-right asymmetry in the core data: material to the left of N, intervening between D and N, causes the appearance of the prenominal article, whereas in the absence of such material, the suffixal definiteness marker appears. The pattern of definiteness marking in the presence of complement clauses and relative clauses reveals that this asymmetry is illusory. In both cases, the presence of material to the right of N licenses the prenominal article. We see no way to account for these facts within an analysis in which the only condition on D-suffixation is linear adjacency to N.

To appreciate this point fully, consider the full data set displayed in table 1.¹¹ There is a limited left-right asymmetry in this data set. If an element other than D appears prenominally—that is, to the left of N (row 2)—then definiteness is realized as an article. If an element appears to the right of N, definiteness may be realized suffixally (rows 3–6) or as an article (rows 6 and 7). The adjacency analysis correctly accounts for rows 1–5, but fails to account for rows 6 and 7. The sisterhood analysis, as developed above and in H&M 2005, 2008, accounts for the entire paradigm. In particular, rows 3 and 4 are accounted for if one grants the assumption that PPs attach higher than NP inside Danish DPs.

¹¹ In H&M 2008, we analyze definiteness marking in Danish pseudopartitive constructions, the correspondents of English *a cup of coffee*. There are two of these: a direct pseudopartitive and an indirect pseudopartitive. (For discussion of this distinction in other Germanic languages, see Delsing 1993, Van Riemsdijk 1998, and Kinn 2001.) The indirect pseudopartitive takes the form of the English pseudopartitive (i.e., D N PP) and, when definite, behaves as shown in row 3 of table 1; that is, it takes a definite suffix. The direct pseudopartitive takes the form D N NP (e.g., *en kop kaffe* ‘a cup coffee’) and has no equivalent in English. Unlike the indirect pseudopartitive, the direct pseudopartitive does not license the definite suffix, despite linear adjacency between D and (the relevant) N. At first, this fact would seem to present a further challenge to E&M’s (2008) linear adjacency analysis, but the challenge is illusory because the direct pseudopartitive does not license the definite article either. In the absence of further DP-internal elements, direct pseudopartitives do not allow definiteness marking at all. We do not provide an explanation for this restriction, but suggest that the explanation is not morphosyntactic in nature, but semantic. If so, direct pseudopartitives are not relevant for distinguishing competing analyses of the realization of definiteness; hence, we omit them in table 1.

Table 1

Distribution of Danish definiteness markers

DP type	Definite article	Definite suffix	Example
1. D N (unmodified)	*	✓	(5)
2. D AP N	✓	*	(6)
3. D N [P DP]	*	✓	(7)
4. D N [P CP]	*	✓	(20)
5. D N CP _{nonrestrictive relative}	*	✓	(15), (16)
6. D N CP _{restrictive relative}	✓	✓	(15), (16)
7. D N CP _{complement}	✓	*	(21)

This is a good place to say something more about that assumption. At present, we do not have independent empirical evidence in favor of it from Danish, and as a result it remains a stipulation. There are three considerations that we feel justify nonetheless keeping this assumption and maintaining the sisterhood analysis. First, other similarly comprehensive analyses of Danish definiteness marking are forced to make similar assumptions about the syntax of PPs. In particular, Julien (2005:67–69) assumes that PPs move to a higher position prior to spell-out of the definite D, which is analogous to our assumption that the PPs adjoin high.

Second, there is evidence from outside Danish that PPs attach higher in the DP than other elements such as APs, which is exactly what we are assuming for Danish. In particular, Adger (2012:chap. 5) offers the PP Peripherality Generalization in (24) based on a crosslinguistic survey of word order.

(24) *PP Peripherality*

When (intersective) AP modifiers and PP complements both occur to one side of N inside a noun phrase, the PP is separated from the N by the AP.

