

# Structure, Architecture, and Blocking\*

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## Abstract

Embick and Marantz (2008) present an analysis of the Danish Definiteness alternation involving a postsyntactic rule of Local Dislocation, and argue that all apparent cases of Poser-blocking are the result of such dislocations conditioned by lineary adjacency. We show that examination of a fuller range of data reveals that the alternation cannot be determined strictly in terms of adjacency, but rather depends on the structural relation (specifically, sisterhood) 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 (2008); the result of competition between VIs 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 VIs spelling out the morphemes.

## 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* below (from Poser p. 122, (24)):

|     |          |             |               |
|-----|----------|-------------|---------------|
| (1) | BASE     | LEXICAL     | PERIPHRASTIC  |
|     | 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 argued against blocking analyses of such data, the most articulated critique being David Embick and Alec Marantz’s 2008 paper *Architecture and Blocking* (Linguistic Inquiry 39, 1; henceforth E&M). E&M make three interrelated claims:

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- (2)
  - a. Blocking is analytically reducible to competition for Vocabulary Insertion (VI).
  - b. There is no blocking at the word level or above.
  - c. Poser alternations (i.e. alternations where the well-formedness of a periphrastic form is inversely related to that of a lexical form as in (1) above) always result from morphological rules that are sensitive to linear adjacency, and not hierarchical structure.

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*. They take the second claim to follow from the first, but this is one of the conclusions we will question (section 4). The third 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 3 we focus on Danish definiteness marking and how it is licensed, and there we will show that there are Poser alternations of exactly the kind that E&M claim are impossible. Thus we demonstrate that (2c) is empirically false; and while we accept (2a) as plausible, we argue that (2b) does not follow from (2a) without additional assumptions, which we try to clarify in section 4. A central issue is whether a Vocabulary Item can specify whether its exponent is free or bound. Assuming that VIs can contain this kind of information, we will argue that there is indeed blocking at the level of word vs. phrase, resulting from VI competition when a bound allomorph competes with a free allomorph of the same morpheme. Another issue is whether the free vs. bound distinction is *ever* indicated anywhere other than in VIs. On this issue, assuming Bare Phrase Structure leads to a set of consequences regarding wordhood; rejecting Bare Phrase Structure opens another set of possibilities, which we will explore in section 4.

## 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:<sup>1</sup>

- (3) *Poser Alternation* (based on Poser (1992:121)):  
In the expression of a grammatical category, the acceptability of periphrastic forms is inversely related to that of lexical forms.
- (4) *Poser Blocking* (Embick and Marantz 2008:38):  
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 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 VI competition, there are indeed Poser alternations that qualify as “blocking”.

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<sup>1</sup>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 paper, because we don’t believe that the latter kind of lexical-semantic blocking exists (and besides it would be rather hard to define ‘mare’).

## 2.1 Empirical starting point

Like other Scandinavian languages, Danish has two definiteness markers: a prenominal definite article and a definite suffix.<sup>2</sup> Where Swedish and Norwegian exhibit a pattern of definiteness agreement, the two are in complementary distribution in Danish (Delsing 1993:113–38). In the literature, this is commonly illustrated with reference to the pattern in (5)–(7) below.<sup>3,4</sup>

- (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’
- (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 the lexical form is ungrammatical (6a), and the prenominal article must be used, as in (6b). The opposite pattern is found with a postnominal PP: 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), certain nouns resist the definite suffix (Mikkelsen 1998:61–62, 135–138, Hankamer and Mikkelsen 2005:97–103). With such nouns, the definite article is used irrespective of syntactic context (8b–d):

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<sup>2</sup>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 (1993:113–27) and Dahl (2004). All data discussed below is from standard Danish.

<sup>3</sup>Glossing conventions are DEF for ‘definite’, and GEN for ‘genitive’.

<sup>4</sup>The definite article is homophonous with the demonstrative determiner, except for the latter being 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.)

