

The ups and downs of head displacement

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Abstract: We propose a theory of head displacement that replaces traditional Head Movement and Lowering with a single syntactic operation of Generalized Head Movement. We argue that upward and downward head displacement have the same syntactic properties: cyclicity, Mirror-Principle effects and blocking in the same syntactic configurations. We also study the interaction of head displacement and other syntactic operations arguing that claimed differences between upward and downward displacement are either spurious or follow directly from our account. Finally, we show that our theory correctly predicts the attested crosslinguistic variation in verb and inflection doubling in predicate clefts.

Keywords: head displacement, Mirror Principle, V2, VP ellipsis, *do*-support, predicate clefts

1 Introduction

Many languages have constructions that involve some sort of head displacement, such as subject-auxiliary inversion in English. The status of this process has been the focus of hotly-contested debate. While some authors have highlighted formal similarities with phrasal movement (i.a. [Koopman 1984](#), [Travis 1984](#), [Baker 1988](#), [Lema and Rivero 1990](#), [Rizzi 1990](#), [Koopman and Szabolcsi 2000](#), [Matushansky 2006](#), [Vicente 2007](#), [Harizanov and Gribanova, to appear](#), [Preminger, to appear](#)), others have argued that at least some cases of head displacement are not the result of the same type of process as phrasal movement (i.a. [Chomsky 2001](#), [Hale and Keyser 2002](#), [Harley 2004](#), [Platzack 2013](#), [Barrie 2017](#), [Harizanov and Gribanova, to appear](#)). A related question is whether the crosslinguistic variety in the typology of head displacements points to a unified account or a division of labor into separate processes. A specific version of the latter hypothesis is that, while upward displacement is Head Movement, a syntactic process, downward displacement is postsyntactic (PF) Merger or Lowering ([Halle and Marantz 1993:132–138](#), [Bobaljik 1995:57–109](#), and [Embick and Noyer 2001](#), based on ideas in [Lasnik 1981](#) and [Marantz 1984](#)). This separation, in turn, allows the assimilation of Head Movement to phrasal movement, at least in the sense that the resulting theory is one in which syntactic displacement is always upward.

We propose that upward and downward head displacement are the surface manifestations of a single syntactic operation of *Generalized Head Movement* (GenHM) that is distinct from phrasal movement (Move or Internal Merge). A unification of the different types of head displacement has precedents in the theory of Minimalist Grammars ([Stabler 2001](#)), and in [Harizanov and Gribanova, to appear](#), and is one of the defining features of Mirror Theory ([Brody 2000](#), [Adger, Harbour, and Watkins 2009](#), [Svenonius 2016](#)). However, our specific implementation, as laid out in section 2, is different from those works, and is based on the idea that head displacement involves manipulation of specific parts of the feature content of syntactic heads. In this specific sense, head displacement in this analysis has commonalities with agreement, and has its precedents in [Stabler 2001](#), [Hale and Keyser 2002](#), [Harley 2004](#), and [Barrie 2017](#).

We provide several arguments for the unification of upward and downward head displacement proposed here. First, we argue in section 3 that the two types of head displacement have the same syntactic properties: they are both cyclic and yield Mirror Principle effects, they both feed

upward head displacement, and they are both blocked in the same configurations. Second, we study the interaction between head displacement and other syntactic operations, concentrating on those that have been claimed to argue for dissociating upward and downward head displacement. In developing an analysis of these interactions in section 4, we argue that claimed differences between upward and downward head displacement are either spurious or follow directly from our account.

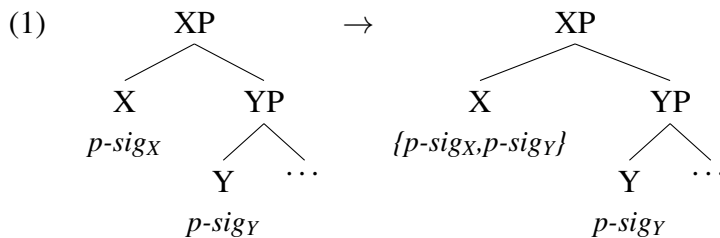
GenHM unifies upward and downward head displacement by generating identical copies of the resulting complex head in the two positions related by the operation. Postsyntactic principles determine that either the higher or lower copy of the complex head is pronounced, yielding upward or downward displacement, respectively. This predicts that head displacement can in some cases result in multiple overt copies of the same complex head. Section 5 provides a final argument for GenHM based on predicate clefts crosslinguistically, in which, we claim, verb doubling involves fronting of a fully inflected verb copy, not a bare verb, as in previous accounts.

Before we turn to the definition of GenHM in the next section, we briefly address here another aspect of the debate on head displacement, namely, whether it is syntactic or postsyntactic (see [Harizanov and Gribanova](#), to appear, for a detailed overview). We place GenHM in the syntax, but the evidence presented here is also compatible with an analysis in which GenHM is postsyntactic. Our unification of upward and downward head displacement is relevant to this aspect of the debate, but only in the specific sense that, whatever component the two types of displacement belong to, it is the same for both.

2 Generalized Head Movement

In this section, we propose a novel operation of Generalized Head Movement that unifies different types of head displacement and makes the predictions outlined in the introduction. The analysis is partly based on ideas about the mechanisms behind head displacement proposed in [Hale and Keyser 2002](#) and [Harley 2004](#), to which we now turn.

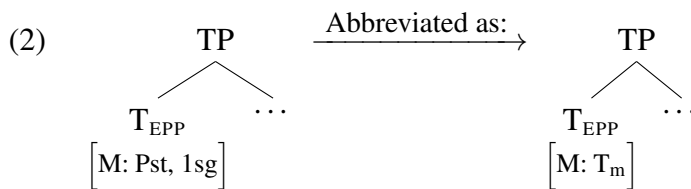
[Hale and Keyser \(2002\)](#) and [Harley 2004](#) propose to replace Head Movement with *Conflation*, an operation that, instead of moving (or copying) an entire head, copies a subset of its featural content (a different proposal along these lines is also made in [Barrie 2017](#)). More precisely, the copied features are those relevant to PF interpretation – the *phonological signature* (p-sig) of the head ([Hale and Keyser 2002:62](#)). Conflation applies when a head X is merged with its complement YP, and copies the p-sig of Y onto X. As a result, X’s new p-sig is a complex containing the original p-sigs of both X and Y (1).¹



¹Head displacement in the framework of Minimalist Grammars ([Stabler 2001](#)) is very similar to Conflation in this respect, and like our Generalized Head Movement, it accounts for both upward and downward head displacement.

Similarly, Generalized Head Movement is based on partial copying of the contents of heads – the content relevant to Spellout, but with important differences having to do with the specifics of the copied featural content and the directionality of copying. Unlike Conflation, in which the conflated feature appears only in the higher head (X in (1)), Generalized Head Movement creates such a cluster in both X and Y, implemented as feature sharing between heads X and Y. The feature sharing approach has the advantage of unifying upward and downward head displacement, as we demonstrate below.

Our theory assumes a dichotomy of feature types: *syntactic features*, present on syntactic terminals, are involved in structure building (e.g. selection and movement-triggering features); *morphological features*, on the other hand, are those that underlie overt morphological contrasts (e.g. tense inflection or φ -features). Unlike syntactic features, morphological features are bundled in a value of a larger M-feature. For example, a past tense T with first singular agreement features and an EPP feature is represented as in (2), where EPP, a syntactic feature, is located on the syntactic terminal, while the morphological features [Pst] and [1sg] are in the value of M. Exactly what morphological features are present on a head will be largely irrelevant in the discussion of head displacement. Therefore, we will abbreviate the value of M as follows: for any head X, X_m is the set of X’s morphological features.



Another crucial difference between syntactic and morphological features relates to their spellout. We assume the realizational framework of Distributed Morphology (DM; Halle and Marantz 1993), with the addition that the sole target of Vocabulary Insertion (VI) is the value of M in each syntactic terminal. What is spelled out in (2), then, is the bundle of morphological features T_m .²

We define Generalized Head Movement (GenHM) as an operation that relates a head with the head of its complement by creating a shared M-value for both heads. The shared M-value is a structure containing the M-values of the input heads:

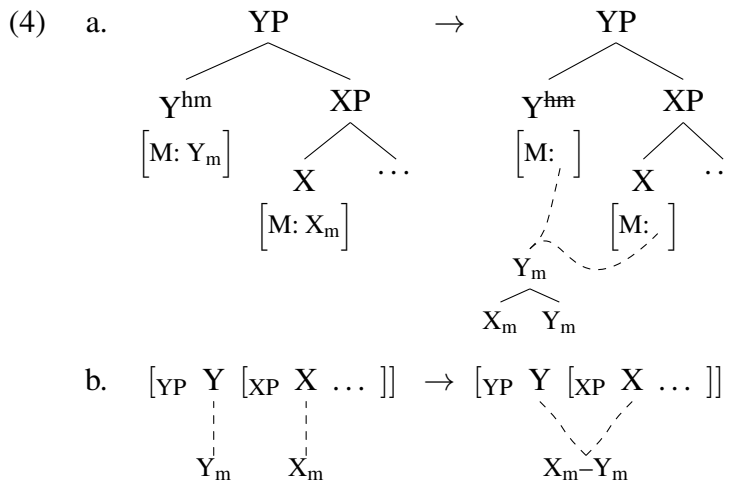
(3) *Generalized Head Movement*

- a. Structural description: a syntactic object XP such that
 - the head X of XP contains a feature [hm] and an M-value X_m , and
 - the head Y of the complement of X contains an M-value Y_m .
- b. Structural change:
 - delete [hm] in X,

²The value of M in our theory resembles the p-signature of Hale and Keyser 2002 in that it comprises features relevant for pronunciation. A more detailed comparison is difficult as p-signature is not defined in detail in previous work. While Hale and Keyser (2002) tentatively take it to be the phonological form of a head, Harley (2004) points out this characterization is incompatible with a realizational theory of morphology. The value of M in the present theory is defined as a set of morphosyntactic features and thus is immediately implementable in the realizational framework of DM.

- and replace X_m and Y_m with $\begin{array}{c} X_m \\ \diagdown \quad \diagup \\ Y_m \quad X_m \end{array}$ or $\begin{array}{c} X_m \\ \diagup \quad \diagdown \\ X_m \quad Y_m \end{array}$, shared by X and Y.

The operation is triggered by a syntactic feature [hm] on the higher head (notated in our structures below with a superscripted *hm*) that is deleted after the operation applies. This formulation of GenHM is neutral with respect to linear order: X may precede or follow its complement YP, and the output M-value is a structure headed by either the leftmost or rightmost daughter. We adopt the standard assumption that linear order is determined by (potentially language- or item-specific) principles of postsyntactic linearization, which will not play any role in our analysis. In the particular case in which X precedes YP and Y_m precedes X_m , GenHM is represented as in (4a). We often use abbreviated representations involving brackets, in which case we represent GenHM as in (4b).

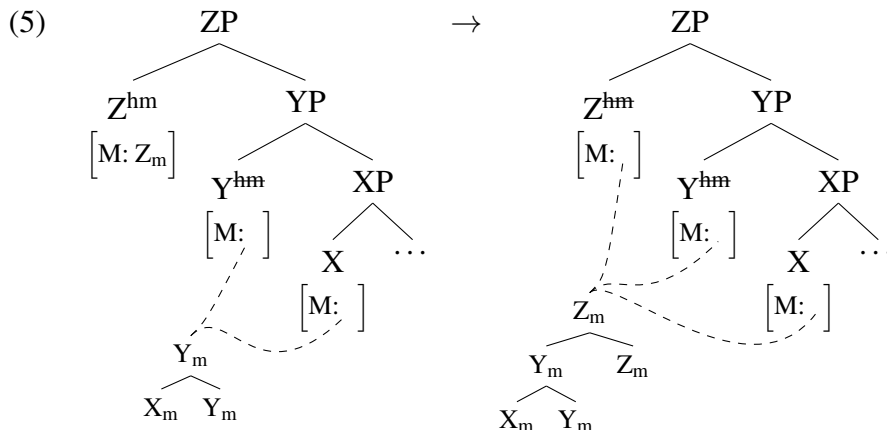


GenHM thus creates a new object that has the internal structure of a complex head (an *M-word* in Embick and Noyer’s (2001) sense). Unlike previous accounts, this complex head is the shared M-value of the syntactic terminals related by GenHM. For ease of exposition, we refer to the terminal nodes in this complex head as *morphological terminals*, to distinguish them from the syntactic terminals whose M-values they are part of. Within this complex head, VI applies to each morphological terminal in a bottom up fashion, as standardly assumed in DM (Bobaljik 2000, Embick 2010).