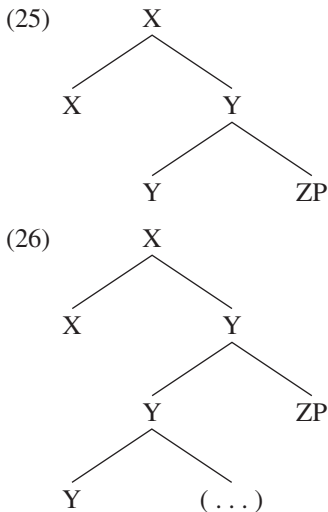
To account for the PP Peripherality Generalization, Adger argues that PPs are base-generated outside the phrase that contains N, A, and articles. This coincides with what we propose for Danish DPs and what accounts for APs triggering the definite article, but PPs licensing the definite suffix. We should note that Adger's claim about PPs being higher than AP and articles holds strictly for complement PPs, whereas we assume it for PPs of all kinds, including modifiers.

Third, the challenges faced by the adjacency analysis (rows 6 and 7) and the sisterhood analysis (rows 3 and 4) are different in kind. The challenge presented by postnominal PPs for the sisterhood analysis is that a special and somewhat controversial assumption about the syntax of such PPs must be made, but once that assumption is made, the definiteness marking is fully accounted for. As we see it, there is no way for the adjacency analysis to account for the fact that postnominal material can license prenominal definiteness marking, nor is there any additional assumption about linear order or structure that would enable it to account for this. As a result, the adjacency analysis is empirically inadequate and thus cannot be maintained. This is worth emphasizing, because E&M repeatedly claim that their analyses of various blocking phenomena,

including Danish definiteness marking, are empirically superior to existing analyses (2008:4, 20, 25, 31, 34, 35, 39–40, 43, 44, 47, 48, 51).¹²

3.4 Structure Matters

One way to summarize the difference between the sisterhood analysis and the adjacency analysis is in terms of their assumptions about the answer to the following question: in the string X Y Z, may the realization of X depend on the structural relationship between Y and Z? The sisterhood analysis assumes that the answer is affirmative; the adjacency analysis, that it is negative. To quote E&M: “[W]hat is not attested is a case in which, for X and Y that potentially form ‘one word,’ both pre-Y Z(P) and post-Y Z(P)—whether complements to Y or specifiers/adjuncts in the phrase headed by Y—prevent a lexical form from occurring” (2008:50; the tree diagrams in (25) and (26) are E&M’s (92) and (93)).



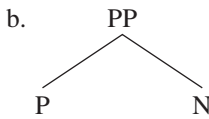
Above, we examined two instances where the presence of a ZP complement to Y affects the realization of X in a structure like (25),¹³ namely, the relative clause structure in (18) and the

¹² In a footnote, E&M (2008:26–27n26) furthermore suggest that our 2002 rule-based account of the lack of adjectival modification of derived definite nouns (see (6)) is less than solid. Specifically, they sketch a derivation in which a definite noun derived by our Rule D (e.g., *stol-en* ‘chair-DEF’) takes an NP complement that is headed by a null N and in which that NP hosts an attributive adjective, yielding the ungrammatical string **stol-en brune* ‘chair-DEF brown’. But our rule-based analysis does rule out such a structure. The last clause of Rule D says that “parts of the [lexical] entry not mentioned in the rule are not affected” (H&M 2002:155, (36c)). The ability to take a complement would be listed in the lexical entry for a noun; specifically, it would be listed as the value of the noun’s SUBCAT feature. Rule D does not mention the SUBCAT feature; thus, a derived D would inherit the complement-taking abilities of the input noun. We show (H&M 2002: 156, 158–159) that this is empirically correct by comparing the relational noun *ejer* ‘owner’ with the nonrelational noun *hest* ‘horse’. The noun *ejer* can take a PP complement and so can the derived D *ejer-en* ‘owner-DEF’; the noun *hest* cannot take a PP complement and neither can the derived D *hest-en* ‘horse-DEF’. The same reasoning applies to *stol* ‘chair’ and *stol-en* ‘chair-DEF’: since *stol* can’t take an NP complement, *stol-en* can’t either and, consequently, the ungrammatical string **stol-en brune* is not generated under our 2002 analysis.

¹³ At present, we have no counterexamples involving adjuncts, as in (26).

