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C-command and Local Dislocation in the Danish DP: A reply to Hankamer and Mikkelsen

In a series of papers Hankamer and Mikkelsen develop an analysis of Danish definiteness marking in Distributed Morphology. They propose that Vocabulary Items that realize the definite determiner are sensitive to whether their complement is a minimal projection of N. In this reply, I discuss a central theoretical problem for this analysis: Under standard assumptions in Distributed Morphology, no other nominal morphology can be derived in the syntax. I propose an alternative analysis that still relies on competition between Vocabulary Items, but the vocabulary is sensitive to immediate asymmetric c-command rather than sisterhood to a minimal N.

Keywords: Danish, definiteness, Distributed Morphology, morphosyntax

1   Introduction

In a series of papers, Hankamer and Mikkelsen (2005, 2008, 2018a,b) develop a morphosyntactic analysis of definite suffixation in Danish DPs. Beginning with their 2005 reply to Embick and Noyer (2001), they adopt the view that the definite suffix and definite article are allomorphs of the definite determiner (henceforth $D_{[DEF]}$) and propose this allomorphy is conditioned by whether the sister of $D_{[DEF]}$ is a minimal projection of N. They employ this proposal in several subsequent papers (2008, 2018a, 2018b), and Author (2011) attempts to extend the proposal to double definiteness marking in Swedish. While their analysis is ostensibly couched in Distributed Morphology (Halle and Marantz 1993; henceforth DM), in this reply I argue the proposal is in fact incompatible with mainstream DM. For their proposal to be viable, all nouns – even morphologically complex ones – must be syntactically atomic. No nominal affixes can be syntactically independent from the noun except the definite suffix. This contravenes SYNTAX ALL THE WAY DOWN, a core tenet of DM which states that '[t]he primary mode of meaningful composition in the grammar, both above and below the word-level, is the syntax' (Bobaljik 2017).

In Section 2, I review the core facts regarding definiteness in Danish DPs and Hankamer and Mikkelsen's analysis. In Section 3, I show that standard assumptions about morphological derivation in DM do not allow any meaningful reference to whether the sister of $D_{[DEF]}$ is minimal: Under DM all nouns are syntactically complex, so any nominal complement of $D_{[DEF]}$ will be non-minimal. I discuss similar challenges posed by number inflection in Section 4. In Sections 5 and 6, I propose a revised analysis that preserves Hankamer and Mikkelsen's key insight – that certain kinds of modification condition the alternation – while avoiding reference to the minimality of the sister of $D_{[DEF]}$. I argue that the DM operation Local Dislocation plays a key role in placing the suffix on nouns, *pace* Hankamer and Mikkelsen (2018b), but I maintain that linear adjacency between D and N is not solely responsible for triggering the operation, *contra* Embick and Marantz (2008). Ultimately, this analysis opens up the structure of DPs, allowing for more conventional accounts of many phenomena dis-

cussed by Hankamer and Mikkelsen (2005, 2008, 2018a).

2   Background

In this section, I review Hankamer and Mikkelsen's main proposals about definiteness suffix-ation in Danish. Since most of the arguments for their analysis originate in Hankamer and Mikkelsen 2005, I will concentrate on this paper, bringing up the others as necessary.

2.1   Background on definiteness in Danish DPs

DPs in Danish express definiteness with either a freestanding article or a suffix on the noun. Unmodified nouns, as in (1a) and (2a), take the suffix. DPs with certain modifiers, including adjectives, some restrictive relative clauses, but not PPs, use the definite article, as in (1b) and (2b). The suffix, as (1c) and (2c) show, cannot be used with a modifying adjective. Unlike in the related languages Faroese, Norwegian, and Swedish, the article and suffix cannot co-occur as in (1d) and (2d). The article and suffix both reflect the gender of the noun (either common gender, or neuter) and the number (singular or plural).[1]

(1)   *hest* 'horse' (common gender):

      a.   hest   -en   c.   *gaml-e hest-en

            horse -DEF.CG   old-DEF horse-DEF.CG

            'the horse'   *Intended*: 'the old horse'

      b.   den   gaml-e hest   d.   *den   gaml-e hest-en

            the.CG old-DEF horse   the.CG old-DEF horse-DEF.CG

            'the old horse'   *Intended*: 'the old horse'

(2)   *hus* 'house' (neuter gender):

      a.   hus   -et   c.   *rød-e   hus-et

            house -DEF.NG   red-DEF house-DEF.NG

            'the house'   *Intended*: 'the red house'

      b.   det   rød-e   hus   d.   *det   rød-e   hus-et

            the.NG red-DEF house   the.NG old-DEF horse-DEF.NG

            'the red house'   *Intended*: 'the red house'

I refer to the alternation between the suffix and article as the ARTICLE–SUFFIX ALTERNATION. The article and the suffix are in complementary distribution. This observation has led to the idea, which Hankamer and Mikkelsen adopt, that there is only a single underlying D head that is realized differently in different contexts (Delsing 1993).[2]

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[1]   Glosses used in this paper: CG = common gender, DEF = definite, NG = neuter gender, PL = plural. I discuss plural in Section 4.

[2]   This is not a universal assumption; Julien (2005), for instance, argues that the article and suffix are exponents of different functional heads.

As mentioned, restrictive relatives can also condition the appearance of the prenominal determiner, but non-restrictive relatives do not (Hankamer and Mikkelsen 2002: 144):[3]
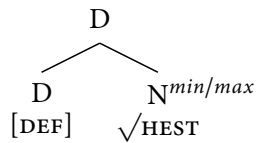
(3) a. Den hest   der vandt løbet,   er til salg.
         the horse that won   race.DEF is to sale

         'The horse that won the race is for sale.'   (*Restrictive*)

     b. Hest-en,   der vandt løbet,   er til salg.
         horse-DEF that won   race.DEF is to sale

         'The horse, which won the race, is for sale.'   (*Non-restrictive*)

As Hankamer and Mikkelsen (2018b) discuss at length, the data in (3a) preclude any analysis proposing that linear adjacency between $D_{[DEF]}$ and N results in suffixation (*cf.* Embick and Marantz 2008; see also Section 5.2). I take this as a given.
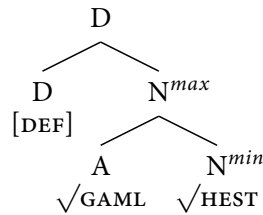
2.2 Explaining the pattern

Hankamer and Mikkelsen (2002) propose that the article–suffix alternation is conditioned by whether NP is modified by an adjective or restrictive relative. They argue, *pace* Delsing (1993), that adjectives are adjuncts to NP and not heads of a complement to D:

(4) a. *Unmodified noun:*[4]   b. *Noun with adjectival modifier*:

$$
\begin{array}{c}
\text{D} \\
\diagup\diagdown \\
\begin{array}{cc}
\text{D} & \text{N}^{min/max} \\
[\text{DEF}] & \sqrt{\text{HEST}}
\end{array}
\end{array}
\qquad
\begin{array}{c}
\text{D} \\
\diagup\diagdown \\
\begin{array}{cc}
\text{D} & \text{N}^{max} \\
[\text{DEF}] & \diagup\diagdown \\
& \begin{array}{cc}
\text{A} & \text{N}^{min} \\
\sqrt{\text{GAML}} & \sqrt{\text{HEST}}
\end{array}
\end{array}
\end{array}
$$

Hankamer and Mikkelsen (2005) adopt Bare Phrase Structure (BPS; Chomsky 1995). Under BPS, $D_{[DEF]}$ merges with a minimal N when N is unmodified. When N is modified it will project, so D will merge with a non-minimal projection of N. Under DM, several Vocabulary Items may compete to realize a single terminal node. Hankamer and Mikkelsen propose that the article–suffix alternation can be explained by making the Vocabulary Items that can realize $D_{[DEF]}$ sensitive to the syntactic structure. They propose that there are both suffixal (5a) and free-standing (5b) exponents of $D_{[DEF]}$. The definite suffix realizes $D_{[DEF]}$ when $D_{[DEF]}$ is sister to a minimal N projection. The article is used elsewhere:

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3 While (3a) is always interpreted as a restrictive relative, some speakers can interpret (3b) as restrictive as well. See Hankamer and Mikkelsen (2005: 107–118) for discussion. On the analysis here, this might suggest that some speakers allow restrictive relatives to adjoin to to the n^{max} rather than Num^{max}; see the discussion of adjunct PPs in Section 6.1.