The newly created M-value is a single syntactic object associated with two (or more) structural locations. In this respect, we draw a parallel with feature-sharing approaches to agreement, in which valuation is replaced by the notion of feature sharing, whereby a single feature is shared between multiple locations (Pollard and Sag 1994, Brody 1997, Frampton and Gutmann 2000, Pesetsky and Torrego 2007). An important consequence of this implementation is the fact that the output of GenHM is neutral between upward and downward displacement. As we discuss below, the output M-value can be pronounced in either position, determined by postsyntactic spellout rules. A sequence of heads which share a single M-value will from now on be referred to as a *head chain*.

Another property of GenHM is that further instances of the operation extend the head chain and result in sharing of an M-value by more than two heads. In (5), the output of (4a) is merged

with another head that triggers GenHM, Z^{hm} . The newly created M-value is now shared across the extended head chain that includes Z, Y, and X.



As should be clear from the description above, GenHM derives Mirror Principle effects by incorporating the Head Movement Constraint (HMC) and the ban on excorporation (Travis 1984, Baker 1985, 1988).

A key feature of GenHM is that upward and downward head displacement are the result of the same syntactic operation – one that creates a complex head associated with multiple positions. In principle, the shared complex head can be pronounced in any of these positions. Pronunciation in the highest position gives the effect of upward displacement (traditional Head Movement); pronunciation in the lowest position yields downward displacement (cf. Lowering). We implement this aspect of the account in terms of a diacritic syntactic feature: as a lexical property, some syntactic terminals are strong (X^*), while others are weak. This feature governs the application of *Head Chain Pronunciation* (6), which we assume is a component of postsyntactic linearization.³

(6) *Head Chain Pronunciation*

Delink all positions in a head chain except:

- a. the highest strong position, if any;
- b. otherwise, the highest position.

This parametrization can be illustrated by contrasting the behavior of finite lexical (nonauxiliary) verbs in French and English. While French finite verbs undergo upward head displacement to T (7),⁴ lexical finite verbs in English stay in situ, and surface with finite inflection because of downward displacement of T to V (8), as diagnosed, for instance, by the relative position of the finite verb with respect to adverbs adjoined to the left of VP (Chomsky 1957, Emonds 1970:211–226, 1978:65–68, Pollock 1989).⁵

³This implementation has clear parallels in Mirror Theory (Brody 2000). More specifically, our strong diacritic feature (X^*) is similar to Svenonius’s (2016) @ feature.

⁴We follow the Leipzig Glossing Rules (<https://www.eva.mpg.de/lingua/resources/glossing-rules.php>), with the addition of the abbreviations DSJ (disjoint), REL (relative subject prefix) and cardinal numerals denoting noun classes in the Ndebele examples.

⁵For the purposes of this paper, we remain agnostic as to the exact position of the finite verb in English, which could be V, v, or Voice, or even higher, but in any case, lower than T and adverbs such as *often*. For ease of exposition, we represent this position as V and to its phrasal projections as VP. If it turns out that the verb is in a higher position,

- (7) Jean {*souvent embrasse / embrasse souvent} Marie.
 Jean often kisses / kisses often Marie

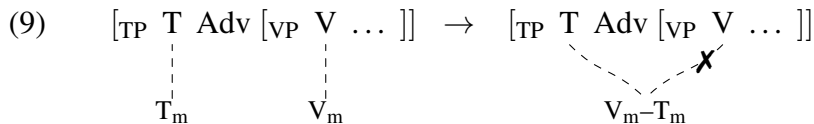
‘Jean often kisses Marie.’

French (Pollock 1989:367)

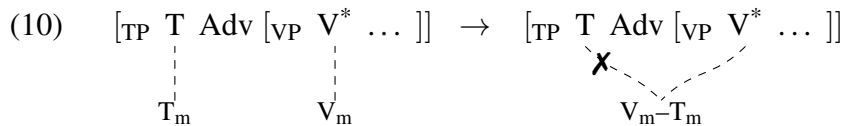
- (8) Sue {often eats / *eats often} fish.

These phenomena are often taken to illustrate two different kinds of operations: upward head displacement is an instance of syntactic Head Movement in the sense of Koopman 1984, Travis 1984, and Baker 1988, while downward displacement is postsyntactic (Halle and Marantz 1993:132–138, Bobaljik 1995:57–109, Embick and Noyer 2001).

In contrast, the two phenomena are instances of the same syntactic operation in the GenHM framework proposed here. In both languages, GenHM relates T and V, triggered by the feature [hm] on T and creating a complex M-value shared by both positions. Both T and V are weak in French, hence the finite verb is pronounced in the highest position (T) by (6b). The derivation in (9) shows the application of Head Chain Pronunciation which delinks the M-value from the V position, giving rise to upward head displacement.



In English, T is weak as well, but lexical verbs are strong (V^*). Consequently, the shared M-value is pronounced in the highest (and only) strong position in the chain, namely V^* (by (6a)), giving the appearance of downward displacement of T to V, as shown in (10).⁶



The contrast between French and English disappears if the clause contains an auxiliary verb, as illustrated in (11) by relative order with negation. In the present account, the high position of auxiliaries in both languages is the consequence of Aux being a weak head in both. In the absence of strong positions in the chain, the shared M-value is pronounced in T, the highest position (12). The lexical verb in such structures is a trivial chain on its own (the auxiliary does not trigger GenHM). It must therefore be pronounced in V, whether V is strong (English) or weak (French).

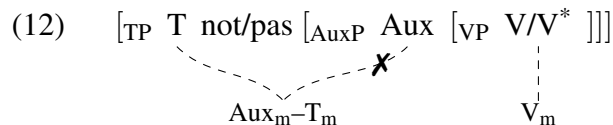
- (11) a. He has **not** understood.
 b. Il a **pas** compris.
 he has not understood

‘He has not understood.’

French (Pollock 1989:370)

our analysis below should be modified to include further GenHM steps moving V to this higher position. Similar comments apply to our analysis of verb movement in Mainland Scandinavian in subsection 3.2.

⁶In this particular case, application of (6a) is trivial, since there is only one strong position in the chain. See subsection 3.2 for illustration of the spellout of head chains with more than one strong position.



This French/English paradigm illustrates the basic workings of GenHM. In the following sections, we expand the empirical coverage of the analysis, and provide several arguments for the proposed unification of upward and downward head displacement.

3 Evidence for the unification of upward and downward displacement

Upward head displacement has certain well-established syntactic properties, derivable from the HMC and the ban on excorporation. Since GenHM incorporates both conditions, downward head displacement is predicted to have those same syntactic properties. This section provides several direct arguments for GenHM based on these predictions.

3.1 Successive cyclic downward displacement in Ndebele

Any theory of upward head displacement must capture the generalization that the internal structure of the resulting complex head mirrors the syntactic structure – the Mirror Principle (Baker 1985). Assuming the HMC and the ban on excorporation, the mirroring effect follows from cyclicity. GenHM derives the Mirror Principle in the same way, as it is an operation applying cyclically in a bottom-up fashion. It additionally makes clear predictions about the internal structure of complex heads formed by downward displacement: they too are expected to have a fully cyclic internal structure. This is a natural consequence of treating upward and downward head displacement as outcomes of the same syntactic operation. This section presents an argument that downward displacement indeed creates complex heads that obey the Mirror Principle.⁷

The argument comes from the formation of relative agreement (Rel-Agr) prefixes in Ndebele (Bantu, S44). In Ndebele, the subject agreement prefix on the verb has a special form in relative clauses (RCs). Compare the regular subject agreement prefix for class 7 in (13) with its counterpart in an RC-internal verb in (14).

(13) Isi-lwane **si**-za-gijima.
7-lion 7SBJ-FUT-run

‘The lion will run’

(14) isi-lwane [_{RC} **esi**-za-gijima]
7-lion [_{RC} 7REL-FUT-run]

‘the lion that will run’

Building on previous work on Bantu (Khumalo 1992, Demuth and Harford 1999, Zeller 2004, Cheng 2006, Henderson 2006, 2013, Diercks 2010, Taraldsen 2010), and on the basis of morphosyntactic and phonological evidence, Pietraszko (to appear) shows that the Ndebele relative prefix contains three morphemes: an associative linker, an augment vowel (a nominal prefix), and a regular subject agreement prefix.

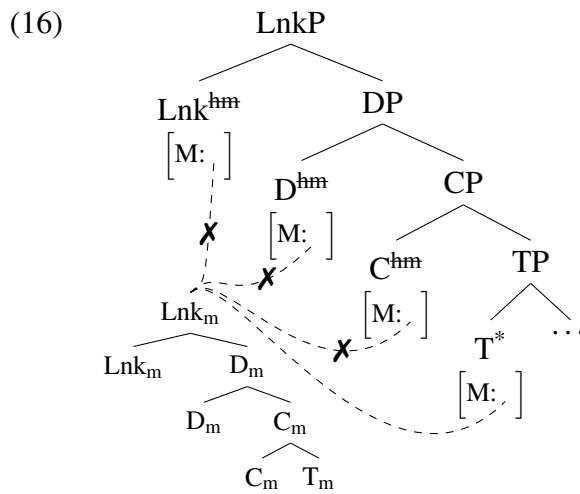
⁷The same predictions are made by Mirror Theory. For instance, Adger, Harbour, and Watkins’s (2009) Mirror-Theoretic analysis of Kiowa accounts for the fact that complex verbal heads that are pronounced low have a Mirror-Principle obeying internal structure. A yet different implementation of cyclic downward displacement can be found in Harizanov and Gribanova, to appear. In their theory, lowering of Y to X removes Y from its original position, making it possible for a higher head to lower to X directly. Unlike Mirror Theory and GenHM, this theory does not derive the cyclicity of upward and downward displacement in a uniform way, as it does not unify them under a single operation.

As shown in (15), we adopt the standard view of the augment vowel as a determiner (von Staden 1973, Giusti 1997, de Dreu 2008, Visser 2008, among many others), and treat it as an exponent of D. Thus, a relative CP (whose head is null) is dominated by a DP shell headed by an augment vowel. This analysis of RCs is supported by the observation that all embedded clauses in the language are contained in a DP shell (see Pietraszko, to appear, for evidence) and the fact that relative clauses attach to the head noun the same way other DPs (e.g. possessors) do – they are introduced by the *associative linker a-*.

- (15) [LnkP Lnk [DP D [CP C [TP T ...]]]]
linker augment ∅ Sbj-Agr

As an illustration, consider the Rel-Agr prefix of class 7 *esi-* in (14). It consists of the linker *a-* in Lnk, an augment vowel in D, and subject agreement in T. Since the D head in RCs covaries with the class of the RC-internal subject, D and T have the exponents of class 7: *i-* and *si-*, respectively. The three morphemes, *a+i+si*, surface as *esi-* as a result of regular phonological processes (see below for details).

We argue that the formation of Rel-Agr prefixes in Ndebele is an instance of cyclic downward head displacement. GenHM applies bottom up to T, C, D and Lnk. T is the only strong position, which is where the resulting complex head is pronounced:



The internal structure of the complex head obeys the Mirror Principle (T_m and C_m form a constituent to the exclusion of D_m , etc.), a consequence of cyclic application of GenHM.