- (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*

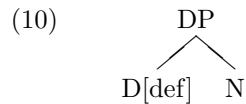
The pattern in (5)–(8) qualifies as a Poser-alternation in that the grammaticality of the periphrastic construction (*den* N) is inversely correlated with the grammaticality of the lexical form (N-*en*).

## 2.2 Hankamer and Mikkelsen’s structure-based analyses

Hankamer and Mikkelsen (2002:160–1) 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 take issue with, as it is incompatible with their general claim that all blocking phenomena are reducible to competition for Vocabulary Insertion, and do not involve any global search for alternatives. But Hankamer and Mikkelsen (2005:103–7) also developed a DM analysis of the Danish definiteness alternation that reduces it to competition for Vocabulary Insertion. 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”, and summarize it as follows:<sup>5</sup>

- (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 free-standing article.

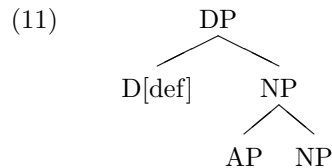
To see how the sisterhood condition applies to the data in (5)–(7), we need to consider the syntactic structures involved. In (5), there are no modifiers and thus D[def] is a sister to a minimal N, as shown in (10).



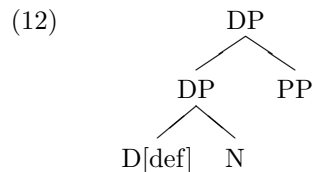
By the sisterhood condition, D[def] is realized as a suffix. In (6), there is an AP adjoined to the NP sister of D[def]:

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<sup>5</sup>See below for the analysis of morphological gaps in the distribution of the definite suffix.



Consequently, the sister of D[def] is not a minimal N and the suffix cannot be inserted. Instead the elsewhere form is used. Finally, Hankamer and Mikkelsen (2005) argue that PPs adjoin to DP so that (7) has the structure in (12):



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.

Thus the apparent blocking of phrasal forms by lexical forms is reduced to a Paninian 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 its authors thought innocuous but turns out to have interesting consequences. That assumption is that a VI can have as part of its specification 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), H&M 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 VIs in (13). (We continue to abstract away from number-gender distinctions on D; see Hankamer and Mikkelsen (2005:104) for the fully specified Vocabulary Items.):

- (13)
- a.  $-en \longleftrightarrow [D, \text{def}]$  if sister to a minimal N whose exponent is not *studerende*, ...
  - b.  $den \longleftrightarrow [D, \text{def}]$  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. Hankamer and Mikkelsen (2005:105) extend Halle’s Subset Principle to include syntactic restrictions on insertion context, with the effect that the definite suffix will be inserted whenever it can be inserted, i.e. 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 Vocabulary Insertion.

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 linear adjacency analysis

E&M 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 (p. 44):

$$(14) \quad \begin{array}{l} \textit{D-suffixation} \\ D[\textit{def}] \frown N \rightarrow [[N]D[\textit{def}]] \end{array}$$

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

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 linearized<sup>6</sup>) 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 and thus D-suffixation applies and that in turn results in the bound morph of D[def] being 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 in (7), and therefore do not disturb the linear adjacency of D[def] and N. Consequently D-suffixation applies and produces the insertion context for the definite suffix. From now on we will call this the Adjacency analysis.

## 2.4 Summary and look-ahead

The immediate difference between the Sisterhood and Adjacency analyses is 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 is in assumptions about the nature of VI rules: H&M assume that a VI can specify whether its exponent is a prefix, a suffix, or a free morpheme; E&M apparently do not assume that, although the standard DM practice of including directionality markers (hyphens) in VI rules indicates that they should. See section 4. The first is a difference 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

<sup>6</sup>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 rule (14) applies, to guarantee that it is adjacent to N.

allomorphy can in fact be a result of VI competition, precisely of the kind that E&M say cannot exist.