4 Following the usual assumptions of Bare Phrase Structure, I assume that the distinction between minimum and maximum projections is not actually encoded formally on any label in the tree. The *min* and *max* labels on nodes here and throughout are provided as a convenience to the reader.

(5)   *Vocabulary items* (after Hankamer and Mikkelsen 2005: 104, example (35)):

    a.   *-en* ↔ [D, CG, DEF] if sister to a minimal N

    b.   *den* ↔ [D, CG, DEF] elsewhere

Halle and Marantz (1993: 123–124) originally proposed that Vocabulary Items may be specified for a context into which their exponents are inserted. Hankamer and Mikkelsen's innovation is the proposal that this specification may reference the syntactic structure itself rather than just the identity and morphosyntactic features of the adjacent syntactic nodes.

    Hankamer and Mikkelsen's (2005) proposal is a response to Embick and Noyer's (2001) DM implementation of Delsing's (1993) N-to-D head movement analysis, which assumes adjectives project a phrase that intervenes between D and N. They propose $D_{[DEF]}$ is always realized as *-en* and that N moves to $D_{[DEF]}$ unless an intervening adjective blocks this movement (assuming the Head Movement Constraint; Travis 1984). When N-to-D movement is blocked, a /d/ segment is inserted to rescue the stranded *-en*:

(6)   *Embick and Noyer's (2001) head-movement analysis*:
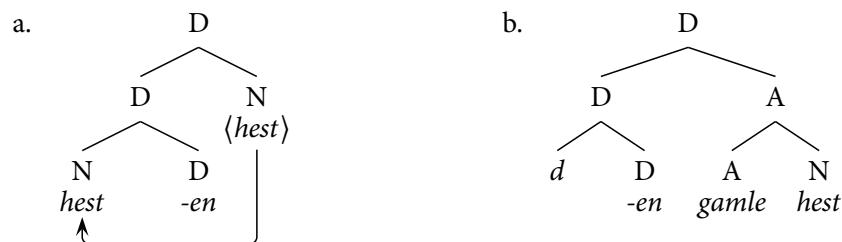
Hankamer and Mikkelsen's proposal avoids many issues encountered by Embick and Noyer. Due to space limitations, I will not rehearse them all (see Hankamer and Mikkelsen 2005: 95–103),[5] but a key issue is the conjecture that adjectives block head movement. Hankamer and Mikkelsen (2002, 2005), however, argue adjectives are adjuncts, not heads, and so cannot block head movement. They also point out that restrictive relatives can cause the article to appear instead of the suffix. Since relative clauses are presumably adjuncts, the fact they condition the article cannot be due to an intervening head.

    Hankamer and Mikkelsen's syntactically specified Vocabulary Items (5) permit adjuncts to have this apparent blocking effect. No movement needs to be blocked since suffixation involves no movement. The only factor is whether the complement of $D_{[DEF]}$ is minimal or maximal. The direction of the adjunct (pre-nominal like an adjective or post-nominal like a relative clause) is correctly predicted to be irrelevant, and the fact that adjectives linearly intervene between D and N has nothing to do with the appearance of the article.

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5   There are two other criticisms in Hankamer and Mikkelsen 2005. First, recalling their 2002 analysis, they note that it's unclear why adjectives cannot move to D; however, it is already widely assumed that head movement is sensitive to category (after all, many languages have V-to-T movement but not A-to-T movement), so I do not see this as a significant problem for the head movement analysis. Their second criticism comes from the observation that some nouns do not take the definite suffix and therefore a blanket N-to-D analysis cannot explain why the determiner appears as a separate word in this case; however, this criticism is significantly undermined in their 2018b paper where they entertain the idea that not all complex heads are realized as single words.

Hankamer and Mikkelsen's proposal, however, takes as a critical assumption that it is possible for $D_{[DEF]}$ to take a minimal N as its sister. In the next two sections of this paper, I argue that this is not possible while maintaining central DM assumptions.

3   Lexical categories require branching structure in DM

A central hypothesis of DM is that words with lexical categories (nouns, verbs, and adjectives) are formed by combining, minimally, an acategorial root with a categorizing head. In some cases, both the root and the categorizing head contain phonological material:

(7) a.

n

$\sqrt{}$QUAL n
              -ity

b.

v

$\sqrt{}$QUAL v
              -ify

Apparent cases of morphological conversion are analyzed as different categorizing heads selecting the same root, as shown with the noun *hug* in (8a) and the verb *hug* in (8b).

(8) a.

n

$\sqrt{}$HUG n
             $\varnothing$

b.

v

$\sqrt{}$HUG v
             $\varnothing$

This has an important consequence for Hankamer and Mikkelsen's (2005) proposal: Under standard DM assumptions, $D_{[DEF]}$ will never take a minimal N as its complement because there is no such thing as a minimal N under DM. In order for their analysis to work, no nominal derivation may occur in the syntax and the only affix syntactically separate from the noun is the definite suffix.[6] That is, we must deny there is syntax all the way down.

3.1 $D_{[Def]}$ takes non-minimal complements

In their trees, Hankamer and Mikkelsen (2005) show nouns as syntactically atomic units indistinct from roots, suggesting (pp. 93, 104) that nouns are bundles of features including number and gender. This is not the usual assumption in DM. Under standard assumptions, $D_{[DEF]}$ will merge, at the very least, with a non-minimal projection of the categorizing head *n*. The trees in (4) receive the following representations under standard DM assumptions:

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6   I use the terms INFLECTIONAL and DERIVATIONAL in this paper for descriptive purposes, but as is common in DM I assume no formal distinction between them.
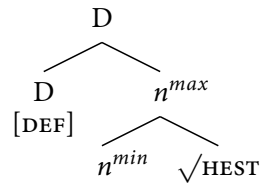
(9)   a.   *Unmodified noun:*   b.   *Noun with adjectival modifier:*
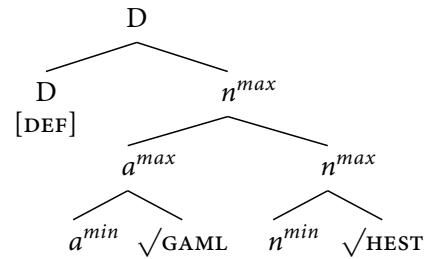
Since the sister of $D_{[DEF]}$ will never be a minimal N, specifying Vocabulary Items to be sensitive to the minimal–maximal distinction cannot account for the article–suffix alternation. The choice between suffix and article, therefore, cannot be determined by whether the complement of $D_{[DEF]}$ is a minimal projection of N (or any other category) as there is simply no way for $D_{[DEF]}$ to take such a complement under DM.
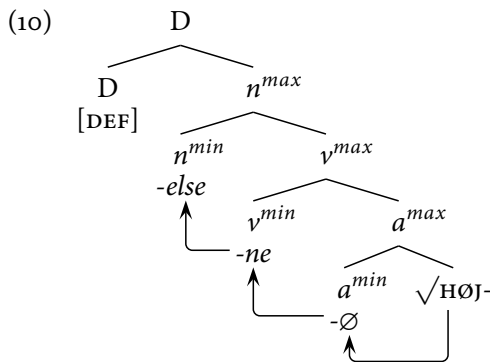
3.2   Derivationally complex nouns

We could reject the DM assumption that outwardly simplex words like *hest* 'horse' are composed of a root and categorizing head and instead assume they are stored in the list of syntactic atoms as nouns. This is equivalent to Hankamer and Mikkelsen's (2005) structural assumptions in (4a) and (4b) and would allow for the use of the Vocabulary Items in (5).