Evidence for the low spellout position of the Rel-Agr complex head comes from object relative clauses with overt preverbal subjects, as in (17). The crucial fact is that all components of the Rel-Agr prefix follow the subject *isilwane* ‘lion’. Assuming that the subject is in Spec,TP, as shown in (18), the linker and the augment must undergo downward displacement across the subject to be linearized to its right.

- (17) i-nyama [*isi-lwane esi-* yi- dlileyo]
 9-meat [7-lion 7REL- 9OBJ- ate.DSJ]
 ‘the meat that the lion ate’

(18) [NP 9-meat [Lnp Lnk [DP D_{φ:7} [CP C [TP 7-lion [T' T_{φ:7} [vP run]]]]]]]

a i isi-lwane si

A different explanation of similar facts in Zulu is proposed by Henderson (2006, 2007), who treats Rel-Agr as created by upward, rather than downward, head displacement. Henderson proposes that the reason the subject precedes all components of the Rel-Agr prefix is that it is structurally higher than all these components – it is a left-dislocated topic. While preverbal subjects in Bantu languages typically behave like topics (Bresnan and Mchombo 1987, Baker 2003, Letsholo 2002), it is not universally so. Crucially, relative clause subjects in Ndebele do not have the topical properties of matrix subjects.⁸ This is evident from the contrast between (19) and (20), where the focus particle *only* is used as a diagnostic for a focus (i.e. non-topic) interpretation of the subject. A preverbal subject cannot be in focus in a matrix sentence (19), but it can in an RC (20).

(19) *Aba-fana kuphela ba-dla i-suphu.
 2-boys only 2SBJ-eat 7-soup
 ‘Only boys eat soup.’

(20) i-suphu [RC aba-fana kuphela aba-si-dlayo]
 7-soup [RC 2-boys only 2REL-7OBJ-eat.DSJ]
 ‘the soup that only boys eat’

The possibility of focusing a preverbal subject in RCs suggests that, unlike matrix preverbal subjects, it is not a left-dislocated topic. Importantly, even under its focused interpretation, the subject precedes all components of Rel-Agr, supporting the downward displacement view.

Evidence for the predicted Mirror-Principle-obeying structure of the low complex head comes from phonology. Rel-Agr is formed by bottom-up application of regular vowel coalescence rules in (21) (Sibanda 2004) and illustrated for some noun classes in (22).

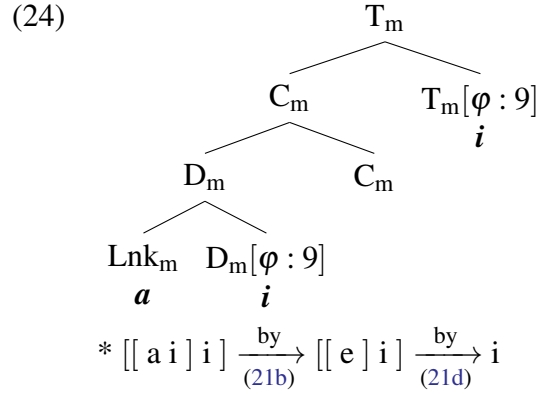
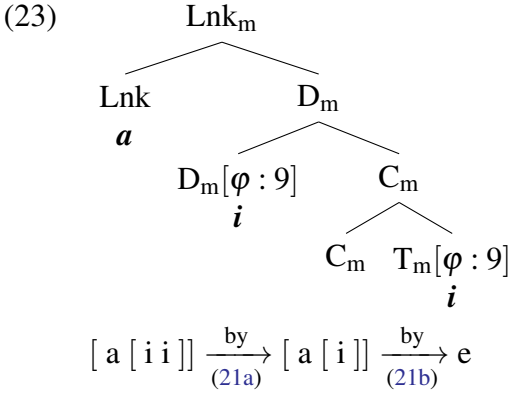
(21) a. V_α + V_α → V_α c. a + u → o
 b. a + i → e d. e + V_α → V_α

(22) class [Lnk [D_φ [C T_φ]]] → REL

1	a	u	u	→ [a [u]]	→ o
9	a	i	i	→ [a [i]]	→ e
7	a	i	si	→ [a [isi]]	→ esi
11	a	u	lu	→ [a [ulu]]	→ olu

The order in which coalescence rules apply is determined by the internal structure of the complex head. Their application is cyclic – it targets the two most embedded components first and so on, as indicated by the bracketing in (22). Crucially, the surface form of Rel-Agr can be correctly derived by regular phonology only if the internal structure of the complex head obeys the Mirror Principle, as shown in (23) for class 9 Rel-Agr.

⁸Similar constraints on topical vs. focal subjects are discussed e.g. by Schneider-Zioga (2007) for Kinande.



While the predicted structure derives the correct form *e* (23), the non-mirroring bracketing in (24) incorrectly predicts the form *i* for the class 9 Rel-Agr prefix.

We conclude that Rel-Agr prefixes in Ndebele are formed by cyclic downward displacement. They are complex heads whose internal structure is identical to the internal structure of complex heads created by upward displacement (they obey the Mirror Principle), but whose pronunciation is low. This is as predicted by GenHM, according to which upward and downward head displacement are the same syntactic process.

3.2 Downward displacement feeds upward displacement in Mainland Scandinavian V2

In this subsection, we explore the predictions of the account with respect to a head chain with structurally nonadjacent strong positions:

(25) $[ZP Z^{hm,*} [YP Y^{hm} [XP X^*]]]$

Descriptively, this is a case of downward head displacement feeding upward head displacement: in the absence of *Z*, the result is downward displacement to the lowest position (*Y*), but if *Z* is present, the complex head surfaces in the highest position (*Z*). Syntactically, upward displacement to the highest position is always possible, regardless of the directionality of the displacement relating the two lower heads. In the particular case in which *Y* first displaces downward to *X*, the surface effect is one in which nonadjacent positions seem to be related in a nonlocal or noncyclic way, yet each step involves an application of GenHM that is both cyclic and local, since at each step a head is related to the head of its complement, and GenHM in a lower part of the structure precedes GenHM in a higher part of the structure. We argue that this is precisely the case in V2 sentences in the North Germanic languages of Mainland Scandinavia (MSc; Danish, Norwegian, and Swedish). We exemplify the phenomenon throughout with examples from Danish.

The basic puzzle posed by V2 in MSc is that, although *V* moves to *C* in V2 contexts, there is no independent evidence for an intermediate step of this movement in *T* (i.a. [den Besten 1983](#), [Taraldsen 1985](#), [Holmberg 1986](#), [Platzack 1986](#), [Holmberg and Platzack 1995](#), [Vikner 1995](#)). First, *V* is in *C* in V2 contexts, as diagnosed by the position of the finite verb to the immediate left of the subject (26). Second, in non-V2 sentences, the position of the finite verb to the right of markers of the left edge of VP (e.g. adverbials) reveals that the former surfaces within VP (27).⁹

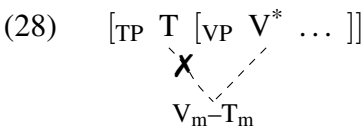
⁹On the precise position of the finite verb in non-V2 contexts, see footnote 2. Unlike English, all verbs, including auxiliaries, surface in a low position in non-V2 contexts (see references cited above for evidence). Under the GenHM account presented below, this entails that auxiliaries are generated in strong head positions.

- (26) Om morgenen **drikker** [TP Peter [VP ofte kaffe]]
 in the.morning drinks [TP Peter [VP often coffee]]
 ‘Peter often drinks coffee in the morning.’ Danish (Vikner 1995:47)
- (27) Vi ved at [TP Peter [VP ofte **drikker** kaffe om morgenen]]
 we know that [TP Peter [VP often drinks coffee in the.morning]]
 ‘We know that Peter often drinks coffee in the morning.’ Danish (Vikner 1995:47)

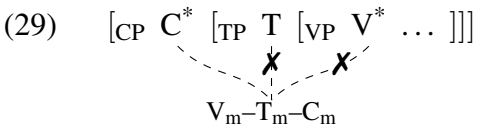
This paradigm thus illustrates (25): the complex head surfaces in the highest (C) or lowest (V) position, but never in the intermediate position (T).

Previous Head-Movement-based analyses of this pattern sacrifice either cyclicity or locality. In Holmberg and Platzack 1995:49–50 and Vikner 1995:28–31, 133, V moves to T only if there is further movement to C: V does not move to T overtly in non-V2 contexts,¹⁰ and in V2 sentences, V moves to C making an intermediate step in T enforced by locality (HMC). This is a non-cyclic account, in the sense that V-to-T movement is contingent on further movement from T to C, and thus does not solely depend on properties of V and T. On the other hand, Harizanov and Gribanova, to appear, preserve cyclicity, but propose that V moves to C directly, not constrained by the HMC.¹¹

In contrast to these analyses, GenHM allows for a derivation of this paradigm that is strictly cyclic and local, as it instantiates the abstract pattern in (25).¹² Both the highest (C) and lowest (V) head positions are strong, and the intermediate position (T) is weak.¹³ In non-V2 contexts, C does not trigger GenHM, and only V* and T are involved:



Since V is the highest – in fact, the only – strong position, the complex head is spelled out within VP. A V2 derivation involves a further step of GenHM relating T and C*:



In this case, the highest strong position is C*, which is where the complex head is spelled out. The surface effect is the appearance of downward displacement from T to V* followed by upward

¹⁰In addition, V and T are related by either downward displacement or a lexicalist feature-checking operation and LF movement, along the lines of Chomsky 1993.

¹¹In Harizanov and Gribanova, to appear, T and V are related by postsyntactic lowering, under a partially unified analysis of postsyntactic upward and downward head displacement that is similar to our proposal in many respects. Crucially, under their proposal, the direct movement of V to the C domain in V2 contexts is not due to these postsyntactic processes, which are subject to HMC-like locality.

¹²In Arregi & Pietraszko 2018, we address two potential challenges to the claim that head displacement to C in MSc is strictly cyclic and local. Specifically, we argue that it does not display the behavior of clear cases of long head movement, such as participle fronting in Slavic (i.a. Lema and Rivero 1990, Embick and Izvorski 1997, Harizanov and Gribanova, to appear). We also discuss an argument from Sailor (2009, 2018) based on the interaction between V2 and VP ellipsis. Our counterargument is summarized in subsection 4.3 below.

¹³The idea that the apparent locality or noncyclicity problems in V2 in MSc dissolve once we view this as a matter of determining the spellout positions of heads is due to Svenonius 2016:217–218.

displacement from V^* to C^* either in one long step or countercyclically stopping in T. However, each step in the syntactic derivation is local and cyclic: the first instance of GenHM relates T and V^* , and the second, C^* and T. The apparent nonlocality or noncyclicality of the derivation is due to the fact that the strong positions are not structurally adjacent.

3.3 Upward and downward displacement in Romance imperatives

The unification of upward and downward head displacement under GenHM predicts that both types of displacement are blocked in the same configurations. In this subsection, we test this prediction with Romance imperatives. In many Romance languages, the verb moves to C in positive imperatives, but this movement is blocked by negation, which forces the verb into a lower position. These different positions of imperatives correlate with differences in their inflectional exponence. We argue that in varieties of Vallader Romansh, a similar correlation holds, except that the head-displacement process that is blocked by negation is downward, not upward.