### 3 Adjacency vs. Sisterhood: beyond the core data

As E&M observe, the core definiteness marking data exhibits a left-right asymmetry: prenominal material (i.e. a prenominal adjective) co-occurs with the definite article, whereas post-nominal material (i.e. a postnominal PP complement or modifier) co-occurs with the definite suffix. Below we present two cases in which post-nominal material gives rise to the definite article. The first involves restrictive relative clauses, the other 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 Hankamer and Mikkelsen (2009, 2012). The restrictive relative clause facts are part of the published literature (e.g. Delsing 1993:119; Hankamer and Mikkelsen 2002: 144-5, 165-8; Hankamer and Mikkelsen 2005: 107-18, Hankamer and Mikkelsen 2008: 336-8). E&M acknowledge (fn. 29) the existence of the relative clause facts, but they fail to acknowledge that the relative clause facts are problematic for their analysis.

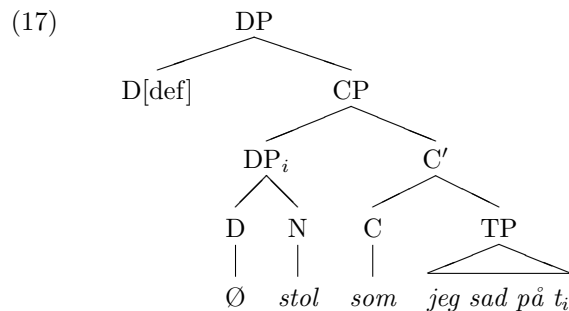
#### 3.1 Restrictive relative clauses

Restrictive relative clauses co-occur 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* [non-restrictive]  
              Some speakers: *the chair that I sat on* [restrictive]

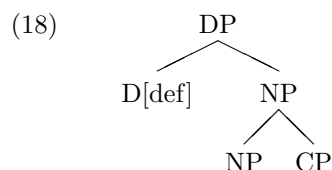
The prenominal version in (15) is acceptable to all speakers, whereas some speakers only allow a non-restrictive reading for (16); Hankamer and Mikkelsen (2002:166), Hansen and Heltoft (2011:1520). There is thus complexity in the data, which is discussed in detail in Hankamer and Mikkelsen (2005). The important point here is that on the adjacency view there shouldn't be any complexity: the D and N are adjacent, and the only possibility should be suffixation (as in 16). The possibility of non-suffixation 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), H&M propose a head-raising analysis of restrictive relative clauses, in which (15) has the structure 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) (Hankamer and Mikkelsen, 2002):



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

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 (19).<sup>7</sup> In the absence of a preposition, definiteness is realized as a prenominal article (20).<sup>8</sup>

- (19)
- 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

<sup>7</sup>The string in (19b) is grammatical on a demonstrative reading of *den*; see fn. 4.

<sup>8</sup>The string in (20b) 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, and thus involving a different structure than the one in (21). Specifically, apposition of DP and CP allows D[def] and N to be sisters, which is what licenses the definite suffix.

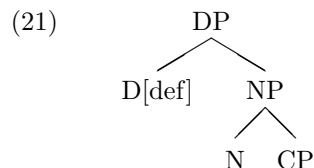


- (20) a. den aftale at vi lægger nøglen i skuret  
 DEF agreement that we put key.DEF in shed.DEF  
*the agreement that we leave the key in the shed*
- b. \*aftal-en at vi lægger nøglen i skuret  
 agreement-DEF that we put key.DEF in shed.DEF

As discussed in Hankamer and Mikkelsen (2012), these two constructions differ in meaning and use. The prepositional construction in (19) presupposes existence and is used anaphorically. The bare CP construction in (20) asserts existence and is used to establish reference (in the sense of Hawkins (1978)).

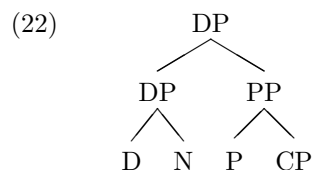
What's important for present purposes is that we observe an alternation between suffixal and prenominal definiteness marking governed by post-nominal material. This is what E&M claim never happens. The D-suffixation rule in (14) yields the correct outcome for the prepositional structure in (19). Since the PP is realized post-nominally, nothing intervenes between D[def] and N and so, at linearization, D[def] and N are concatenated. Thus the environment for the D-suffixation rule in (14) is met and the rule applies, yielding the suffixed form in (19a). The trouble is with (20). Again, the CP is realized post-nominally, and so D[def] and N are concatenated. Thus the structural description for the D-suffixation rule is met and, since rules apply when their structural description is met (E&M p. 27), the Adjacency analysis wrongly predicts suffixal definiteness marking in (20).