The question then becomes how to analyze derivationally complex nouns and nominalizations.[7] Under DM, the syntax builds morphological structure; no other component of the grammar can derive morphologically complex words. Since by hypothesis only one Vocabulary Item may realize a syntactic terminal, it follows that each affix represents a syntactic node; in Harley's (2009: 322) words, though not every terminal node will be realized, 'where you do see a morpheme, there had better be a terminal node'.

Danish, of course, has derivationally complex nouns, and most take the definite suffix. For example, the noun *højnelse* 'raising' is derived from the verb *højne* 'to heighten, raise' and the nominal suffix *-else*. This verb is derived from the adjective *høj* 'high' and the verbal suffix *-ne*. A DM derivation of this word, following Harley (2009), should look as in (10).

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7   Hankamer and Mikkelsen (2005: 99) only briefly discuss derivationally complex nouns, focusing on common gender deverbal nouns derived with the suffix *-ende*, which do not take a definite suffix. They take the view that these nouns are syntactically atomic in part, they say, because it is easier to extend Embick and Noyer's analysis if they are. As the discussion here shows, though, this is the only choice they can make for most nouns. They propose that these nouns do not take the suffix because every common gender noun containing *-ende* is listed as an exception to Vocabulary Item for the neuter gender suffix. I assume an exception is listed only for neuter *n* *-ende* .

(10)

$$
\begin{array}{c}
\text{D} \\
\diagup\diagdown \\
\text{D} \qquad n^{max} \\
\text{[DEF]} \\
\qquad n^{min} \quad v^{max} \\
\qquad \text{-else} \\
\qquad\qquad v^{min} \quad a^{max} \\
\qquad\qquad \text{-ne} \\
\qquad\qquad\qquad a^{min} \quad \sqrt{}\text{HØJ-} \\
\qquad\qquad\qquad \text{-}\varnothing
\end{array}
$$

Thus, *hønelse* is derived from a complex syntactic structure under DM. Since *n* takes a complement, it projects a non-minimal label. The prediction, following Hankamer and Mikkelsen, is that the definite article should be used with this noun since, as shown in (10), the complement of $D_{[DEF]}$ will be non-minimal. Yet, this noun appears as *højnelsen*, with the suffix, when unmodified. It behaves no differently than the outwardly simplex *hest* 'horse'.

For the Vocabulary Items in (5) to provide a viable analysis of the article–suffix alternation, we must assume morphologically complex nouns are syntactically atomic, otherwise $D_{[DEF]}$ will not take a minimal N as its complement. No nominalization or nominal derivation may occur in the syntax, in direct conflict with DM's central tenet of syntax all the way down. To be clear, this is not just a notational problem, derived from the choice of using DM's categorizing heads. To accommodate Hankamer and Mikkelsen's Vocabulary Items in (5), we must assume an essentially lexicalist analysis of nominal derivation, and to that end the analysis is directly at odds with the constructionist assumptions of mainstream DM.

3.3   Summary: No minimal Ns

I have shown that Hankamer and Mikkelsen's (2005) analysis of definiteness suffixation in Danish is incompatible with core assumptions about morphological derivation in DM. If the realization of $D_{[DEF]}$ is sensitive to the minimality of its sister, one must assume no nominal morphological structure is built in the syntax. This leads to a strange conclusion: The only nominal affix that can be syntactically separate from the noun is the definite suffix. No other affixes may exist in the syntax. As I show in the next section, number inflection on nouns poses as similar challenge to Hankamer and Mikkelsen's analysis.
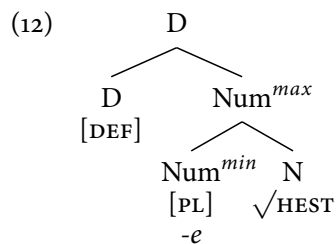
4   Plural DPs in Danish

Definiteness marking in plural DPs behaves the same as in singular DPs. Unmodified, plural nouns take the definite suffix *-ne*, and modified nouns require the definite article *de*, both underspecified for gender. The plural suffix is either *-e* or *-er*, depending on the noun stem:

(11) a. hest -e -ne
          horse -PL -DEF

          'the horses'

      b. de   gamle hest-e
          the.PL old.DEF horse-PL

          'the old horses'

      c. hus -e -ne
          house -PL -DEF

          'the houses'

      d. de   røde   hus-e
          the.PL red.DEF house-PL

          'the red houses'

Hankamer and Mikkelsen provide few details about how number morphology works in their system, but plural affixation may pose a challenge depending one's assumptions. DM requires each morpheme to represent a terminal node, so plural suffixes must be associated with a terminal node at PF. I show that for Hankamer and Mikkelsen's analysis to be viable, plural nouns must be syntactically atomic elements that enter the derivation bearing a plural feature. Plural suffixes must be inserted post-syntactically as dissociated morphemes.

4.1 NumP cannot be used

Recent discussions of the structure of DP, both inside North Germanic (Julien 2005, Norris 2012) and outside (Kramer 2016, Norris 2014), place number features in Num projections (Ritter 1992). It is not unreasonable to take this approach under DM. Every morpheme must be associated with a terminal node and Num provides one for plural suffixes. This is not possible under Hankamer and Mikkelsen's analysis. The Num projection, as shown in (12), keeps $D_{[DEF]}$ from taking a minimal N sister and Num will always be non-minimal.