We first illustrate the correlation between verb position and inflection with Iberian Spanish second plural imperatives. In affirmative commands, the verb is inflected in an imperative-specific form, and object clitics follow the verb (i.e. they are enclitics):¹⁴

- (30) Llamad nos!
 call.IMP.2PL us
 ‘Call us!’ Iberian Spanish

The postverbal position of the clitic in imperatives is standardly taken to diagnose a high position for the verb, more specifically, C, contrasting with the low position of other finite forms, in which proclisis obtains (Rivero 1994, Rivero and Terzi 1995). In contrast, the verb in negative imperatives follows object clitics, and has a different inflectional form that is syncretic with the present subjunctive (notated here as IMP/PRS.SBJV):

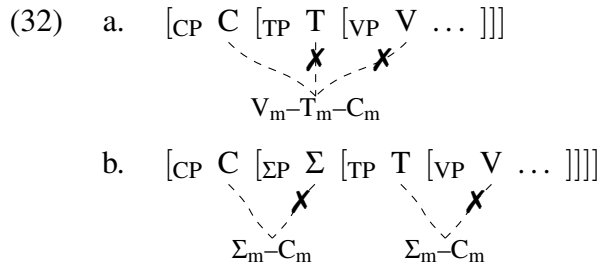
- (31) No nos llaméis!
 not us call.IMP/PRS.SBJV.2PL
 ‘Don’t call us!’ Iberian Spanish

Following the accounts in Rivero 1994, Rivero and Terzi 1995, and Zanuttini 1997, we assume that the preverbal position of the clitic indicates that negation blocks movement of the verb to C, and that the difference in inflectional form is closely correlated with position: in imperatives, C triggers the special exponence visible in affirmatives, but in negatives, the verb is not in a local configuration with C, which blocks allomorphy.¹⁵ The form of the verb in negative imperatives is often syncretic with either the subjunctive (e.g. Spanish) or the infinitive (e.g. Italian), though, as we will see below, this syncretism is only partial in some Romance varieties.

¹⁴Throughout this subsection, we systematically represent Romance clitics as separate words, ignoring standard orthographic conventions. We also ignore the opening exclamation mark (!) in Spanish, to avoid confusion with markers of acceptability.

¹⁵The tight correlation between imperative syntax and exponence in the works cited above is challenged in Harris 1998, who nevertheless also adopts a similar analysis of the syntax of imperatives and its relation to inflectional exponence. See also Romanello and Repetti 2014.

Adapting the analyses cited above to the GenHM framework, we take positive imperatives to involve a GenHM relation between V, T, and C, and implement the blocking by negation in terms of a high Σ head (Laka 1990) that intervenes between C and T.¹⁶ The single head chain in the affirmative is spelled out in the highest position (C), since no head is strong (32a). Regardless of the surface position of the complex head, the $[V_m-T_m]$ complex is in a local configuration with C_m in the value of the shared M-feature, which triggers imperative-specific allomorphy. In negative imperatives (32b), C enters into a GenHM relation with Σ , leaving the $[V_m-T_m]$ complex in T (since Σ itself does not trigger GenHM).



As $[V_m-T_m]$ is not in a local configuration with C_m in (32b), the finite verb takes on a different inflectional form.

In the context of this analysis of the correlation between head displacement and inflectional form, the GenHM account makes the following prediction: if T is strong, the C-T relation in positive imperatives will be downward, that is, the finite verb will be spelled out in T instead of C. This prediction is borne out by some varieties of Vallader Romansh, which we illustrate here with the variety of Scuol.¹⁷ The inflectional form of imperatives in this variety is different in affirmative (33) and negative (34) sentences, illustrated here with the second person plural.

(33) ans klɔ'mai
us call.IMP.2PL
'Call us!'

(34) nu ns klɔma'rai
not us call.IMP/INF.2PL
'Don't call us!
Scuol (Manzini and Savoia 2005:424)

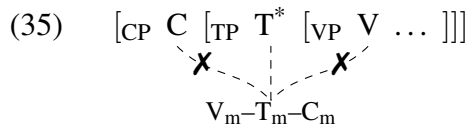
While the second plural imperative has the inflectional suffix *-ai* specific to imperatives in the affirmative, the form used in the negative counterpart is different, as it involves a form that is partially syncretic with the infinitive (notated here as IMP/INF).¹⁸ As in other Romance languages, we take this to be the result of a C-T relation in affirmatives (32a) that is blocked by intervening Σ in negatives (32b). However, as shown above, the verb surfaces in the same low position (T)

¹⁶We abstract away from intermediate projections and head positions between V, T, and C.

¹⁷Vallader is the easternmost variety of Romansh in Switzerland (Haiman and Benincà 1992, Anderson 2016). Other varieties of Vallader Romansh with the same patterns in imperatives include Sent and Müstair. The variety of Zernez is different, in that negative imperatives can have the same imperative-specific form as in affirmatives, with proclitics in both. This can be interpreted in different ways. It could be taken to be evidence that no relation with C is established (even in affirmatives), and that imperative-specific exponence is not due to allomorphy triggered by C. Perhaps more interestingly, the pattern might also be due downward displacement of C in imperatives that is not blocked by negation. See Manzini and Savoia 2005:424–425 for relevant examples in all these varieties.

¹⁸More specifically, the negative form is the same as the infinitive with the addition of the second person plural suffix *-ai* characteristic of imperatives in Vallader Romansh (Haiman and Benincà 1992:98–101).

in both, as evidenced by the fact that clitics are preverbal in both cases.¹⁹ That is, imperatives in Scuol and other varieties of Vallader Romansh involve a relation with C that is blocked by negation (as diagnosed by verbal form), but this relation is one of downward, not upward, displacement (as diagnosed by clitic placement), due to the strength of (imperative) T in these varieties. In affirmative imperatives, the output of GenHM is (35), to be contrasted with this construction in other Romance languages (32a).



In negative imperatives, T is also strong, but the resulting configuration is the same as in other Romance languages, shown in (32b): by being the top position in the lower head chain, a strong feature in T has no effect on where the complex head is pronounced.

To summarize this section, the unification of upward and downward head displacement afforded by GenHM finds support in the different ways in which these syntactic processes behave the same way: they are both cyclic and derive the same types of Mirror-Principle effects, both feed further upward head displacement, and both are blocked in the same configurations. In the next section, we discuss differences between upward and downward displacement, and how GenHM accounts for these.

4 Differences between upward and downward displacement

The literature has uncovered certain important differences between upward and downward head displacement, beyond the directly observable difference in directionality, having to do with the way head displacement interacts with other syntactic phenomena such as phrasal movement and *do*-support. GenHM offers a novel way of looking at these differences in terms of the relation between syntactic operations and Spellout, and correctly predicts that these interactions are more complex than standardly assumed.

4.1 Phase extension and Holmberg’s Generalization

The Minimalist literature contains several related proposals to the effect that upward head displacement (formalized as Head Movement) licenses phrasal movements that are otherwise not possible. All these proposals have in common the hypothesis that upward head displacement of the head *H* of a phase *P* to a higher head extends the phase defined by *H*, so that extraction of elements from *P* that is otherwise banned by Chomsky’s (2000) Phase Impenetrability Condition (PIC) is made possible. We refer to this family of phenomena as *phase extension*, following den Dikken (2006:81–152, 2007). Other accounts along these lines include Gallego’s (2006) phase sliding (see also Gallego and Uriagereka 2007) and Bošković’s (2015) phase collapsing. See also Chomsky 1993:13–19 and Fox and Pesetsky 2005 for related proposals that do not involve redefining phase boundaries.

¹⁹In second person singular imperatives, the verb can surface before or after the clitics (Manzini and Savoia 2005:424–425). This might indicate a featural difference in T between second person plural and singular imperatives: while T is obligatorily strong in the plural, as proposed above, it is optionally so in the singular. Exploring potential consequences of this hypothesis would take us far beyond the scope of the present paper.

Under GenHM, phase extension can be implemented in two different ways. First, we can supplement our analysis with the proposal that, along the lines of the works cited above, the boundaries of a phase are redrawn when the head of the phase establishes a GenHM relation with a higher head. This would predict that downward and upward head displacement would have the same phase-extending capabilities, since they are the result of the same syntactic operation. A second possibility is that phase extension is a postsyntactic effect, which predicts that downward and upward head movement behave differently with respect to phase extension, since, under our analysis, downward and upward head displacement have different postsyntactic properties. Following [Fox and Pesetsky 2005](#), we claim that the latter account is correct, by concentrating on the set of phenomena that fall under Holmberg’s Generalization ([Holmberg 1986:165–240](#), [Vikner 2005](#)).²⁰ The rationale behind focussing on Holmberg’s Generalization is that it is the only detailed case study in which upward and downward head displacement have been compared with respect to phase extension in a single language or language family: in MSc, upward displacement of the main verb licenses object shift, but downward displacement to the verb does not. As argued in detail in [Fox and Pesetsky 2005](#) (based in large part on data in [Holmberg 1999](#)), the crucial difference between upward and downward displacement that results in the licensing of object shift has to do with postsyntactic linearization. As we show below, [Fox and Pesetsky’s \(2005\)](#) cyclic linearization account of Holmberg’s Generalization is compatible with GenHM, which we take to be further evidence for the view of head displacement adopted here.

One of the basic contrasts covered by Holmberg’s Generalization is the following. In a V2 sentence in which the main verb is in C due to upward head displacement, the verb’s object can be shifted outside the VP to the left of adverbs such as negation (36), but in a non-V2 sentence (37), the main verb stays in VP, and object shift is not possible (we represent unpronounced positions in head chains as traces for expository purposes only).

- (36) Jag kysste **henne** inte [_{VP} t_{kysste} t_{henne}]
 I kissed her not
 ‘I didn’t kiss her.’ Swedish ([Holmberg 1999:1](#))
- (37) *... att jag **henne** inte [_{VP} kysste t_{henne}]
 that I her not kissed
 ‘... that I didn’t kiss her.’ Swedish ([Holmberg 1999:1](#))

As shown in [Holmberg 1986, 1999](#), this correlation between the possibility of object shift and the position of the main verb outside VP is only partial, and part of a more general pattern of order preservation: all VP-internal material that precedes an object in a sentence without object shift must also precede the object in a corresponding sentence in which the object is shifted. In the examples above, the relevant VP-internal material is the main verb: if the verb surfaces in C, object shift preserves the base verb-object order (36), but if the verb surfaces in VP, object shift reverses the order, which is not licit (37). Thus, the explanation for the correlation between the directionality of head displacement of the verb and object shift has to do with the surface effect of the displacement, and not directly with the specific syntactic operation underlying it.

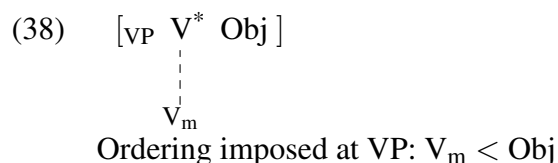
This predicts that upward head displacement of the verb is neither sufficient, since other VP-internal material may contribute to blocking object shift, nor necessary, since syntactic operations

²⁰[Holmberg \(1986\)](#) refers to the generalization as the *phonetic adjacency condition*. The first use of *Holmberg’s Generalization* in this sense is in [Collins and Thráinsson 1993:135](#).

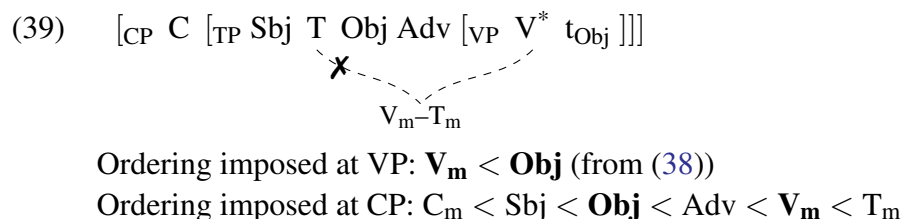
other than head displacement may contribute to preserving the base verb-object order. Both predictions are confirmed, as shown in [Holmberg 1986, 1999](#), and [Fox and Pesetsky 2005](#).