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 (20), the simplest possible analysis is that the CP is a complement to N, as in (21):



In the structure in (21), 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 (20).<sup>9</sup>

Turning to the construction in (19) where the CP complement is encased in a PP, we propose that the use of suffixal definiteness marking follows from DP-internal PPs attaching high in Danish, i.e. to DP, not to NP, as schematized in (22).



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) above.

<sup>9</sup>Hankamer and Mikkelsen (2012) develop a more abstract analysis in which the CP is a complement to D and D itself undergoes headraising 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.

### 3.3 Linear adjacency is not enough

The Adjacency analysis takes as 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, we find that the presence of material to the right of N licenses the prenominal article. We see no way to account for this 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 as tabulated below:<sup>10</sup>

(23) Distribution of Danish definiteness markers

| DP  | 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]                                 | *                | ✓               | (19)       |
| 5. D N CP <sub>non-restrictive relative</sub> | *                | ✓               | (15), (16) |
| 6. D N CP <sub>restrictive relative</sub>     | ✓                | ✓               | (15), (16) |
| 7. D N CP <sub>complement</sub>               | ✓                | *               | (20)       |

There is a limited left-right asymmetry in this data set: if an element other than D appears prenominally, i.e. to the left of N (row 2), definiteness is realized as an article. If an element appears to the right of N, definiteness may be realized suffixally (rows 3, 4, 5, 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 Hankamer and Mikkelsen (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.

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 such it remains a stipulation. There are three considerations that we feel justify nonetheless keeping this assumption and

<sup>10</sup>Hankamer and Mikkelsen (2008) analyze definiteness marking in Danish pseudopartitive constructions, the correspondents of English *a cup of coffee*. There are two of these; what Hankamer and Mikkelsen call the Direct Pseudopartitive and what they call the Indirect Pseudopartitive. The Indirect Pseudopartitive takes the form of the English pseudopartitive, i.e. D N PP, and, when definite, behaves as tabulated for row 3 in the table in taking suffixal definiteness. The Direct Partitive 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 linear Adjacency analysis, but the challenge is somewhat illusory because, as Hankamer and Mikkelsen (2008) show, 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. Hankamer and Mikkelsen (2008) don’t provide an explanation for this restriction, but suggest that the explanation is not morpho-syntactic, but semantic in nature. If so, Direct Pseudopartitives are not relevant for distinguishing competing analyses of the realization of definiteness, and hence we omit them in the table in (23).

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. Secondly, 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:chapter 5) offers the PP Peripherality generalization in (24) based on a cross-linguistic 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 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 claims about PPs being higher than AP and articles is strictly for complement PPs, whereas we assume it for PPs of all kinds, including modifiers.

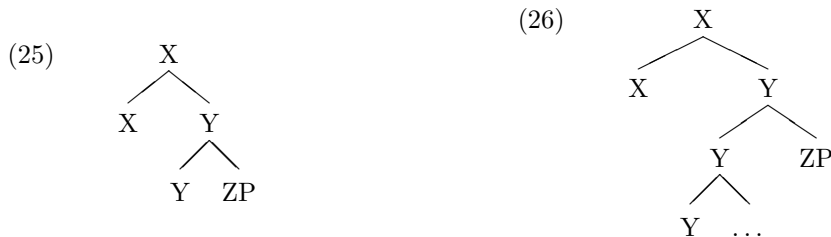
The third and final consideration is that when we compare the challenge faced by the Adjacency analysis (rows 6 and 7) to the challenge faced by the Sisterhood analysis (rows 3 and 4), they are different in kind. The challenge presented by postnominal PPs for the Sisterhood analysis is that a special 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 post-nominal material can license prenominal definiteness marking, and also no additional assumption about linear order or structure that would enable it to account for this. As such 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 (pp. 4, 20, 25, 31, 34, 35, 39-40, 43, 44, 47, 48, 51).<sup>11</sup>