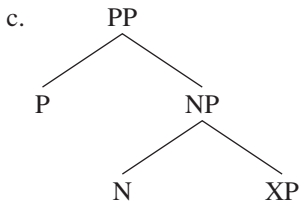
CP complement structure in (22). A third, and slightly different, instance is documented by Blumenfeld (2012) and Gribanova and Blumenfeld (2013). Certain Russian prepositions are subject to two phonological processes: *yer* realization (alternations between \emptyset and [o] in the preposition or root) and stress retraction (onto the preposition).¹⁴ These processes are conditioned by a multitude of factors, including syntactic structure. In particular, a necessary—but not sufficient—condition for *yer* realization and stress retraction is that P's syntactic sister be nonbranching (Gribanova and Blumenfeld 2013:4). This is illustrated for *yer* realization in (27) and (28); the alternating vowel is boldfaced.¹⁵

- (27) a. **v**o sne
in dream
(Vera Gribanova, pers. comm.)



- (28) a. v(***o**) sne o zajchikax
in dream about bunnies
(Vera Gribanova, pers. comm.)

- b. . . . v sne Dmitrija.
in dream Dimitri.GEN
' . . . in Dimitri's dream.'
(Bakhtin 1963 via Blumenfeld 2012:58, (25a))



The sisterhood of P and N conditions *yer* realization, independent of linear order. When P and N are sisters, as in (27), *yer* realization applies. When P and N are not sisters, as in (28), *yer* realization does not apply. Gribanova and Blumenfeld analyze this in terms of prosodic incorporation: when P and N are sisters, P prosodically incorporates into N, and that prosodic structure is what conditions *yer* realization (and stress contraction; see their paper for relevant data). The important point for present purposes is that the Russian data constitute another instance where, in a string of the form X Y Z, the realization of X depends on the structural configuration of Y and Z. In particular, the structure in (28c) maps onto the structure in (25).

¹⁴ Gribanova and Blumenfeld (2013) extend their analysis to prefixes, which are largely homophonous with the prepositions. Here we focus on the prepositional case, since that suffices to make our point.

¹⁵ See Blumenfeld 2012:sec. 2.3 for additional examples. The structures in (27b) and (28c) are taken from Gribanova and Blumenfeld 2013:8.

4 Definite Allomorphy and Wordhood

Recall E&M's (2008) three claims in (2), repeated here:

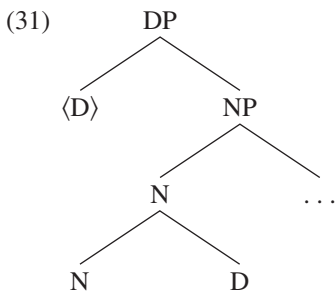
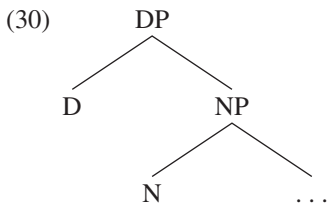
- (29) a. Blocking is analytically reducible to competition for Vocabulary Insertion (VI).
 b. The Danish definiteness alternation is due to a Local Dislocation rule that operates under linear adjacency, not structural sisterhood (contra Hankamer and Mikkelsen 2002, 2005). (E&M 2008:40–44)
 c. There are no cases where a structural configuration induces blocking irrespective of the linear order of the syntactic elements relative to the terminal node for which multiple Vocabulary items compete for insertion. (E&M 2008:50)

We have accepted (29a) as reasonable, and in fact our analysis of Danish definiteness conforms to it. We have shown in section 3 that (29b) is incorrect and that the allomorphy of the definite morpheme in Danish is sensitive to a structural configuration rather than linear adjacency. If we are right in this, claim (29c) must be rejected. In this section, we develop some of the consequences of this conclusion.

4.1 Keys to E&M's (2008) Analysis

E&M (2008) hold that the definiteness realization alternation must be linked to a local dislocation of the D[def] morpheme, subject to linear adjacency. There seem to be two reasons for this. First, in their view, context to the right of N does not matter; in addition, they adopt what we will call the *Wordhood Condition*: “[M]ultiple terminal nodes that are packaged as one complex head by the syntax or PF are ‘one word’ in an informal way of speaking” (E&M 2008:7).