[Fox and Pesetsky \(2005\)](#) account for these patterns based on the hypothesis that postsyntactic linearization is done cyclically, that is, it is interleaved with the syntactic derivation at particular structural points (this is their implementation of [Chomsky's \(2000\)](#) derivation by phase). These *cyclic spellout domains* include VP and CP: as the syntax incrementally builds clause structure, it ships the structure to be processed postsyntactically whenever it constitutes a spellout domain. Postsyntactic processing includes linearization of the syntactic objects in the spellout domain, and, crucially, the linear order of elements determined at a given application of Spellout is preserved in later stages in the derivation. Application of Spellout in higher domains may add other linear relations, but never delete or alter previously established ones. This derives order preservation in the particular case of object shift, under the assumption that this operation involves direct extraction of the object to its VP-external surface position, that is, it does not involve an intermediate VP-internal step. When VP is spelled out, the relative order of its constituents is fixed; in particular, any element that precedes the object at this stage (e.g. the verb) must do so as well at later applications of Spellout. Thus, if the object moves out of the VP, any such element must displace to an even higher position, in order to be consistent with the linear order fixed at the VP domain.

This account of Holmberg's Generalization does not rely on the specific syntactic mechanism underlying head displacement, but on its effect on linearization. The contrast between upward and downward head displacement observed in (36–37) is simply due to the fact that the verb precedes the shifted object under upward displacement, but follows it under downward displacement. The analysis is thus compatible with GenHM, under the hypothesis that Head Chain Pronunciation is part of the process of postsyntactic linearization. When the VP is spelled out in both (36) and (37), V^* is not in a GenHM relation with any higher head, and the order verb-object is fixed (recall from subsection 3.2 that V is strong in MSc, and so is C in V2 sentences):²¹



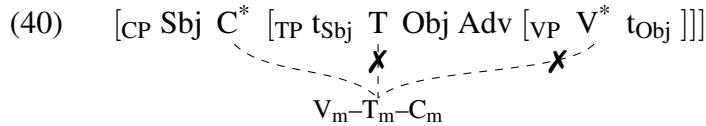
In the CP domain, the object is extracted from VP, and V^* enters into a GenHM relation with T. No other relevant operations apply in a non-V2 sentence (37), and since V^* is strong, the $[V_m-T_m]$ complex is spelled out in V^* (i.e. downward head displacement):



This yields an ordering conflict in which the verb both precedes and follows the object, resulting in ungrammaticality. On the other hand, in a V2 sentence (36), T enters into an additional GenHM

²¹In the representations below, $x < y$ denotes 'x precedes y', and we ignore the ordering of phonetically null elements.

relation with C^* , forming a complex head $[V_m-T_m-C_m]$ that is spelled out in C^* , as the latter is strong:



Ordering imposed at VP: $V_m < \mathbf{Obj}$ (from (38))

Ordering imposed at CP: $\text{Sbj} < V_m < T_m < C_m < \mathbf{Obj} < \text{Adv}$

No ordering conflict arises, since, in particular, the verb is required to precede the object at both spellout domains.

To conclude, to the extent that upward and downward head displacement display asymmetries in their ability to license phrasal movements, these are arguably due to their differing effects on linear order, not to any alleged differences in their syntactic derivations. This is precisely as predicted by the theory of GenHM, in which upward and downward head displacement only differ with respect to postsyntactic linearization.

4.2 Directionality of displacement and *do*-support: The lack of correlation

We have seen that in English, auxiliaries undergo upward displacement to T, while lexical verbs trigger downward displacement from T. In this language, we find a correlation between this difference in the direction of displacement and the process known as *do*-support. In certain contexts (negation, subject-auxiliary inversion, and others), downward displacement is blocked, and *do*-support applies instead. On the other hand, upward displacement is never blocked in these contexts, and does not alternate with *do*-support. In the literature, this difference between English downward and upward displacement has been used as evidence that these are different types of operations, subject to different conditions. In this subsection, we provide an analysis of this correlation in English, based on the hypothesis that certain languages with strong V heads impose strict adjacency conditions on the spellout of head chains containing them, which results in the splitting of a head chain into two. These split chains are subject to special spellout conditions, which result in defective pronunciation of V_m in one of them as *do*.

The analysis developed for English makes the prediction that the correlation between the direction of head displacement and *do*-support is spurious, and that it does not hold crosslinguistically. The prediction is borne out in two different directions. First, downward displacement does not always alternate with *do*-support in Mainland Scandinavian. Second, in the Lombard variety of Monnese, lexical verbs undergo upward displacement to T, but trigger *do*-support in subject-auxiliary inversion contexts (Benincá and Poletto 2004). Taken together, these crosslinguistic data provide an additional argument for the unification of upward and downward displacement under GenHM.

The following examples illustrate the correlation in English. First, lexical verbs trigger downward displacement of T (section 2), and, accordingly, trigger *do*-support in the context of sentential negation (41a) and subject-auxiliary inversion (41b).²²

²²Like negation, verum focus also triggers *do*-support, whether it involves an overt particle or not (e.g. *Sue does (so/too) eat fish*; see Chomsky 1957, Emonds 1970:216–217).

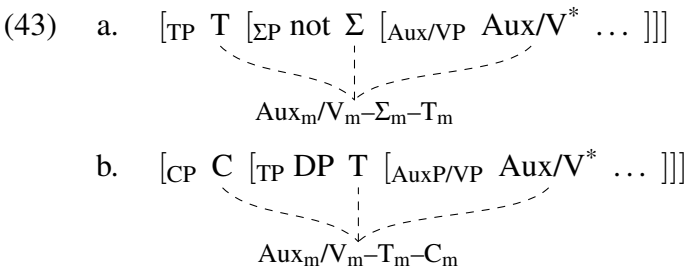
- (41) a. Sue {does not eat/*not eats/*eats not} fish.
 b. Where {does Sue eat/*Sue eats/*eats Sue} fish?

Under *do*-support, the verb surfaces in a bare form in V, and T is pronounced in T (41a) or C (41b), along with the dummy verb *do*. On the other hand, auxiliary verbs undergo upward displacement to T (section 2), and do not trigger *do*-support in these contexts:

- (42) a. Sue {is not/*does not be} eating fish.
 b. Where {is Sue/*does Sue be} eating fish?

As mentioned above, this English paradigm has been taken to diagnose an important difference between downward and upward displacement: the former is subject to an adjacency condition, but the latter is not. More specifically, certain items such as *not* and subjects (in subject-auxiliary inversion contexts) disrupt adjacency between T and V, which blocks downward displacement (Lowering), thereby triggering insertion of *do* in T. (Chomsky 1957:61–69, Lasnik 1981:160–169, Halle and Marantz 1993:132–138, Bobaljik 1995:57–109).²³ None of these items block upward displacement (Head Movement), which is why English auxiliaries do not trigger *do*-support.

In the analysis of head displacement proposed here, this difference between downward and upward displacement must be couched in different terms. Since both types of displacement are the result of the same syntactic operation of GenHM, whatever differences there are between them cannot be the result of differences in the application of GenHM. In the case of sentential negation, GenHM relates a verb and T across *not* in the specifier of Σ P, regardless of the strength of the verb. Thus, the structure of both (41a) and (42a) after GenHM applies is as shown in (43a).²⁴ Similarly, in cases of subject-auxiliary inversion, GenHM relates a verb, T and C across the subject in the specifier of TP, both in cases in which the verb is a strong V (41b) or a weak Aux (42b), as schematized in (43b).



Therefore, the blocking effect that downward displacement is subject to must be due to constraints on the postsyntactic realization of head chains, which is the locus of the difference between downward and upward displacement under this account. The analysis proposed here, to which we turn below, is based on two hypotheses: (i) in certain morphosyntactic contexts, head chains containing V* are split, and (ii) certain elements in the M-values of the resulting chains are exponded defectively. In a nutshell, *do* is the defective realization of the verb in the higher chain, and bare inflection in the lower chain is the defective realization of T in that chain.

²³Lowering of T in English is also assumed to be blocked by intervening sentence negation and inverted subjects in Embick and Noyer 2001:584–591, but this is not the immediate trigger of *do*-support in that analysis.

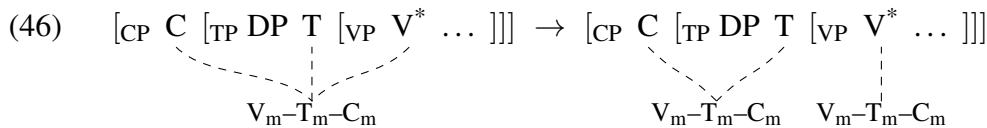
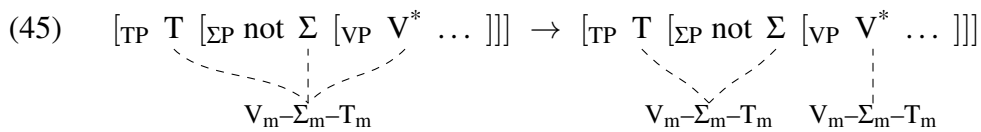
²⁴We assume, following Pollock 1989:409–422, that *not* in English and its equivalents in other languages are in the specifier of a Σ head between T and V (labeled ‘Neg’ by Pollock). This head is part of the head chain relating V and T. We assume that English verum focus constructions have the same syntax, following Bobaljik 1995:72–73.

We propose that in some languages, head chains with strong V are subject to a special postsyntactic adjacency condition that triggers *Chain Splitting*:²⁵

(44) *Chain Splitting*

In a head chain terminating in V^* such that a specifier intervenes between the top of the chain and V^* , split the chain at V^* .

In head chains terminating in weak Aux, Chain Splitting does not occur. Accordingly, the M-value of the head chain in (43a) surfaces solely in T, to the left of *not* (42a), and the M-value of the head chain in (43b) surfaces in C, to the left of the subject (42b). However, if the head chain terminates in strong V (i.e. a lexical verb), Chain Splitting applies because of the intervening specifier (*not* or the subject):



Chain Splitting results in a periphrastic construction with two verbal words with the same M-value. The higher word surfaces in T in negation contexts (45) and in C under subject-auxiliary inversion (46), that is, in the highest position of the head chain. In both cases, the lower word surfaces in V^* , the only position in the head chain.

Note however, that the two elements in the periphrasis do not have identical exponence, despite the fact they spell out the same M-value containing V_m and T_m (as well as Σ_m and C_m , which are always null). In particular, V_m is realized defectively as *do* in the higher word, but fully as the lexical verb root in the lower word, and T_m is realized defectively in the lower word (as null), but fully in the higher word (as finite tense). We submit that this is because a chain that is the output of Chain Splitting has a special property: because of splitting, certain morphological terminals in its M-value are no longer associated with the syntactic terminals they are generated in. This is the case for V_m in the higher chain and for T_m in the lower chain in (45, 46), which is precisely the set of morphological terminals that are pronounced defectively. We refer to such morphological terminals as *orphans*, and to chains containing them as *defective chains*. Orphans in defective chains are assigned the feature [O] as an automatic repair to Chain Splitting:

(47) *Defective Chain Repair*

Assign [O] to morphological terminal X_m in a head chain that does not contain the syntactic terminal X.²⁶

²⁵Adapting Bobaljik 1995:76–78 to the present framework, we assume that specifiers disrupt adjacency in head chains, but adjuncts do not. This explains why adverbials such as *often* (8) do not trigger *do*-support.

²⁶This formulation presupposes that it is possible to identify the syntactic terminal a given morphological terminal is generated in. In the formalization of minimalist syntax proposed in Collins and Stabler 2016, this can be implemented by pairing the M-value of each lexical item token in a Lexical Array with the same index as that lexical item token.