### 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

<sup>11</sup>In a footnote (footnote 26, pp. 26-27), E&M furthermore suggest that Hankamer and Mikkelsen’s (2002) account of the lack of adjectival modification of derived definite nouns (cf. (6)) is less than solid. Specifically they sketch a derivation in which a definite noun derived by Rule D (e.g. *stol-en* ‘chair-DEF’) takes an NP complement that is headed by a null N and that NP hosts an attributive adjective, yielding the ungrammatical string *\*stol-en brune* ‘chair-DEF brown’. But Hankamer and Mikkelsen’s (2002) 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” (36c, p. 155). 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 and thus a derived D would inherit the complement-taking abilities of the input noun. Hankamer and Mikkelsen (2002:156, 158–9) show that this is empirically correct by comparing the relational noun *ejer* ‘owner’ with the non-relational 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 Hankamer and Mikkelsen’s (2002) analysis.

quote E&M “what 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 complement to Y or specifiers/adjuncts in the phrase headed by Y—prevent a lexical form from occurring” (p. 50; tree diagrams below are their (92) and (93)).



Above we have examined two instances where the presence of a ZP adjunct or complement to Y affects the realization of X in structures like (25-26). These are the relative clause structure in (18) and the CP-complement structure in (21). A third, and slightly different, instance is documented in 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).<sup>12</sup> 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 is non-branching (p. 4). This is illustrated for *yer* realization in (27) and (28) below, with the alternating vowel in bold.<sup>13</sup>

- (27) a. v**o** sne  
in dream

b. PP  
   / \  
  P N

(Vera Gribanova, p.c.)
- (28) a. v(\***o**) sne o zajchikax  
in dream about bunnies

b. ... v sne Dmitrija  
in dream Dimitri.GEN  
... *in Dmitri’s dream.*

c. PP  
   / \  
  P NP  
     / \  
    N XP

(Vera Gribanova, p.c.)

(Bakhtin via Blumenfeld 2012:(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

<sup>12</sup>Gribanova and Blumenfeld (2013) extend their analysis to prefixes, which are largely homophonous to the prepositions. Here we focus on the prepositional case, since that is sufficient to make our point.

<sup>13</sup>See Blumenfeld (2012:§2.3) for additional examples. The structures in (27b) and (28c) are taken from Gribanova and Blumenfeld (2013:8).

(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 constitutes 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).

## 4 Definite Allomorphy and Wordhood

Recall from the introduction, by way of (29) below, that one of E&M’s key claims is that there is no blocking at the word level or above (29b).

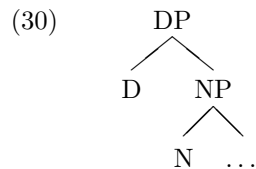
- (29)
- a. Blocking is analytically reducible to competition for Vocabulary Insertion.
  - b. There is no blocking at the word level or above.
  - c. Poser alternations (i.e. alternations where the well-formedness of a periphrastic form is inversely related to that of a lexical form as in (1) above) always result from morphological rules that are sensitive to linear adjacency, and not hierarchical structure.

E&M assume that this follows from claim (29a), that blocking alternations are always the result of VI competition. While we accept claim (29a) as plausible, we have presented an analysis of the Danish definiteness alternation in which the alternation between free and bound allomorphs **is** directly a matter of VI competition. So we accept claim (29a), but deny claim (29b), while E&M seem to believe that (29b) follows from (29a).<sup>14</sup> What assumption are we making that they are not? In this section we will try to expose the fundamental (one might say “architectural”) differences between our assumptions and theirs.