Thus, in a configuration like (30) D must structurally reattach to N in order for the two to spell out as one word, with the D suffixed to the N, as in (31).



Note that the operation cannot be just that the D suffixes to the head of its complement (lowering), because an intervening adjective blocks the suffixation, and such adjectives are presumably adjuncts.¹⁶ It cannot be N- to D-raising, for essentially the same reason. That leaves Local Dislocation, which is sensitive to linear adjacency and not to structure.

It is worth spelling out the consequences of this conclusion, since it leads to a rather complex order of operations. First, and uncontroversially, the N must be inserted by VI. This is uncontroversial, because it has been realized for some time that VI must be cyclic (see Bobaljik 2000, 2012, Embick 2010), in part because it is very common for affix morphology to depend on morphological and phonological properties of the stem.

In the present case, then, the N must be realized before D-suffixation (assuming late insertion of roots), because D-suffixation is in part sensitive to the identity of the N, there being a number of Ns that idiosyncratically prohibit D-suffixation. After VI of the N, but before VI of D, D-suffixation applies, sensitive to linear adjacency. Consequently, before D-suffixation can apply, the linearization of D with its complement NP, and the linearization of elements within the NP, must have taken place. Without this, D-suffixation would have no way of knowing whether D is linearly adjacent to N. The order of operations thus must be something like (32) (where the curly braces in (32a) convey that we assume no crucial ordering among these three operations).¹⁷

- (32) a. $\left. \begin{array}{l} \text{VI of N} \\ \text{Linearization of elements of NP} \\ \text{Linearization of D and NP} \end{array} \right\}$
 b. D-suffixation
 c. VI of D

One of the attractive features of early DM was the idea that linearization is “imposed at PF in virtue of the requirement that speech be instantiated in time” (Embick and Noyer 2001:562). Embick and Noyer (2001) provide a succinct formulation of this idea.

(33) *The Late Linearization Hypothesis*

The elements of a phrase marker are linearized at Vocabulary Insertion.
 (Embick and Noyer 2001:562, (8))

¹⁶ Two reviewers ask whether assuming a Cinque (2010)–style analysis, in which adjectives (and also adverbs) occupy the specifier position of special functional heads instead of being adjoined, would not have the effect of blocking lowering of D to N when an adjective is present. We don’t really understand the suggestion, because no matter the structural analysis, intervening adverbs don’t block lowering of T to V: *Harvey really liked the chicken*. In the nominal domain, Longobardi’s (1994) proposal that N raises to D (to get the right order between adjectives and names, as in *Cameresi vecchio* ‘Cameresi older’) specifically involves raising N to D past an intervening adjective. Whatever their structural position is, adjectives and adverbs do not appear to be barriers to head raising or lowering.

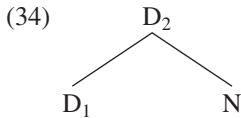
¹⁷ It occurred to us to wonder whether E&M could have intended VI of D to precede D-suffixation (though it does not seem so from their presentation). However, that would necessitate a number of phonologically unmotivated post-VI readjustments, so we conclude that they could not have intended that.

There is no obvious sense in which this is true of the adjacency analysis. We will not attempt to construct a theory of linearization that might accommodate the adjacency analysis,¹⁸ since we believe we have already shown that the correct condition for D-suffixation is not linear adjacency but sisterhood to N.

4.2 Wordhood

Let us return to the Wordhood Condition: “[M]ultiple terminal nodes that are packaged as one head by the syntax or PF are ‘one word’” (E&M 2008:7). On the assumption that D might suffix to a linearly adjacent N that itself had a sister constituent of some kind (such as a PP complement), the Wordhood Condition would indeed require some operation to bundle D together with N in a single complex head, as sketched in (30)–(31).

If, however, we are correct in asserting that the real condition for suffixation is sisterhood between D and N, the structure in question is as in (34) (indices purely for ease of reference).