In English split chains, Defective Chain Repair applies as follows:

$$\begin{array}{l}
 (48) \quad \left[\begin{array}{c} \text{TP} \quad \text{T} \quad [\Sigma\text{P} \text{ not } \Sigma \quad \text{VP} \quad \text{V}^* \quad \dots] \\ \text{V}_m\text{-}\Sigma_m\text{-T}_m \quad \text{V}_m\text{-}\Sigma_m\text{-T}_m \end{array} \right] \rightarrow \left[\begin{array}{c} \text{TP} \quad \text{T} \quad [\Sigma\text{P} \text{ not } \Sigma \quad \text{VP} \quad \text{V}^* \quad \dots] \\ \text{V}_m[\text{O}]\text{-}\Sigma_m\text{-T}_m \quad \text{V}_m\text{-}\Sigma_m[\text{O}]\text{-T}_m[\text{O}] \end{array} \right] \\
 (49) \quad \left[\begin{array}{c} \text{CP} \quad \text{C} \quad [\text{TP} \text{ DP} \quad \text{T} \quad \text{VP} \quad \text{V}^* \quad \dots] \\ \text{V}_m\text{-T}_m\text{-C}_m \quad \text{V}_m\text{-T}_m\text{-C}_m \end{array} \right] \rightarrow \left[\begin{array}{c} \text{CP} \quad \text{C} \quad [\text{TP} \text{ DP} \quad \text{T} \quad \text{VP} \quad \text{V}^* \quad \dots] \\ \text{V}_m[\text{O}]\text{-T}_m\text{-C}_m \quad \text{V}_m\text{-T}_m[\text{O}]\text{-C}_m[\text{O}] \end{array} \right]
 \end{array}$$

V_m is an orphan in the higher chain, which does not contain V. The lower chain does not contain T, and T_m is accordingly an orphan in that chain. By Head Chain Pronunciation, the higher chain is pronounced in its highest position (T in (48), C in (49)), and the lower chain in its only position (V^*).²⁷

The feature [O] in orphan morphological terminals has an effect on their realization. Specifically, [O] overrides whatever other features would normally determine the exponence of V_m , which is invariably realized as *do* in the higher head chain. In the lower head chain, we propose that [O] triggers obliteration in the sense of Arregi and Nevins 2007, 2012, that is, deletion of T_m . As we show below for Monnese and in section 5 for several other languages, there is substantial variation in the ways in which [O] affects the exponence of orphans.

In the present analysis, *do*-support is dependent on the presence of a strong V head that can trigger Chain Splitting under certain conditions. Since strong features typically trigger downward head displacement, the account captures a certain correlation between *do*-support and downward head displacement. However, this correlation is weak, and we predict that it does not hold in certain circumstances. A first possibility is that a language may simply not have an adjacency condition on head chains, so that chains terminating in V^* never split. This is the case of Mainland Scandinavian. As we saw in subsection 3.2, V is strong in these languages, which accounts for the low position of finite verbs in non-V2 environments. However, unlike English, neither negation nor subject-verb inversion trigger *do*-support. The former is illustrated in the embedded non-V2 negative sentence in (50), and the latter in the V2 sentence in (26), repeated here as (51).

- (50) Jeg tror $\left[\begin{array}{c} \text{CP} \text{ at} \quad \text{Johan} \text{ ikke} \text{ købte} \quad \text{bogen} \\ \text{I} \quad \text{believe} \left[\begin{array}{c} \text{CP} \text{ that} \text{ Johan} \text{ not} \quad \text{bought} \text{ the.book} \end{array} \right] \end{array} \right]$
‘I believe that Johan didn’t buy the book.’ Danish (Vikner 1995:144)
- (51) Om morgenen drikker Peter ofte kaffe.
in the.morning drinks Peter often coffee
‘Peter often drinks coffee in the morning.’ Danish (Vikner 1995:47)

In (50), the finite verb surfaces to the right of negation, and in (51), to the left of the subject. Neither structure involves *do*-support, which follows from the assumption that head chains in these

²⁷Since Head Chain Pronunciation is part of linearization, it occurs relatively late in the postsyntactic derivation (Embick and Noyer 2001, Embick 2010, Arregi and Nevins 2012). Therefore, it follows Defective Chain Repair and does not create orphans, despite the fact that it delinks some syntactic terminals from their associated M-values.

languages are not subject to the adjacency conditions they are in English, and accordingly do not have Chain Splitting.²⁸

A second way in which there may not be a correlation between *do*-support and downward head displacement has to do with the relation between strong heads and the directionality of head displacement. Although a strong V typically results in downward displacement, this need not be so. Specifically, if the strong V is part of a chain that contains a higher strong head, the complex head will surface in the higher strong position, as is the case in V2 sentences in MSc (subsection 3.2). In this type of head chain, if the language has Chain Splitting and some element disrupts adjacency in the chain, the result will be a split chain. The predicted pattern is thus one in which *upward* head displacement alternates with *do*-support. This is precisely the pattern found in Monnese, as argued in Benincá and Poletto 2004.²⁹

First, both lexical verbs (52) and auxiliaries (53) undergo upward displacement to T in finite contexts, as shown by their placement before adverbials including negation.

- (52) a. I **tjàkola** semper b. I **tjàkola** mià
he speak.PRS.IND.3SG always he speak.PRS.IND.3SG not
‘He always speaks.’ ‘He doesn’t speak.’
Monnese (Benincá and Poletto 2004:59–60)

- (53) I **à** semper tjàkolà
he have.PRS.IND.3SG always spoken
‘He has always spoken.’ Monnese (Benincá and Poletto 2004:59)

Second, auxiliaries surface in C (to the left of subject clitics) in subject-auxiliary inversion constructions such as matrix (nonsubject) questions:

- (54) kwal **è** -t tferkà fora?
which have.PRS.IND.2SG -you searched out
‘Which have you chosen?’ Monnese (Benincá and Poletto 2004:63)

Finally, in subject-auxiliary inversion contexts, finite lexical verbs do not surface in C and instead trigger *do*-support:

- (55) ke **fe** -t majá?
what do.PRS.IND.2SG -you eat.INF
‘What do you eat?’ Monnese (Benincá and Poletto 2004:68)

That is, instead of inverting with the subject clitic, the pre-subject position is filled by dummy *fà* ‘do’ with finite inflection, and the lexical verb surfaces in infinitival form after the subject clitic. As shown in Bjorkman 2011, the infinitival lexical verb is in a low position below T and follows adverbials (contrasting with the high position of finite lexical verbs, shown in (52a)):

²⁸Bobaljik (1995:78–88) proposes that downward displacement in Mainland Scandinavian is subject to the same adjacency conditions as in English, and uses this to derive Holmberg’s Generalization. The analysis is predicated on the existence of a strict correlation between the directionality of head displacement and the availability of object shift. As shown in the literature reviewed in subsection 4.1, this correlation does not hold.

²⁹Monnese is the variety of Lombard (a Northern Italian Romance language) spoken in the village of Monno.

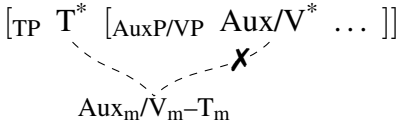
- (56) fe -t mia **majal** 'l pom?
do.PRS.IND.2SG -you not eat.INF the apple

‘Do you not eat the apple?’

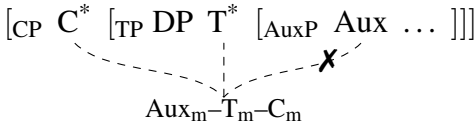
Monnese (Bjorkman 2011:190–191)

We take this low position to be V.

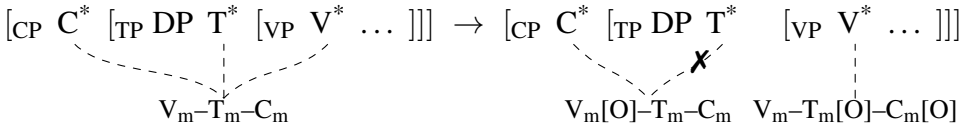
The GenHM analysis of this pattern is as follows. Both finite T and lexical verbs in Monnese are strong, and auxiliary verbs are weak. In sentences without displacement to C, finite verbs surface in T, whether they are auxiliaries or lexical verbs:

- (57) [TP T* [AuxP/VP Aux/V* ...]]


In sentences in which C triggers GenHM, C is strong. If the verb is an auxiliary, the M-value of the resulting head chain surfaces in the inverted position in C*:

- (58) [CP C* [TP DP T* [AuxP Aux ...]]]


However, lexical verbs in this context trigger Chain Splitting and concomitant Defective Chain Repair, as they are strong and the subject clitic disrupts adjacency in the head chain:³⁰

- (59) [CP C* [TP DP T* [VP V* ...]]] → [CP C* [TP DP T* [VP V* ...]]]


As in English, V_m is an orphan in the higher chain, and so is T_m in the lower chain. Consequently, V_m is exponed as *fá* in finite form in the higher pre-subject position in C. Orphan T_m in the lower chain also surfaces in defective form, which in the case of Monnese is infinitival inflection. We assume that this is due to impoverishment of tense (and agreement) features in this morphological terminal, which therefore surfaces in default infinitival form. This contrasts minimally with English, in which [O] triggers obliteration instead of impoverishment in T_m .

To conclude, the correlation between the directionality of head displacement and *do*-support is spurious and does not hold crosslinguistically. The specific case of Monnese shows that *do*-support can alternate with upward instead of downward displacement. This is a strong argument for the unification of upward and downward head displacement proposed here. The pattern found in this dialect is particularly illuminating to our theory, as it shows that strength can be diagnosed independently of word order: in Monnese, Aux is weak and (lexical) V is strong, as diagnosed by *do*-support, but both verb types surface in the same position in finite contexts. This aspect of the theory is further confirmed by the interaction of GenHM and VP ellipsis in Mainland Scandinavian, to which we now turn.

³⁰Unlike subject-auxiliary inversion, negation does not trigger *do*-support in Monnese (Benincá and Poletto 2004:70–71). As shown above, finite verbs surface to the left of negation (52b). We assume that this particle is a VP adverbial in Monnese, and thus does not disrupt adjacency in head chains. On the relation between head displacement, adjacency, and adverbials, see Bobaljik 1995:76–78.

4.3 VP ellipsis and *do*-support

In this subsection, we focus on a different known correlation between *do*-support and the directionality of head displacement. The correlation is manifested in how VP ellipsis (VPE) affects pronunciation of the verb. In languages with downward head displacement, like English, VPE triggers *do*-support (60). Upward head displacement, on the other hand, is correlated with full pronunciation of the verb outside the ellipsis site. This latter phenomenon is known as verb-stranding VPE (VVPE) (McCloskey 1991, Doron 1999, Ngonyani 1996, Goldberg 2005, Gribanova 2013), and is illustrated in (61) with Polish.

(60) *Do-support VPE*
 Mary wanted to watch the game and she **did**.

(61) *Verb-stranding VPE*
 Maria chciała oglądać mecz i **oglądała**.
 Maria wanted watch.INF game and watched.

‘Maria wanted to watch the game and she did’. Polish

In the present account, the two types of ellipsis involve the same syntactic operation – GenHM relating V with some higher head X. The contrast between them is due to different spellout of the verb in X, after VP ellipsis. If V is strong (English), its pronunciation in X is defective, namely as *do* (62a). In a language with a weak V, like Polish, the verb is pronounced fully (62b).