(12)

$$
\begin{array}{c}
\text{D} \\
\diagup \quad \diagdown \\
\text{D} \qquad \text{Num}^{max} \\
\text{[DEF]} \quad \diagup \ \diagdown \\
\qquad \text{Num}^{min} \ \ \text{N} \\
\qquad \text{[PL]} \quad \sqrt{\text{HEST}} \\
\qquad \textit{-e}
\end{array}
$$

Use of Num projections, therefore, predicts the article must be used in definite plurals regardless of whether the noun is modified since $D_{[DEF]}$ is not a sister to a minimal N.
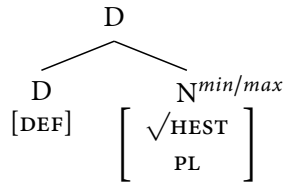
4.2 Number as a feature on the root/noun

To maintain Hankamer and Mikkelsen's analysis, nouns must enter the derivation with (interpretable) number features and cannot be specified on a separate head. To maintain the assumption that only one exponent may be inserted into a terminal, we could propose plural affixes are dissociated morphemes, terminals inserted into the morphosyntactic structure after syntax to host specific morphological features (Embick and Noyer 2001):
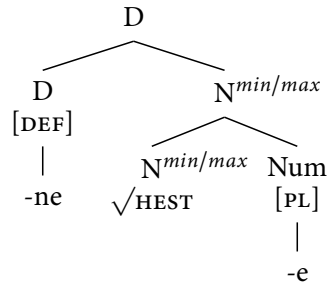
(13) $N_{[PL]} \rightarrow [N + Num_{[PL]}]$ (*A dissociated morpheme rule for plural*)

Assuming Dissociated Morphemes are adjoined to the head they are split off from, the resulting N head would still be minimal when Vocabulary Insertion occurs. So, by using another DM operation, we can account for plural suffixes on nouns under Hankamer and Mikkelsen's (2005) assumptions if nouns enter the derivation specified for number:

(14) a. *At Spell-Out*:

$$D$$

$$D \qquad N^{min/max}$$

$$[\text{DEF}] \qquad \begin{bmatrix} \sqrt{\text{HEST}} \\ \text{PL} \end{bmatrix}$$

b. *After rule (13) and Vocab. Insertion*:

$$D$$

$$D \qquad N^{min/max}$$

$$[\text{DEF}] \qquad N^{min/max} \quad \text{Num}$$

$$| \qquad \qquad \qquad [\text{PL}]$$

$$\text{-ne} \quad \sqrt{\text{HEST}}$$

$$|$$

$$\text{-e}$$

This works, but we are driven to the same conclusion as in Section 3: No affixes – either derivational or, now, inflectional – can exist in the syntax other than the definite suffix. All nominal affixes other than the definite suffix must be inherent parts of the noun.

4.3 Summary

The assumptions necessary for Hankamer and Mikkelsen's (2005) analysis to be viable are fairly distinct from typical DM assumptions about building morphologically complex words. The Vocabulary Items in (5) require all nouns to be syntactically atomic objects to ensure that the definite suffix will appear on unmodified nouns. The only affix that can be syntactically independent from the noun is the definite suffix. This would seem to require a kind of hybrid of lexicalism and DM, using syntax and Vocabulary Insertion for the definite suffix but building and inflecting nouns by some other means.

As I discuss below, the central problem with their analysis stems from the idea that the Vocabulary Items that realize $D_{[\text{DEF}]}$ are sensitive to whether $D_{[\text{DEF}]}$ is the sister to a minimal N. As I discuss below, if one replaces this structural condition with another that allows $D_{[\text{DEF}]}$ to take non-minimal complements, it is possible to retain their insight that Vocabulary Insertion is sensitive to structure while using mainstream DM assumptions.

5 An immediate c-command approach

In this section, I propose a revision to Hankamer and Mikkelsen's (2005) analysis of Danish definiteness marking that aims to cover the same range of data as their original proposal. I retain their proposal that Vocabulary Insertion into $D_{[\text{DEF}]}$ is sensitive to syntactic structure, but I argue the relevant condition is one of immediate asymmetric c-command between $D_{[\text{DEF}]}$ and Num^{min}. This avoids the issues raised above, but allows Vocabulary Items to be sensitive to adjunction. In Section 6, I will sketch how this analysis can be extended to a range of phenomena discussed by Hankamer and Mikkelsen (2005, 2008, 2018a).

5.1   Starting assumptions

Hankamer and Mikkelsen (2002, 2005, 2018b) make several interrelated insights that I assume should form the basis of any morphosyntactic analysis of this phenomenon:

(15)   a.   Some adjuncts (adjectives and relative clauses, but not PPs) play a role in determining if the article or the suffix is used (Hankamer and Mikkelsen 2002).

   b.   Appearance of the article is not conditioned on the failure of some head-to-head operation; *e.g.*, head movement or lowering (Hankamer and Mikkelsen 2002, 2005).

   c.   It is not linear adjacency between D and *n* that conditions the appearance of the suffix (Hankamer and Mikkelsen 2005: 116n., 2018b; *cf.* Embick and Marantz 2008).

I propose making the following two changes to Hankamer and Mikkelsen's analysis to bring it into accord with standard DM assumptions while keeping their central insights:

   (i)   Derive nouns by merging a categorizing *n* head with material in the syntax.

   (ii)   Revise the vocabulary items for $D_{[DEF]}$ to be sensitive to whether the head is in an immediate asymmetric c-command relation with a structurally adjacent head.

Change (i) is a standard assumption in DM, discussed in Section 3, and will not be elaborated further. Change (ii), however requires some more discussion.

Change (ii) is meant to capture the idea that Vocabulary Insertion is sensitive to the syntactic structure in which a phonological exponent is inserted. While Hankamer and Mikkelsen (2005) argue that it is the level of projection of the complement of $D_{[DEF]}$ that conditions definite suffixation, I have shown this requires non-standard assumptions about word building in DM. As such, I replace this condition with another that can distinguish whether the sister of $D_{[DEF]}$ has material adjoined to it or not but allows morphological structure to be built in the syntax, preserving their insights in a DM-compatible approach.

I propose the relevant condition is when D immediately asymmetrically c-commands Num^{min}, as given in the Vocabulary Items in (16): $D_{[DEF]}$ is realized as the suffix if no element intervenes between $D_{[DEF]}$ and Num^{min}. I define immediate asymmetric c-command in (17).

(16)   *Revised vocabulary items* (*cf.* Hankamer and Mikkelsen 2005: 104):

   a.   D[DEF, -PL, CG] ↔ *-en* / when immediately asymmetrically c-commanding Num^{min}.

   b.   D[DEF, -PL, NG] ↔ *-et* / when immediately asymmetrically c-commanding Num^{min}.

   c.   D[DEF, +PL] ↔ *-ne* / when immediately asymmetrically c-commanding Num^{min}.

   d.   D[DEF, -PL, CG] ↔ *den* / elsewhere

   e.   D[DEF, -PL, NG] ↔ *det* / elsewhere

   f.   D[DEF, +PL] ↔ *de* / elsewhere

(17) *Immediate asymmetric c-command*:[8]

A node α immediately asymmetrically c-commands a node β iff α asymmetrically c-commands β and there is no node γ that asymmetrically c-commands β but does not c-command α, and $\gamma \neq \alpha$.

This is an initial hypothesis; it may need to be revised depending on what the functional material in Danish DPs is taken to be, but given the following set of assumptions, I argue it does a good job of capturing Hankamer and Mikkelsen's proposal. I assume every DP contains a Num head bearing a number feature (*i.e.*, [±PL]). Num[+PL] is realized as the plural suffix *-e* or *-er*, depending on the noun. Num[-PL] is realized as *-∅*. I adopt Hankamer and Mikkelsen's assumption that nouns never move to D. I hypothesize that adjectives and relative clauses adjoin to Num^{max}; the analysis hinges on this, as it conditions the definite suffix. I also assume nouns ($\sqrt{\text{Root}}+n$) move to Num, which is needed to feed Local Dislocation – see (21). Here, as is standard, I assume head movement creates head-adjunction structures (Baker 1988) and that the resulting complex head is a minimal projection; nothing relies on narrow syntactic head movement (*cf.* Author 2016).
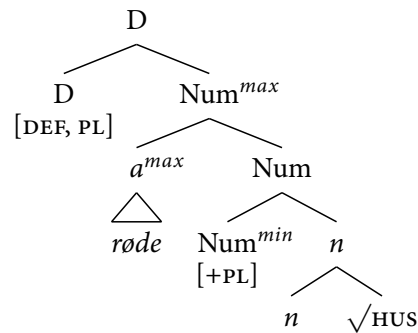
5.2   Demonstration

To demonstrate how the analysis works, consider the subject of (3a) *den hest der vandt løbet* 'the horse that won the race', the structure of which is given in (18). On the assumptions above, the relative clause is adjoined to Num^{max}. D$_{[\text{DEF}]}$ does not immediately asymmetrically c-command Num^{min} because the relative clause c-commands Num^{min} but does not c-command D$_{[\text{DEF}]}$. Since the contextual restriction on (16a) is not met, the less specified Vocabulary Item (16d) will be chosen, and the exponent *den* will be inserted in D$_{[\text{DEF}]}$.