In Bare Phrase Structure terms, D_2 looks like a complex head, and the structure would seem to satisfy E&M’s condition for wordhood. In particular, D_1 and N were packaged as one head, D_2 , by Merge. We have assumed that in a configuration like this, the Vocabulary item for D[def] could simply specify that D spells out as a suffix (with the appropriate shape) attached to N.

4.2.1 An Alternative Wordhood Condition Chomsky (1995) offers an explicit assumption about wordhood that differs from that articulated by E&M. In a discussion about the morphological component, a component that manipulates “wordlike elements,” Chomsky proposes, “The morphological component gives no output (so the derivation crashes) if presented with an element

¹⁸ Some practitioners of DM (see, e.g., Embick 2010, Arregi and Nevins 2012, Henderson 2012) have proposed a more complex interaction between linearization and VI. In Embick 2010, for example, linearization systematically precedes VI (pp. 59–60, (56)).

- (56) a. Syntax: v and the Root are merged
 i. PF: Spell-Out of phases in the domain of v
 b. Syntax: T head merged with vP
 c. Syntax: Higher cyclic head triggers Spell-Out of v -headed phase
 i. (T lowers to v to create complex head $[[\sqrt{\text{ROOT}}\ v]\ T[\text{past}]]$)
 ii. Linearization: $\sqrt{\text{ROOT}}\ v, v\ \widehat{T}[\text{past}]$
 iii. Vocabulary Insertion at v : $\sqrt{\text{ROOT}}\ [v, -\theta], [v, -\theta]\ \widehat{T}[\text{past}]$
 iv. Pruning: $\sqrt{\text{ROOT}}\ [v, -\theta], [v, -\theta]\ \widehat{T}[\text{past}] \rightarrow \sqrt{\text{ROOT}}\ \widehat{T}[\text{past}]$
 v. Vocabulary Insertion at $T[\text{past}]$

But it is not clear how this linearization can happen, because by hypothesis there is no phonological information (which includes information about linear order) in the morphemes themselves; that information is in the Vocabulary items that spell out the morphemes.

that is not an X^0 ,” where an X^0 is either an item from the lexicon or such an item with another element adjoined to it; and he continues, “On this natural assumption, the largest phrases entering Morphology are X^0 s” (1995:319).

Now Chomsky cannot mean “Morphology” in the DM sense; he appears to refer to that part of morphology that is responsible for spelling out words, which in DM terms would be the Vocabulary items of the individual morphemes. The content of the Wordhood Condition is that any combination of morphemes not packaged as an adjunction structure containing nothing but heads cannot end up being a word.

If we adopt this view, then $[_D D N]$, where N is a complement of D, cannot be a word unless some further operation takes place. But if D is adjoined to N, as it apparently would be by Local Dislocation, the resulting structure, $[_N D N]$, could be a word. Then Local Dislocation would do some work, because it makes D an adjunct to N, permitting wordhood of D+N. Something still has to make D *follow* N, and that is stipulated in the D-suffixation rule.

4.2.2 A Hybrid Analysis What happens if we adopt Chomsky’s version of the Wordhood Condition, together with the Sisterhood Condition on D[def] allomorphy that we have defended above? The result is an analysis that requires a pre-VI (of D) operation that lowers D[def] to adjoin to N just when D and N are sisters (call it “D-suffixation”). This operation will have to be a new addition to the arsenal of morphological operations, since it does not have the properties of raising, lowering, or local dislocation. There would, however, be no need for a particularly complex order of operations, as D-suffixation could apply independently of any linearization effects. D-suffixation or some other requirement would, of course, have to specify in some way that D is linearized to the right of N when it is a suffix.

4.3 Another Alternative

In this section, we suggest an alternative set of assumptions that seem to be consistent with all the facts in view at present and, we believe, lead to a more pleasant architecture.