(62) a. *Do-support VPE* b. *Verb-stranding VPE*

$$\left[\begin{array}{c} \text{XP X} \quad \left[\text{VP V}^* \text{DP} \right] \\ \left\lfloor \text{GenHM} \right\rfloor \end{array} \right]$$

$$\left[\begin{array}{c} \text{XP X} \quad \left[\text{VP V DP} \right] \\ \left\lfloor \text{GenHM} \right\rfloor \end{array} \right]$$

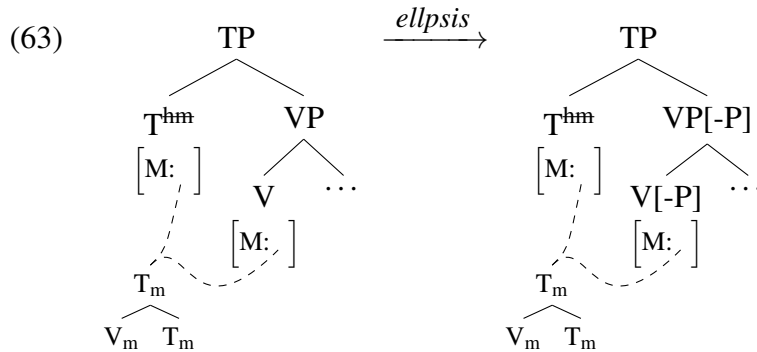
Like in inversion and negation contexts (discussed in the previous subsection), *do*-support in ellipsis is a consequence of a strong V, which, as we proposed, can require certain amount of integrity of its head chain. In English and in Monnese, V* requires adjacency within the chain, triggering Chain Splitting when violated. We argue that V* has a similar effect on its head chain when it is elided. We illustrate this account with derivations of *do*-support VPE in English and of VVPE in Polish. We then move on to an interesting interaction of VPE and *do*-support in Mainland Scandinavian, which supports the view that *do*-support is a direct consequence of strength (specifically of a strong V), rather than a correlate of downward head displacement.

Let us start with VVPE, which involves upward head displacement of V to some head outside of the ellipsis site, for example T.³¹ We assume that ellipsis is not strictly speaking structure deletion but rather non-pronunciation (i.a. Wilder 1997, Bartos 2000, Merchant 2001, Kornfeld and Saab 2004, Murguia 2004), and we formalize it as assignment of a [-P] feature to the elided constituent. [-P] is a feature relevant at PF that renders its host invisible to spellout rules, including Vocabulary Insertion and Head Chain Pronunciation. In the case of VPE, [-P] is assigned to VP and all nodes it dominates down to its syntactic terminals, whose M-values are therefore not subject to Vocabulary Insertion.³² In a configuration like (63), where V and T are related by GenHM and V is made

³¹VVPE does not require verb movement all the way to T. For instance, VVPE in Russian has been argued to result from V-to-Asp movement (Gribanova 2013).

³²Our feature [-P] is similar to Saab’s (2008, 2017) [I], though we remain agnostic as to its relation to identity conditions on ellipsis. Since [-P] is assigned to syntactic nodes and not to the nodes in M-values, we also derive Saab’s *Sub-Word Deletion Corollary*, according to which [-P]/[I] is inert below the M-word level.

invisible at PF by ellipsis, the shared M-valued must be pronounced in T, the only position in that chain visible to Head Chain Pronunciation.



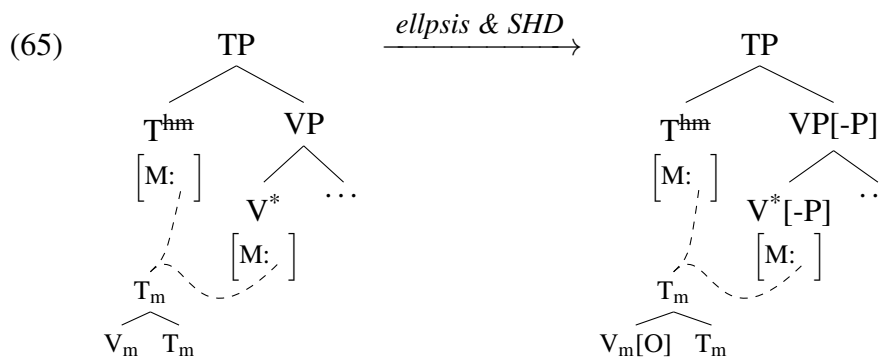
Note that the head chain above does not contain any strong positions, which means its pronunciation even in the absence of VPE is in T – the highest head. Thus, VP ellipsis does not affect the spellout of the verb in this case.

In contrast, ellipsis of a strong V does affect its pronunciation – it makes it defective. We capture this by the rule of *Strong Head Deletion*, which turns a morphological terminal into an orphan if the syntactic terminal it is generated in is strong and [-P]:

(64) *Strong Head Deletion*

Assign [O] to X_m in the M-value of a chain containing $X^*[-P]$.

Since English is a language with strong V, Strong Head Deletion applies in VPE assigning an orphan feature to V_m (65). We assume that [-P] affects strong heads the same way it affects weak heads, i.e. makes them invisible to spellout rules. Thus, only one syntactic terminal in (65) is visible to Head Chain Pronunciation, namely T, forcing pronunciation in that position.³³ As discussed above, $V_m[O]$ is realized as *do* in English.



As in cases of adjacency-triggered *do*-support, the appearance of *do* in ellipsis contexts is not directly related to downward head displacement in the present account. Rather, it arises due to the presence of a strong V head, which triggers Strong Head Deletion and effectively a defective pronunciation of V_m in T. We thus predict that downward displacement and ellipsis-triggered *do*-support tend to cooccur, as they are both triggered by a strong V. However, we also predict that

³³This effect of [-P] on a syntactic terminal can be formalized as part the Head Chain Pronunciation rule. Assume that all syntactic terminals are inherently [+P], and ellipsis reverses its value to [-P]. Head Chain Pronunciation could then be reformulated to apply to [+P] terminals as is, and additionally delink all [-P] terminals.

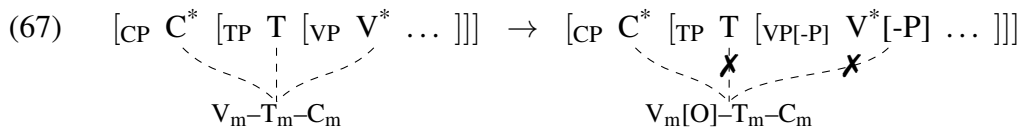
exceptions to this tendency could be found. Recall from the previous subsection that V in Monnese is strong, and yet the language exhibits V-to-T upward displacement. This is because both T and V are strong in this language. We thus predict that, if Monnese had VP ellipsis, it should be *do*-support VPE, not VVPE, despite the fact that the language has V-to-T raising. However, as reported in [Benincá and Poletto 2004:71-72](#), there is no evidence for VPE in Monnese.

It turns out, however, that a similar argument can be made on the basis of Mainland Scandinavian languages, for which we do have documented instances of VPE ([Sailor 2009, 2018](#), [Houser, Mikkelsen, and Toosarvandani 2011](#), [Platzack 2012](#), [Thoms 2012](#), [Bentzen, Merchant, and Svenonius 2013](#)). Recall that V2 clauses in MSc have a strong C. Given that a lexical verb raises to C in V2 clauses, one might expect these languages to display V-stranding VPE in these contexts (an observation due to [Sailor \(2009, 2018\)](#)). This prediction follows only under the assumption that upward displacement of a verb to head X directly correlates with stranding of the verb in X under VPE. This, however, is not the case: as shown in (66), a lexical finite verb cannot surface in second position in a V2 sentence with VPE ([Sailor 2009, 2018](#), [Platzack 2012](#), [Thoms 2012](#)), and the V2 requirement is satisfied by a dummy auxiliary translatable as ‘do’ (*gøre* in Danish):³⁴

- (66) Mona og Jasper vaskede bilen, eller rettere Mona { *vaskede / gjorde }.
 Mona and Jasper washed the car or rather Mona washed / did
 ‘Mona and Jasper washed the car, or rather Mona did.’

Danish ([Sailor 2018:\(7a, 8a\)](#))

Our account, on the other hand, correctly predicts *do*-support in C, despite the usual V-to-C displacement in this environment. This is due to the fact that V in MSc is strong, triggering Strong Head Deletion under ellipsis (67). The shared M-value now contains an orphan V_m and is pronounced in C, the highest strong position. In Danish, $V_m[O]$ is realized as the verb *gøre*.

- (67) $[CP\ C^*\ [TP\ T\ [VP\ V^*\ \dots\]]] \rightarrow [CP\ C^*\ [TP\ T\ [VP[-P]\ V^*[-P]\ \dots\]]]$


Previous analyses of the MSc puzzle assume that the correlation between directionality of displacement and *do*-support is real and that apparent exceptions, such as the Danish case above, must involve a confounding factor. For instance, [Sailor \(2009, 2018\)](#) takes examples such as (66) to be evidence that VPE prevents movement of V to C, as only the absence of such movement can trigger *do*-support. His account relies on two crucial assumptions. First, following [Aelbrecht 2010](#), ellipsis applies at the stage of the syntactic derivation that the licensing head is merged with the constituent containing the target of ellipsis, and makes elided material inaccessible to subsequent operations, including movement (in the case of VPE, the licensing head is T, and the elided constituent is VP). The second assumption is that in MSc V2 clauses, C attracts V (not T) directly when the former is merged (with a possible countercyclic step in T enforced by locality). The derivation of (66) thus proceeds as follows:

³⁴Another locus of VPE-triggered *do*-support in MSc is in a low position (below negation and low adverbs). It is found in non-V2 clauses and optionally under auxiliaries. Following previous work ([Bjorkman 2011](#), [Thoms 2012](#)), we assume that the appearance of a low *do* involves a low head that survives VPE and is targeted by GenHM and *do*-support.

while languages with V-stranding VPE have V-stranding VP fronting (e.g. Polish, Russian). Recall that *do*-support generally correlates with a strong V (85).

(71)

	V*	V
VP ellipsis	<i>do</i> -support	V-stranding
VP fronting	<i>do</i> -support	V-stranding

VP-fronting is analyzed in more detail in the next section, where we focus on the spellout of the fronted VP. At this point, we would like to point out another parallel that can be observed in the table above, namely the fact that *do* alternates with a full pronunciation of the verb in two different constructions. This systematic alternation fits well in a theory which, like GenHM, makes a very close connection between *do* and a fully pronounced verb. Note that, at some level of description, (69) and (70) are identical: they involve VP fronting that strands a verb in the main clause. The difference lies in the form of the stranded verb. In our theory, the level at which (69) and (70) are uniform is narrow syntax; the contrast arises at Spellout (the same is true of the corresponding ellipsis cases).

We close the discussion of *do*-support with another typological prediction. In this and in the previous subsection, we proposed two processes that create orphan morphological terminals: Strong Head Deletion and Chain Splitting. In principle, the two can be active in a language independently of one another. Given the present analysis of *do*-support as a spellout of an orphan V_m , we predict that languages may differ in the distribution of *do*-support, depending on which orphan-creating processes are active in a language. The comparison of *do*-support contexts in English and MSc instantiates the predicted typology:

(72)

	English	MSc
Chain Splitting (lack of adjacency)	✓	✗
Strong Head Deletion (deletion)	✓	✓

We've seen that Chain Splitting is active in English, giving rise to *do*-support in structures which violate adjacency of the head chain, namely negation and inversion. As this rule is inactive in MSc, neither negation nor inversion triggers *do*-support in these languages. Strong Head Deletion, on the other hand, is active in both English and MSc, deriving *do*-support in VP ellipsis and VP fronting in all these languages. Distinguishing two sources of orphan terminals predicts not simply variation in *do*-support contexts, but precisely this clustering of constructions in which *do*-support is found.

We argued in this subsection against a direct correlation between directionality of displacement and *do*-support vs. V-stranding in VP ellipsis/fronting. There does appear to be a *tendency* for *do*-support to appear in languages with downward verb displacement. This tendency is expected under our theory as both downward displacement and *do*-support rely on the language having a strong V. Crucially, however, we also predict the MSc pattern, where *upward* displacement (of V to C) co-occurs with *do*-support, not with V-stranding, in VP ellipsis and fronting (a similar argument was made from Monnese in the previous subsection). One might wonder why patterns like MSc and Monnese *do*-support are not more common. If they were, the correlation between the type of

ellipsis and directionality of displacement would have perhaps never been posited. In our view, this has to do with the specific configuration that is required to allow *do*-support and upward displacement to cooccur in a language. In particular, it requires at least two strong heads: V and some higher head (T in Monnese, C in Msc). Outside of *do*-support contexts, the higher strong head gives the effect of upward displacement, and the strength of V is revealed only in cases when it becomes an orphan, i.e. in *do*-support contexts. We hypothesize that a lexical item with a strong feature is marked, compared to lexical items without it and, unlike weak terminals, it requires positive evidence (e.g. from word order) to be posited by learners. This means that, in general, we expect languages with multiple strong heads to be less frequent than languages with few or no strong heads, and thus downward displacement to be less frequent than upward displacement crosslinguistically.