### 4.1 Keys to the E&M analysis

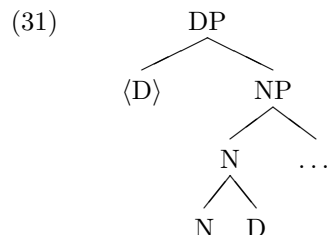
E&M believed that the definiteness realization alternation had to be linked to a local dislocation of the D[def] morpheme subject to linear adjacency. There seem to be two reasons for this. First, they were convinced that context to the right of N didn’t matter; in addition, they adopt what we will call the “wordhood condition” (p. 7): “...multiple terminal nodes that are packaged as one complex head by the syntax or PF are “one word”, in an informal way of speaking ...”.<sup>15</sup>

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



<sup>14</sup>This is perhaps clearest in their abstract, where they state claim (29a) and then continue “There is **thus** no blocking at the word level or above.” (Emphasis added.)

<sup>15</sup>We might be mistaken in assigning any theoretical weight to this statement, but we can’t see any other way of understanding the line of inference that leads from claim (29a) to claim (29b), and in any case we think the question of wordhood is interesting.



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. It can't 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 a bit of attention to spell 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 (cf. Bobaljik 2000, 2012, Embick 2010), in part because it is very common for affix morphology to depend on morphological and phonological properties of the root.

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 which idiosyncratically prohibit D-suffixation. Subsequent to VI of the N, but before VI of D, the rule of D-suffixation applies, sensitive to linear adjacency. Consequently, before D-suffixation can be applied the linearization of D with its complement NP, and the linearization of elements within the NP, must have taken place. Without this, the D-suffixation rule would have no way of knowing whether D is linearly adjacent to N. The order of operations thus must be something like (32):<sup>16, 17</sup>

- (32)
- a.  $\left\{ \begin{array}{l} \text{VI N} \\ \text{linearize elements of NP} \\ \text{linearize D NP} \end{array} \right\}$
  - b. D-suffixation
  - c. VI 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 (their (8)):

- (33) The Late Linearization Hypothesis  
The elements of a phrase marker are linearized at VI.

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,<sup>18</sup> since we believe we have already shown that the correct condition for D-suffixation is not linear adjacency but sisterhood to N.

<sup>16</sup>The curly brace in (32a) conveys that we assume no crucial ordering between these three operations.

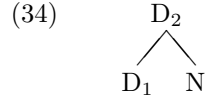
<sup>17</sup>It occurred to us to wonder whether E&M could have intended VI of D to **precede** D-suffixation (though it does not seem so from their presentation); but that would necessitate a number of phonologically unmotivated post-VI readjustments, so we conclude that they could not have intended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

<sup>18</sup>Some practitioners of DM (e.g. Embick 2010, Henderson 2012, Arregi and Nevins 2012) have proposed a more

## 4.2 Wordhood

Let us return to the wordhood condition: “multiple terminal nodes that are packaged as one head by the syntax or PF are “one word” ...” (E&M, p. 7). On the assumption that D might suffix to a linearly adjacent N which 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) above.

If, however, we are correct in our assertion 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 VI for D[def] could simply specify that D spells out as a suffix (with the appropriate shape) attached to N.

**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: “Morphology gives no output (so the derivation crashes) if presented with an element 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 continues: “On this natural assumption the largest phrases entering Morphology are  $X^0$ s.”

Now Chomsky can’t mean “Morphology” in the DM sense; he appears to mean that part of morphology that is responsible for spelling out words, which in DM terms would be the VIs of the individual morphemes. The content of the wordhood assumption 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, then  $[D\ N]_{\mathbb{D}}$ , where N is a complement of D, can’t 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

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complex interaction between linearization and VI. Just to take Embick (2010) as an example, linearization systematically precedes VI (Embick 2010:(56), p. 42):

1. (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:  $\sqrt{\text{ROOT}} \frown v, v \frown T[\text{past}]$
  - iii. VI at  $v: \sqrt{\text{ROOT}} \frown [v, -\emptyset], [v, -\emptyset] \frown T[\text{past}]$
  - iv. Pruning:  $\sqrt{\text{ROOT}} \frown [v, -\emptyset], [v, -\emptyset] \frown T[\text{past}] \rightarrow \sqrt{\text{ROOT}} \frown T[\text{past}]$
  - v. VI at T[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 which spell out the morphemes.

resulting structure  $[D\ N]_N$  could be a word. Then the Local Dislocation operation 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.