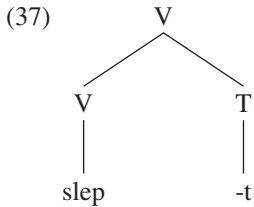
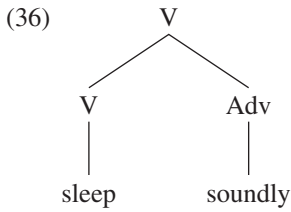
First, suppose we reject Chomsky’s version of the Wordhood Condition in favor of the one articulated by E&M (2008), reworded in (35).

(35) *Wordhood Condition*

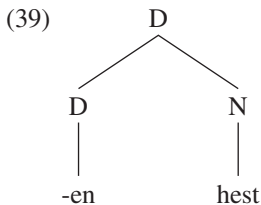
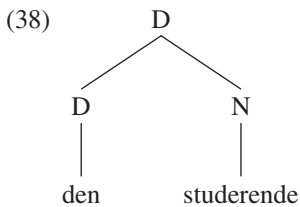
A word must correspond to a (possibly complex) head.

Note immediately that this is a one-way conditional: every word corresponds to a (possibly complex) head, but every complex head does not necessarily surface as a word. Thus, by our assumptions *den studerende* ‘the student’ is a complex head having the structure $[_D [_D den] [_N studerende]]$, but spells out as two words, while *hest-en* ‘the horse’, with the same structure, spells out as one. This is due to the facts that *studerende*, like most Ns, is a free form and that the allomorph of D[def] selected in the environment of $[_D ____ [_N studerende]]$ is also a free form. We are relying on the assumption that some forms are free and some are bound, and that these properties are inherent in the forms themselves. In addition, it is an inherent property of some bound forms that they are suffixes, while others are prefixes. We contend that this free vs.

bound distinction is already necessary if we adopt Bare Phrase Structure, because in Bare Phrase Structure there is no structural difference between (36) and (37).



In the same way, there is no structural difference between (38) and (39).



The distinction between bound and free morphemes is as old as the study of morphology, and so far as we know it has not been repudiated within the DM literature. It has, however, if one looks at practice, undergone a subtle transition. In traditional morphology, it was common to regard some morphemes as bound and others as free, and this was a property of the morphemes themselves. But there is no direct equivalent of the old-fashioned morpheme in DM terms, unless it is the combination of a morphosyntactic feature bundle (the DM “morpheme”) together with all the Vocabulary items that spell it out. Practitioners of DM frequently include a hyphen as part of the spell-out side of a Vocabulary item (see E&M 2008:5, (4); 13, (25); 17, (32); 21, (39); Embick 2010:12, (4); 43, (24); 46, (32); 49, (36); 61, (60); and many more). We can observe two things about this practice: (a) Vocabulary items for morphemes that are free do not have hyphens; and (b) when a morpheme is bound, the only place in the analysis that indicates its

linear relation with its host is the position of the hyphen. The hyphens only appear in the spell-out side of the Vocabulary item, which means in effect that the morpheme itself has no free or bound status (at least none indicated), and also no linear relation with other morphemes (consistent with the standard DM assumption that syntactic structures are unlinearized).¹⁹

So, in current DM practice, there are no longer any free or bound morphemes; there are only free or bound exponents (i.e., morphs), and the only indication of a bound exponent's position is in the Vocabulary item that spells it out. We propose to take this practice seriously, and adopt the following assumption:²⁰

(40) *Bound vs. free is a property of exponents*

Whether a morpheme is free or bound (and if bound, whether it is a prefix or a suffix) is not a property of the morpheme itself (i.e., the bundle of morphosyntactic features that constitute the pre-VI morpheme); rather, it is a property of the Vocabulary items that spell out the morpheme.

Our third assumption follows naturally.

(41) *Structurally conditioned allomorphy*

A particular morpheme can have both bound and free allomorphs. When such a morpheme is within a complex head formed by the morpheme together with an appropriate host, the bound form may surface (or, by Pāṇinian competition, may be required to surface).