(18) a. *Before head movement*:   b. *After head movement and VI*:
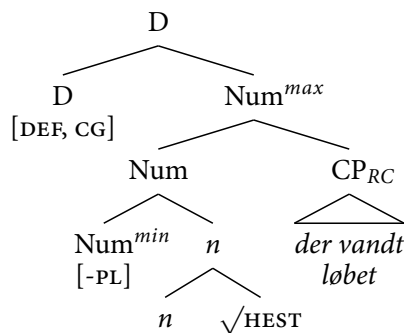
---
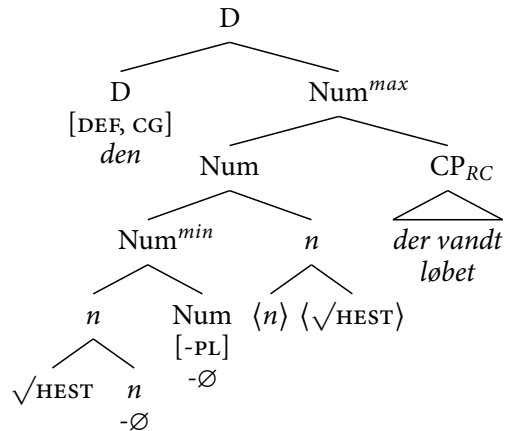
8   This structural condition appears elsewhere in the literature on head-to-head relations. It seems to be a structural condition for the (morphological) m-merger operation proposed by Matushansky (2006) and is similar (if not identical) to Hsu's (2019) HEAD ADJACENCY requirement on Coalescence, a proposed syntactic operation that replaces feature bundling and complex head formation. These conditions play a role in each author's alternative approach to head movement phenomena.

The derivation proceeds in the same way with plural nouns and adjectival modifiers, such as (11d) *de røde huse* 'the red houses'. As can be seen here, assuming that adjectives adjoin to NumP is consistent with their placement between the definite article and the plural noun.

(19)   a.   *Before head movement*:

```
                D
              /   \
            D      Num^max
        [DEF, PL]  /    \
                a^max    Num
                 /\      /  \
               røde   Num^min  n
                      [+PL]    / \
                             n   √HUS
```

b.   *After head movement and VI*:
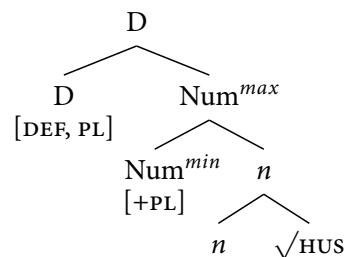
```
                 D
               /   \
             D      Num^max
         [DEF, PL]  /    \
           de    a^max    Num
                  /\      /   \
                røde  Num^min    n
                      /    \    / \
                    n    Num  ⟨n⟩ ⟨√HUS⟩
                    /\   [+PL]
                  √HUS n  -e
                       -∅
```
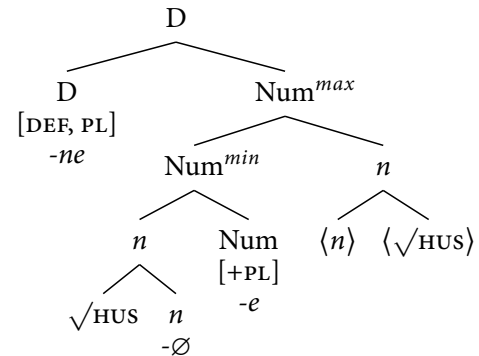
Here, the adjective adjoins to Num^{max}, thereby interrupting the immediate asymmetric c-command relation between D$_{[DEF]}$ and Num^{min}.

This approach captures the fact that adjectives and relative clauses block the realization of D$_{[DEF]}$ as a suffix. Consistent with (15), no head-to-head operation is needed, nor is reference to linear adjacency. Now compare (19) to (20), which lacks the adjective:

(20)   a.   *Before head movement*:

```
               D
             /   \
           D      Num^max
       [DEF, PL]  /    \
              Num^min    n
              [+PL]     / \
                      n   √HUS
```

b.   *After head movement and VI*:

```
                 D
               /   \
             D      Num^max
         [DEF, PL]  /    \
           -ne   Num^min    n
                 /    \    / \
               n    Num  ⟨n⟩ ⟨√HUS⟩
               /\   [+PL]
             √HUS n  -e
                  -∅
```

Here, there is no node that asymmetrically c-commands Num^{min} that does not c-command D$_{[DEF]}$. Since the immediate asymmetrical c-command requirement is satisfied, D$_{[DEF]}$ is realized as the suffix *-ne*.

We must also determine how D comes to be pronounced as a suffix on the noun in (20). I propose that this happens as a result of the DM operation Local Dislocation (Embick 2007,

Embick and Marantz 2008, Embick and Noyer 1999, 2001). Local Dislocation takes two linearly adjacent heads and reverses the order they come in.[9] Since the suffix is necessarily linearly adjacent to Num^{min} when Num is unmodified, it is possible to reorder the suffix and complex Num head with the Local Dislocation operation. The rule in (21) is a Local Dislocation rule for the definite suffix, while (22) shows the rule applied to the tree in (20b); here, the symbol '*' means 'immediately precedes', and '+' represents adjunction.

(21) *Local Dislocation rule for definite suffixes*:
    $[_{DP}\ D_{[DEF]} * [_{NumP}\ Num \ldots]] \rightarrow [_{DP}\ [_{NumP}\ [_{Num}\ Num+D]\ \ldots]]$, where D $\in$ {*-en, -et, -ne*}

(22) *Linearizing (20) with Local Dislocation*:
    $[_{DP}\ [_{D}\ \textit{-ne}] * [_{NumP}\ [_{Num}\ \textit{hus-}\varnothing\textit{-e}]\ \ldots]] \rightarrow [_{DP}\ [_{NumP}\ [_{Num}\ [_{Num}\ \textit{hus-}\varnothing\textit{-e}]+[_{D}\ \textit{ne}]]\ \ldots]]$

To be clear, linear adjacency to Num does not cause $D_{[DEF]}$ to be realized as the suffix on this analysis. Local Dislocation is invoked only after a suffixal exponent has been inserted into $D_{[DEF]}$ and only to ensure that the suffix appears in the correct position. Compare this to Embick and Marantz's (2008: 40–44) proposal where $D_{[DEF]}$ undergoes Local Dislocation onto N whenever they are linearly adjacent. On this view, adjectives block suffixation when they intervene between D and N. They do not discuss, though, how to select the proper exponent of $D_{[DEF]}$. Hankamer and Mikkelsen (2018b), however, argue extensively that realization of the definite determiner as a suffix cannot be conditioned by linear adjacency and criticize (pp. 76–78) the apparent requirement (unstated in Embick and Marantz 2008) that Vocabulary Insertion in $D_{[DEF]}$ must follow Local Dislocation.