### 4.3 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 the D-suffixation operation 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.

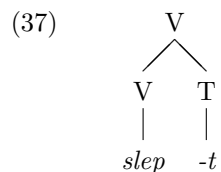
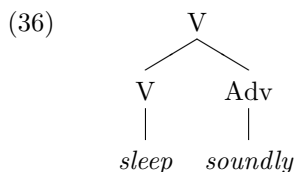
### 4.4 Another Alternative

We suggest here 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, reworded in (35):

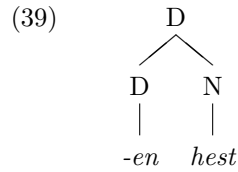
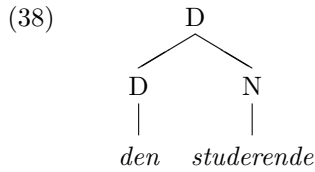
- (35) Wordhood Condition  
A word must correspond to a (possibly complex) head.

It needs to be immediately noted 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* is a complex head having the structure  $[[den]_D\ [studerende]_N]_D$ , but spells out as two words, while *hest-en*, with the same structure, spells out as one. This is due to the fact that *studerende*, like most Ns, is a free form; and that the allomorph of D[def] selected in the environment of  $[\_\ [studerende]_N]_D$  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 properties 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 morpheme. 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 spellout side of a Vocabulary Item, cf. E&M: (4), p.5; (25), p.13; (32), p.17; (39), p.21; Embick 2010: (4), p.9; (24), p.30; (32), p.33; (36), p.35; (60), p.44 (and many more). We can observe two things about this practice: (a) VIs for morphemes that are free don’t 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 spellout 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).<sup>19</sup>

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

- (40) Bound vs. Free is a Property of Exponents<sup>20</sup>  
 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 (that is, the bundle of morphosyntactic features that constitute the pre-VI morpheme), but is rather a property of the VI rules that spell out the morpheme.

<sup>19</sup>Someone might counter that the hyphens in the VIs 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 Verb (by Merge) and a T (a bound form) adjoined to V (by lowering).

<sup>20</sup>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 (41):

- (41) 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 Items spelling out the morpheme. If a morpheme is bound,

Our third assumption follows naturally.

- (42)      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 Paninian competition, may be required to surface).

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

- (43)      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.

## 4.5 Danish Definiteness Allomorphy

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

1. D[def] has two<sup>22</sup>allomorphs, one free and one bound, represented by the following VIs:  
     -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 [Ddef N]<sub>D</sub>, if N is not exceptional, Ddef 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 say all blocking should be. It is 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.

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whether it is a prefix or a suffix is also encoded in its VI(s).

<sup>21</sup>There might be subsequent local dislocations, but by hypothesis (43) a morpheme that has not undergone VI cannot undergo Local Dislocation, because it has no linearization relations to be changed.

<sup>22</sup>Still abstracting away from differences due to gender and number.

## 5 Conclusion

The starting point of this investigation was the empirical claim of E&M that there are no Poser alternations that depend on anything other than linear adjacency between involved elements. We have shown that the phenomenon of Danish definiteness allomorphy is an example of precisely such an alternation. Examination of a fuller range of facts than those considered by E&M reveals that the choice of definite suffix vs. free-standing article is not determinable in terms of linear adjacency between the D and N; rather, as argued previously in Hankamer and Mikkelsen (2005), it is sisterhood between D and N that determines the selection of the suffix.

An examination of ways of accounting for this alternation leads to an examination of the question 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 VIs can specify whether their exponents are free or bound forms, and if bound whether prefix or 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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