We are in a position now, we believe, to adopt the following assumption about linearization:²¹

¹⁹ Someone might counter that the hyphens in the Vocabulary items are merely decorative, present only for the convenience of the reader, and without theoretical significance. Such a person might propose that for each bound morpheme there is a (morpheme-specific) rule moving it to an adjoined position, and it is the adjoined position that causes it to surface as an affix. But that runs into the problem of examples (36)–(37), where in Bare Phrase Structure terms there is no structural difference between an adverb (a free form) adjoined to an intransitive (by Merge) and a T (a bound form) adjoined to V (by lowering).

²⁰ The assumption articulated in (40) is a consequence of accepting Bare Phrase Structure, according to which there is no difference in syntactic structure between (36) and (37). It might not be unreasonable to reject Bare Phrase Structure and assume that there is a syntactic difference between a phrase that consists of a single head (so that the phrase is both minimal and maximal) and a head that is not maximal (hence only minimal). Then the difference between bound and free morphemes *could* be marked in the syntax (heads that are maximal always being free); but for bound morphemes, the difference between prefix and suffix would not (syntax being free of linearization information). In this view, (40) would be weakened to (i).

(i) *Bound vs. free can be a property of exponents*

Whether a morpheme is free or bound may be determined by its syntactic status, in that maximal projections are never bound. Minimal projections that are not maximal, however, may be bound or free, and that information is in the Vocabulary item(s) spelling out the morpheme. If a morpheme is bound, whether it is a prefix or a suffix is also encoded in its Vocabulary item(s).

²¹ There might be subsequent local dislocations, but by hypothesis (42) a morpheme that has not undergone VI cannot undergo Local Dislocation, because it has no linearization relations to be changed.

(42) *Linearization Hypothesis*

A morpheme that has not undergone VI has no linearization relations with anything. Linearization happens ‘‘at VI’’—that is, when the morpheme is realized by sound, not before.

These four assumptions, we believe, provide a spare but adequate framework for dealing with allomorphy involving bound exponents.

4.4 *Danish Definiteness Allomorphy*

In the light of the previous discussion, let us review our proposed analysis of Danish definiteness allomorphy.

1. D[def] has two²² allomorphs, one free and one bound, represented by the following Vocabulary items:
 - en [the hyphen means it’s a bound form and a suffix] when sister to an N that is not exceptional
 - den [a free form] elsewhere
2. Before VI inserts a form for D[def], it has no linearization relations with anything.
3. In the structure [_D D[def] N], if N is not exceptional, D[def] is realized as a suffix. It does not move, since before VI it was not located on the wrong side of N.
4. Otherwise, D[def] is realized as a free article and is linearized with its complement by whatever linearization principles accomplish that.

Note that in this analysis the alternation between the allomorphs of the D[def] morpheme is a Poser alternation, and it is an instance of blocking as a direct result of competition for VI, just as E&M (2008) say all blocking should be. It is, in a sense, ‘‘blocking above the word level’’ because the allomorphy itself determines whether the resulting form will be one word or two. We suggest that this is exactly what is expected when there is competition for VI when one competitor is a bound form and the other is free.

5 Conclusion

The starting point of this investigation was E&M’s (2008) empirical claim that the alternation between prenominal and postnominal definiteness marking in Danish depends only on the linear adjacency between D and N. Examination of a wider range of facts than those considered by E&M reveals that the choice between the definite suffix and the freestanding article cannot be made in terms of linear adjacency between D and N; rather, as we argued previously in H&M 2005, it is sisterhood between D and N that determines the selection of the suffix.

²² Still abstracting away from differences due to gender and number.

Examining ways of accounting for this alternation leads to examining what counts as a possible word in terms of morphosyntactic structure. We have argued that the structural condition for wordhood is simply that the candidate be a zero-level element, simple or complex, without regard to whether adjunction is involved. We further argue that Vocabulary items can specify whether their exponents are free or bound forms, and if bound, whether a prefix or a suffix.

We conclude that these assumptions permit the adoption of a maximally simple theory of linearization, in which a morpheme acquires linearization relations with other elements “at VI,” as envisioned in early DM.

Within the proposed framework, there is indeed “blocking” above the word level: it is what results when a morpheme has both free and bound allomorphs.

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