The analysis here, though it relies on Local Dislocation, is not susceptible to this criticism. The Vocabulary Items in (16) refer to c-command, not linear order, and Vocabulary Insertion explicitly feeds Local Dislocation. Insertion of the suffix into $D_{[DEF]}$ occurs in reference only to the syntactic structure. Local Dislocation follows this, making reference to the phonological exponent of $D_{[DEF]}$ as well as linear order.

6   Extending the analysis

Having shown how the core of the analysis works, I turn now to showing how it can be extended to other issues in the Danish DP that Hankamer and Mikkelsen investigate. I begin by reevaluating the position of argument and adjunct PPs, and then turn to their (2008) analysis of psuedo-partitives. I finish with some comments on their (2018a) analysis of argument CPs. Due to space constraints, I will not address every issue these phenomena raise; my main goal here is only to show that the analysis presented above can be adapted to cover a range of phenomena similar to Hankamer and Mikkelsen's original proposal while at the same time providing a more conventional and extensible account of certain related facts.

---

9   Technically speaking, both elements must be either subwords (syntactic terminals in the same complex head) or M-words (heads not dominated by another head projection). Since both $D_{[DEF]}$ and the complex Num head are not dominated by other head projections, they are both M-words.

6.1   PP arguments and adjuncts

One well-known puzzle for the analysis of DPs in Danish is that the definite suffix must appear when a DP contains a PP unless some other modifier causes the article to occur:

(23) a.   gris-en med blå pletter   b.   *den gris med blå   pletter
            pig-DEF with blue spots   the pig with blue spots
            'the pig with blue spots'   'the pig with blue spots'

Hankamer and Mikkelsen (2002, 2005) stipulate that PPs adjoin to DP rather than to NP, since adjunction to NP would cause the definite article to appear as it does when adjectives and relative clauses adjoin. They later (2018b) defend this proposal by pointing out that there is evidence in some languages that PP modifiers are in higher positions than AP modifiers and that other authors (*e.g.*, Julien 2005: 67–69) also have to do something to accommodate PPs in their approaches to North Germanic DPs.

First, though allowing PPs to adjoin to DPs may be benign from the point of view of syntax, there are good semantic reasons to want them to adjoin lower. PP modifiers are restrictive elements like intersective adjectives and restrictive relatives (Heim and Kratzer 1998). The meaning of the PP *med blå pletter* 'with blue spots' serves to restrict the referent of the DP. In a context with multiple pigs, (23a) refers to the unique pig that has blue spots. This suggests that PPs adjoin internal to DP rather than to DP itself.

A second issue is that PP complements to nouns also occur with the definite suffix when no modifier is present. Although N evidently selects these complement PPs, Hankamer and Mikkelsen (2005: 118) propose that these too are adjoined to DP.
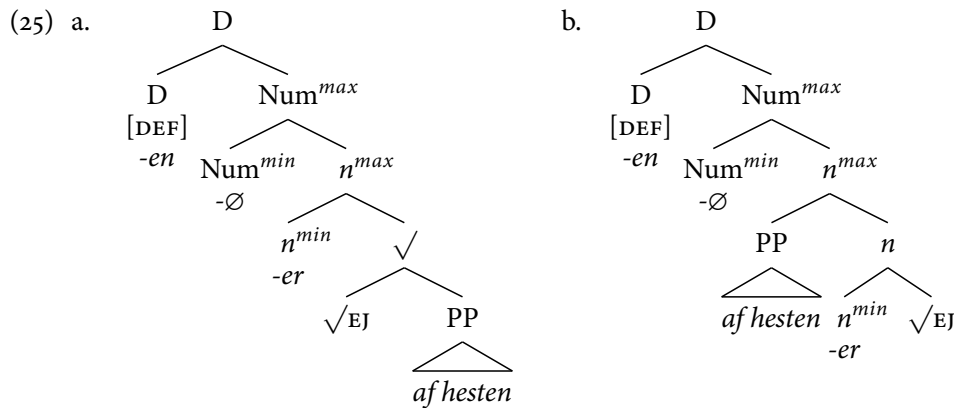
(24) *PP complements to nouns* (Hankamer and Mikkelsen 2002: 156, 2005: 118):

        a.   forfatter-en [PP til bog-en]   c.   ej-er-en   [PP af hest-en]
              author-DEF   to book-DEF   own-er-DEF   of horse-DEF
              'the author of the book'   'the owner of the horse'

        b.   *den forfatter [PP til bog-en]
              the author   to book-DEF
   'the author of the book'

On their analysis, if these PPs are sisters to N, N would project a non-minimal projection, and $D_{[DEF]}$ would be realized as the article. As such, they claim that argument PPs are adjoined to DP, too.

These issues with PPs are in fact symptoms of the problem I identify in Sections 3 and 4. They arise from the proposal that $D_{[DEF]}$ is sensitive to the minimality of its sister. The analysis proposed in Section 5, I argue, gives us a better handle on these issues.

The immediate c-command approach handles argument PPs straightforwardly. These can be introduced as arguments either of roots, as in (25a) (see Harley 2007, 2014) or as the nominalizing head (25b); neither configuration poses a problem for the Vocabulary Items in (16), since $D_{[DEF]}$ immediately asymmetrically c-commands Num^{min} in both cases. The following trees show potential structures for (24c).

(25) a.

$$D$$

D [DEF] -en

Num^{max}

Num^{min} -∅

n^{max}

n^{min} -er

√

√EJ

PP

af hesten

b.

$$D$$

D [DEF] -en

Num^{max}

Num^{min} -∅

n^{max}

PP

af hesten

n

n^{min} -er

√EJ

As for how to account for adjunct PPs, we must still stipulate the position to which PPs adjoin, as Hankamer and Mikkelsen (2002, 2005) do. In this sense, the proposal does not obviously do better than theirs. We could, in fact, even retain the hypothesis that PPs adjoin to DP in Danish. However, as mentioned above, there are semantic reasons to want restrictive modifiers like PPs to merge lower in the DP. The current proposal, unlike theirs, permits the adjunction site of PPs to be lower since we no longer have to prevent N from projecting. To ensure that D and Num are in an immediate asymmetric c-command relation, PPs may adjoin to n^{max} rather than Num^{max}:

(26)

$$D$$

D [DEF] -en

Num^{max}

Num^{min} [-PL]

n^{max}

n^{max}

n^{min} √GRIS
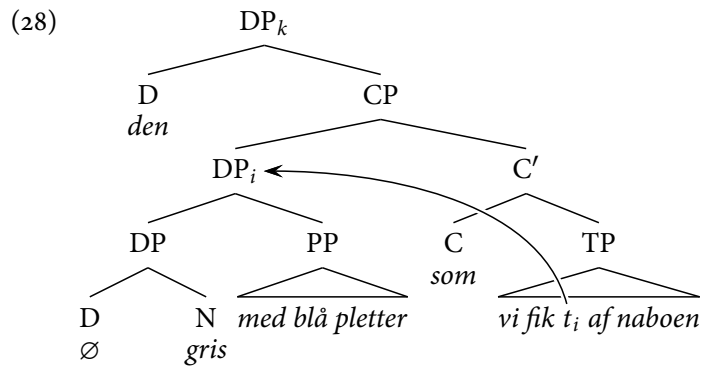
PP

med blå pletter
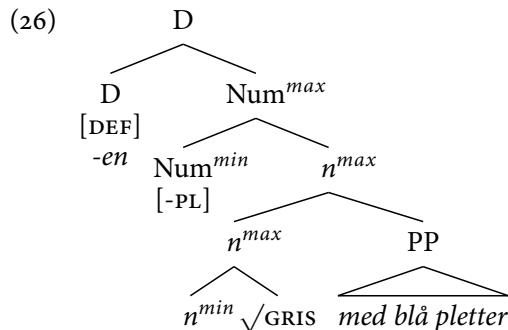
Thus, one advantage of this proposal is that PPs can merge low enough to be restrictive modifiers without requiring the definite article to be used. Since D and Num will be linearly adjacent after Vocabulary Insertion the Local Dislocation rule in (21) will still apply here.

This analysis also captures one final observation about how PPs interact with relative clauses. Hankamer and Mikkelsen (2005: 112ff) note that restrictive relative clauses usually come to the right of adjunct PPs. When this happens, the definite article must be used:

(27)   den gris [PP med blå   pletter] [RRC som vi fik af   naboen]
        the pig   with blue spots   that we got from neighbour.DEF
        'the pig with blue spots that we got from the neighbour'

Since they claim PPs are adjoined to DP, this is a puzzle for their analysis: Assuming restrictive relatives adjoin to NP, PPs should follow relatives. To account for this, they propose an NP-raising analysis of restrictive relative clauses, following Bianchi 2000:

(28)

```
                            DP_k
                   ┌──────────┴──────────┐
                   D                      CP
                  den          ┌───────────┴───────────┐
                            DP_i ◄                      C′
                      ┌───────┴───────┐           ┌──────┴──────┐
                     DP              PP           C             TP
                  ┌───┴───┐                      som
                  D       N   med blå pletter        vi fik t_i af naboen
                  Ø      gris
```

Notice, though, that this doesn't solve the original problem: Nothing prevents PPs from adjoining to DP_k in the above structure; PPs should still be able to freely follow relative clauses.

The facts, however, are actually consistent with PPs adjoining *lower* than restrictive relatives. Following the assumption above that PPs adjoin to n^{max}, the structure in (29) derives the correct order of PPs and relative clauses and correctly predicts, under the immediate c-command approach, that $D_{[DEF]}$ should be realized as the article since $D_{[DEF]}$ does not immediately c-command Num^{min}.

(29)

```
                            D
                   ┌──────────┴──────────┐
                   D                    Num^{max}
                [DEF]          ┌───────────┴───────────┐
                 den        Num^{max}                   CP
                      ┌───────┴───────┐        ┌─────────┴─────────┐
                   Num^{min}        n^{max}   som vi fik af naboen
                   [-PL]       ┌──────┴──────┐
                             n^{max}          PP
                         ┌──────┴──────┐
                      n^{min} √GRIS   med blå pletter
```
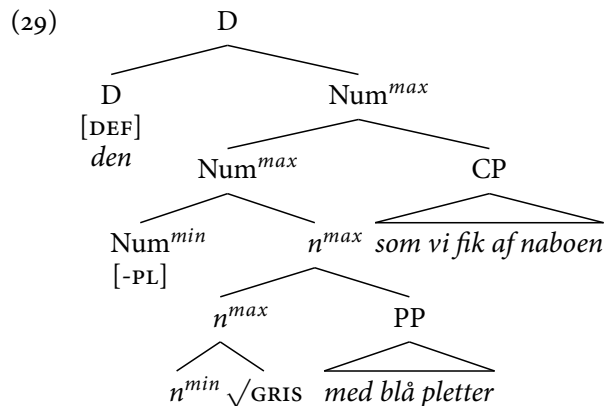
6.2   Pseudo-partitives

In a later paper, Hankamer and Mikkelsen (2008) investigate Danish pseudo-partitives. These constructions are apparently DPs containing two nouns. The first (N_1) is a counter or measure noun, while the second (N_2) denotes a mass or plural. Hankamer and Mikkelsen divide pseudo-partitives into two classes. Indirect pseudo- partitives (IPCs) like (30a) occur with a preposition and take the definite suffix when definite, while Direct pseudo-partitives (DPCs) like (30b) have no preposition and occur with the definite article.

(30) a.   gruppe-n$_{N_1}$ af turister$_{N_2}$ b.   den gruppe$_{N_1}$ turister$_{N_2}$
           group-DEF   of tourists   the group   tourists
           'the group of tourists' (IPC)   'the group of tourists' (DPC)

Hankamer and Mikkelsen (2008: 327–379), following their previous analysis of PPs, propose that in IPCs, N_1 is an ordinary noun, while the PP containing N_2 is an argument of N_1 adjoined to DP; on the proposal here, the PP would be merged in n^{max} as shown in (25).

It is their analysis of DPCs that concerns us here. They argue that in DPCs N_1 is a n that takes a noun as its complement as shown in (31). Here, the sister of $D_{[DEF]}$ is not a minimal N, and so, following their 2005 analysis, $D_{[DEF]}$ will be realized as the article.

(31)   *Direct pseudo-partitive structure* (Hankamer and Mikkelsen 2008: 329):

```
        DP
       /  \
      D    nP
   [DEF]   /  \
    den   n    N
       gruppe turister
```
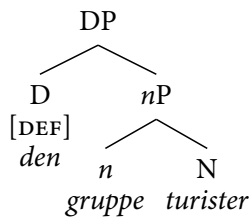
On standard DM assumptions, this structure is untenable. *Turister* 'tourists' is a noun marked with a plural affix, meaning it must minimally contain a categorizing n head and a number head. Furthermore, *gruppe* 'group' contains lexical (*i.e.*, root) material, so it should contain more structure than just n.
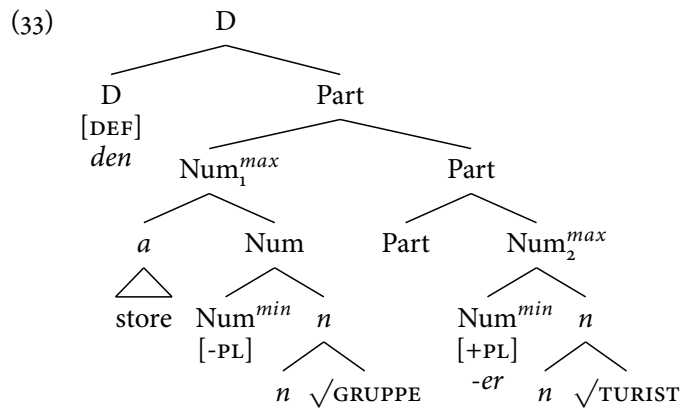
All N_1 elements discussed by Hankamer and Mikkelsen are classified as nouns. They have roots used in other nouns, have grammatical gender independent from N_2 (32a), and they can be modified with an adjective like other nouns (32b). It stands to reason, then, that N_1 is, in fact, a noun. A key difference between these and other nouns, though, is that N_1 in DPCs rarely inflects for number (32c).

(32)   a.   en/*et   spand   vand   c.   tre   liter-(*e) vand
            a.CG/a.NG bucket.CG water.NG   three litre-(s) water
            'a bucket of water'   'three litres of water'

       b.   den store gruppe turister
            the large group   tourists
            'the large group of tourists'

One way to approach the inability of N_1 to inflect for number is to stipulate that there is (usually) no NumP projection above N_1. On the analysis given here, $D_{[DEF]}$ would always be realized as the article in DPCs since it would never immediately c-command a Num head. A problem (beyond being fairly *ad hoc*) is that this does not sit well with the assumption that adjectives do not adjoin to nP. Adjectives clearly precede N_1, as shown in example (32b).

Perhaps a better way of accommodating pseudo-partitives is to assume N_1 is in the specifier of a functional projection, as proposed by Borer (2005). On this view, N_1 would be the specifier of a head (shown as Part below) that semantically divides the mass denoted by N_2 into individuated units. Presumably $D_{[DEF]}$ would agree with N_1 as it is a closer goal than N_2, though it remains unclear why N_1 is rarely plural.[10] Crucially, though, D would not immediately asymmetrically c-command Num^{min}, since a projection of Part does:

10   Hankamer and Mikkelsen (2008: 324) do not provide a explanation of this fact, either. Part of their justification

(33)

```
                          D
              ┌───────────┴───────────┐
              D                      Part
           [DEF]          ┌───────────┴───────────┐
            den        Num₁ᵐᵃˣ                    Part
                  ┌──────┴──────┐          ┌────────┴────────┐
                  a           Num        Part            Num₂ᵐᵃˣ
                  △       ┌────┴────┐                 ┌────┴────┐
                store  Numᵐⁱⁿ      n              Numᵐⁱⁿ        n
                       [-PL]    ┌───┴───┐         [+PL]      ┌───┴───┐
                               n   √GRUPPE        -er       n   √TURIST
```

6.3   CP complements to D

Argument CPs prove to be another challenge for the analysis of Danish DPs. In work in progress, Hankamer and Mikkelsen (2018a) show that CPs may appear embedded inside a PP. When this occurs, as in (34b), the definite suffix is used, not the article (34c).

(34) a.   en ide [$_{PP}$ om   [$_{CP}$ at   ingefær gavner fordøjelsen]]
           an idea   about   that ginger aids   digestion.DEF
           'an idea that ginger aids digestion'   (Indefinite)

      b.   ide-en   [$_{PP}$ om   [$_{CP}$ at   ingefær gavner fordøjelsen]]
           idea-DEF   about   that ginger aids   digestion.DEF
           'the idea that ginger aids digestion'   (Definite)

      c.   *den ide [$_{PP}$ om   [$_{CP}$ at   ingefær gavner fordøjelsen]]
           the idea   about   that ginger aids   digestion.DEF
           'the idea that ginger aids digestion'   (Definite)

Though these PPs are apparently selected by nouns, Hankamer and Mikkelsen propose they adjoin to DP. However, the immediate c-command approach does a better job of explaining these examples. If these PPs merge in *n*P (25), nouns can select the PPs directly, something that is not obviously possible under Hankamer and Mikkelsen's account. Since they do not intervene between D$_{[DEF]}$ and Num, (34c) is correctly predicted not to occur.

Intriguingly, CPs may also appear outside PPs, but only in definite DPs with an article:

(35) a.   *en ide [$_{CP}$ at   ingefær gavner fordøjelsen]
           an idea   that ginger aids   digestion.DEF
           'an idea that ginger aids digestion'

---

for labeling N₁ a *n* is the observation that it does not appear in the plural, as they take the lack of plural marking to indicate membership in a functional category. It is not clear what the basis for this assumption is, though, as many functional elements in DP (pronouns, determiners, and demonstratives) inflect for plural in Danish. Furthermore, some N₁s do appear in the plural in DPCs (*poser* 'bags', *grupper* 'groups'), though rarely, suggesting that Num must be available to the structure of N₁ at least some of the time.

b. *ide-en   [$_{CP}$ at   ingefær gavner fordøjelsen]
   idea-DEF   that ginger aids   digestion.DEF

   'the idea that ginger aids digestion'

c. den ide [$_{CP}$ at   ingefær gavner fordøjelsen]
   the idea   that ginger aids   digestion.DEF

   'the idea that ginger aids digestion'

Hankamer and Mikkelsen (2018a) take this to mean that $D_{[DEF]}$ selects the CP directly. They propose $D_{[DEF]}$ takes the noun and CP as separate arguments. The correct word order is derived by positing a special little-*d* head to which the main determiner moves:

(36) a.

b.
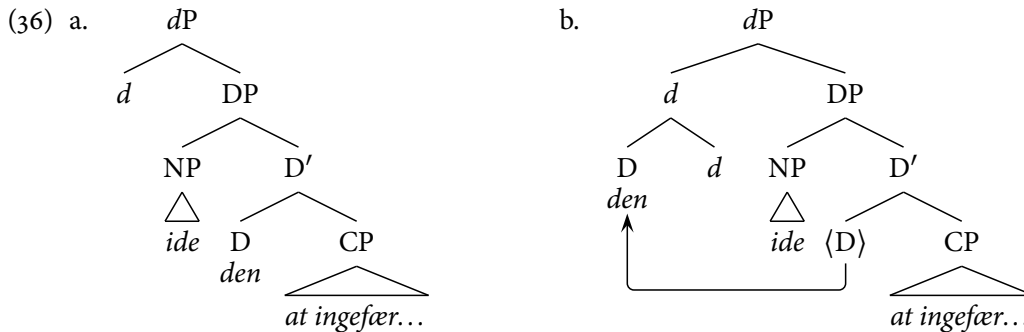
There are two possible ways to address these facts. If Hankamer and Mikkelsen's D-to-*d* analysis is viable, I believe it can be implemented under the immediate c-command approach. Thus, it does no worse than theirs at accounting for the facts. Another possibility is that CP merges as an adjunct with Num, composing with Num^{max} through predicate modification (Moulton 2015). This would cause the definite article to appear, but the link to definiteness becomes harder to establish, and Hankamer and Mikkelsen reject this idea. It remains unclear to me how to explicitly draw a connection between CP complements and definiteness under either analysis, so I leave a full resolution of this issue to future research.

7   Conclusion

Standard assumptions about how morphological structure is built in Distributed Morphology are incompatible with Hankamer and Mikkelsen's (2005, 2008, 2018a, 2018b) analysis of Danish definiteness marking. They argue the definite article and suffix are allomorphs of an underlying $D_{[DEF]}$ head, proposing the definite suffix appears when $D_{[DEF]}$ takes a minimal N as its sister. I showed this analysis is incompatible with the DM tenet of syntax all the way down. Under DM, no nominal complement to $D_{[DEF]}$ will be minimal, so Vocabulary Insertion into $D_{[DEF]}$ cannot be sensitive to minimality. I proposed an alternative analysis that attempts to retain Hankamer and Mikkelsen's (2005) main insights by replacing the sisterhood condition with one that requires $D_{[DEF]}$ to immediately asymmetrically c-command Num^{min} in order for the suffix to be inserted. I then showed that this approach can be adapted

to the cases they discuss in later work (2005, 2008, 2018a) without incurring the theoretical problems discussed in Sections 3 and 4.

I leave to future research whether the immediate c-command approach can be extended to double definiteness marking in Swedish, Norwegian, and Faroese. The article and suffix are not in complementary distribution in these languages; the article and suffix must often co-occur in modified DPs, but under some structural and discourse conditions the suffix or the article can be dropped (see Julien 2005 and Author 2011). The analysis here explains complementary distribution of the definite suffix and article, but it is not yet clear to me how or even if double definiteness patterns can be articulated in the system proposed here. Still, I hope to have shown that it provides a promising account of the Danish DP.

Acknowledgments

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