5 A final argument from predicate clefting

In the GenHM framework, the unification of upward and downward displacement is implemented as linking multiple syntactic positions to the same M-value. In this section, we present evidence from predicate clefts for this type of implementation. In particular, we show that it allows us to account for inflection doubling in Swedish, as well as root allomorphy in Yiddish. We then return to languages in which the clefted predicate is an infinitive or bare form and show how this inflectional deficiency is captured by the system developed in previous sections. In a nutshell, we argue that the lack of finite inflection in the fronted verb is due to phrasal movement creating a defective chain in the fronted VP.

As discussed in the previous section, predicate clefting involves movement of a verb (VP or possibly a bare V)³⁸ to a sentence initial position. In V-stranding languages, the verb is pronounced twice: in the fronted position and inside of the main clause, as illustrated with Polish and Hebrew below.

- (73) a. **Zaśpiewać**, może **zaśpiewam**.
 sing.INF maybe sing.FUT.1SG
 ‘Sing, maybe I will.’ Polish
- b. **lirkod**, Gil lo **yirkod** ba-xayim.
 dance.INF Gil not dance.FUT in-the-life
 ‘As for dancing, Gil will never dance.’ Hebrew (Landau 2006:32)

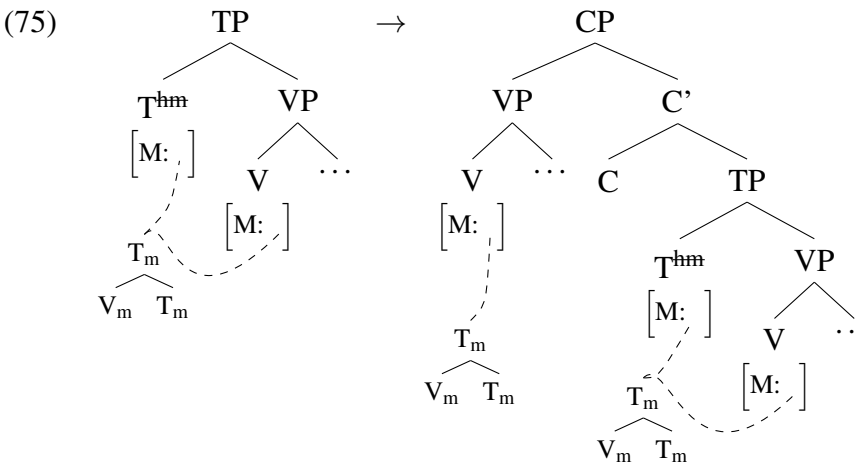
Typically, the fronted copy of the verb does not bear finite inflection and takes the infinitival form instead. The standard analysis of this pattern derives the inflection asymmetry between the two copies by remnant fronting of some constituent below T, e.g. a VP. The lower copy of the verb undergoes displacement to T, where it receives finite inflection. The fronted copy, however, is never in a relation with T and is therefore uninflected (74).

³⁸In some languages it is clear that predicate clefting involves fronting of the entire VP as the fronted constituent may include the object (e.g. Polish, Russian, Swedish). However, some languages have been argued to allow bare V fronting (see e.g. Källgren and Prince 1989 for Yiddish, Landau 2006 and Harizanov and Gribanova, to appear, for Hebrew, and Vicente 2007 for Spanish and Hungarian). We abstract away from this distinction and assume that phrasal movement of a VP and a bare V involves the same copy-and-delete mechanism.

$$(74) \quad [CP [VP_i V] C [TP V_j+T [\cancel{VP_i} \cancel{V_j}]]]$$

This analysis is well suited for predicate clefts in English, in which the fronted verb has a bare form. It is also typically adopted for languages like Polish and Hebrew, with the assumption that infinitival morphology is due to the lack of T in the fronted constituent.

Generalized Head Movement generates a different structure for predicate clefts. It relates T and V, creating a complex head $[V_m-T_m]$ associated with *both* positions. This operation takes place before the trigger of VP fronting, e.g. C, is merged. Assuming the copy theory of movement, VP fronting creates a copy of the VP, including the V's M-value, which is then merged with CP (75). The consequence of this derivation is that the fronted remnant VP has its own head chain which contains the entire $[V_m-T_m]$ complex. Note that the newly created chain is defective – the morphological terminal T_m has no corresponding syntactic terminal T in this chain (we return to this issue shortly).



Since Vocabulary Insertion applies to morphological terminals, GenHM predicts that both copies of the verb should be inflected in predicate clefts. Interestingly, this prediction is borne out in some languages. In Swedish (and optionally in Norwegian and Danish; see Platzack 2012) predicate clefts bear full finite inflection. As we see in (76), the fronted verb cannot be bare and must instead appear in its past tense form. Importantly, finite inflection on the fronted verb co-occurs with identical inflection on the support verb *gjorde* stranded in the main clause.

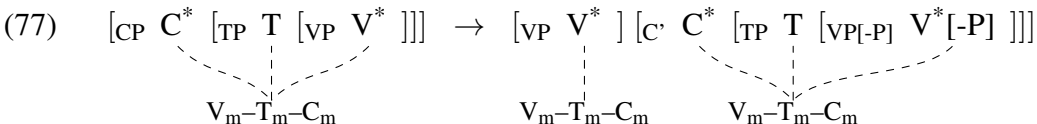
$$(76) \quad \text{och } [VP \{ *k\ddot{o}ra \quad / \quad k\ddot{o}rde \} \text{ bilen }] \text{ g}j\ddot{o}rde \text{ han } t_{VP}$$

and drive.INF / drive.PST the.car do.PST he

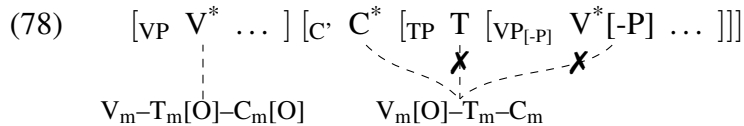
‘... and drive the car he did.’

Swedish (Platzack 2012:281)

As (76) is a matrix clause, *do* appears in a V2 position, in C. Thus, the shared M-value created by GenHM and copied by VP fronting is $[V_m-T_m-C_m]$ (77). After phrasal movement, the lower copy of the VP is deleted, i.e. assigned [-P].



The two chains are interpreted at PF independently. The lower chain contains a strong head with a [-P] feature, namely $V^*[-P]$. The presence of such a head triggers Strong Head Deletion, which assigns [O] to V_m in the lower head chain, giving rise to *do*-support in the main clause. The higher chain, on the other hand, is defective: T_m and C_m have no corresponding syntactic terminals T and C. This triggers Defective Chain Repair, assigning [O] to T_m and C_m . Finally, each head chain undergoes Head Chain Pronunciation: the higher one is pronounced in the only position with which it is associated, while the lower one is in the highest strong position, C^* (78).

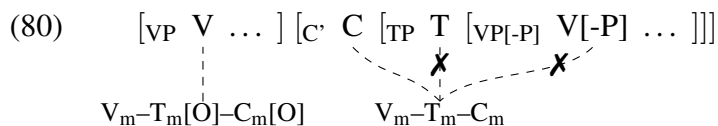


We propose that inflection doubling in Swedish arises because the orphan feature on T in the fronted VP has no effect on the pronunciation of this node. That is, unlike $V_m[O]$ (which is pronounced as ‘do’), there is no special pronunciation of $T_m[O]$ in Swedish. C_m in MSc has a null exponent and the [O] feature does not change that.

In Yiddish, the orphan feature does have an effect on the spellout of T_m – the inflection on the fronted verb is always the infinitival suffix *-(e)n* (79). Interestingly, however, the fronted verb is not the usual infinitive: the verb root has the same form as in finite forms, despite the infinitival suffix (Waletzky 1969, Davis and Prince 1986, Källgren and Prince 1989, Travis 2003, Kilbourn-Ceron et al. 2016). In (79a), for instance, the root allomorph in the *pseudo-infinitive* form of ‘know’ is *veys* – the same as in the first singular form. A true infinitive takes the root allomorph *vis*. What is important is that the root allomorph of a pseudo-infinitive is conditioned by the inflection (tense and agreement) of the matrix clause, i.e. it is always identical to the matrix clause occurrence of the verb (79b–79c).

- (79) a. **Veys-n,** veys ix. (inf: *vis-n*)
 know.PRS.1SG-INF know.PRS.1SG I
 ‘I know.’ Yiddish (Travis 2003:244)
- b. **Iz-n,** iz es reb yikhezk1 gobiners shtub. (inf: *zay-n*)
 be.PRS.3SG-INF be.PRS.3SG it Mr. Yikhezk1’s home
 ‘It is Mr. Yikhezk1’s home.’ Yiddish (Travis 2003:244)
- c. **Bin-en,** bin ikh in amerike.
 be.PRS.1SG-INF be.PRS.1SG I in Americal
 ‘As for being, I am in America.’ Yiddish (Kilbourn-Ceron et al. 2016:150)

This puzzling morphology of Yiddish pseudo-infinitives is easily captured by GenHM, which predicts that the fronted copy of the verb contains an orphan T_m :



T_m in the fronted VP has a defective pronunciation (due to [O]), but its presence is revealed by its tense and agreement features conditioning root allomorphy. The result is a hybrid of a finite root

and an infinitival suffix. Note that Yiddish is a V-stranding language, i.e. a language with a weak V. Unlike strong V in Swedish, the weak V in Yiddish does not trigger Strong Head Deletion and V_m is pronounced fully in C.

We propose that languages with true infinitives or bare verb forms in predicate clefts differ from Swedish and Yiddish only in the extent to which the orphan feature on T_m represses its pronunciation. In Polish (and other Slavic languages), the fronted verb is a true infinitive, i.e. the exponent of T_m is the infinitival suffix, and the root does not show tense/agreement-conditioned allomorphy (81). We propose that in this case, [O] triggers feature impoverishment deleting tense and agreement features from T_m . The node then surfaces in its elsewhere form – the infinitival suffix, and the root in its usual infinitival-triggered allomorph.

- (81) {?By-ć / *jeste-ć} w domu, jeste-śmy.
 be-INF / be.PRS-INF in house, be.PRS-1PL

‘As for being at home, we are.’

Polish

- (82) [VP V ...] [TP T [VP[-P] V[-P] ...]]

Finally, the fronted verb in English has no inflectional morphology whatsoever. The effect an orphan feature on T_m in English was discussed in subsection 4.2, where we proposed that [O] triggers obliteration of T_m in English, giving rise to a bare verb form in *do*-support contexts. Similarly, VP-fronting (83) creates a defective chain with an orphan T_m (84), triggering T_m obliteration.

- (83) {Go/*Went}, he did.

- (84) [VP V* ...] [TP T [VP[-P] V*[-P] ...]]

Like impoverishment, obliteration bleeds root allomorphy, and the features of T_m have no effect on the exponence of the fronted verb.

The four languages we discussed exemplify different degrees to which an orphan feature can affect the spellout of a node. In Swedish, [O] on T_m is ignored; in Yiddish, it triggers defective pronunciation of T_m ; in Polish, it triggers impoverishment of tense and agreement features; in English, it causes obliteration of the entire T_m node. This typology is summarized in (85).

- (85) Typology of predicate clefts based on spellout of orphan T_m

	Swedish	Yiddish	Slavic/Hebrew	English
[O] on T_m	ignored	forces the elsewhere allomorph of T	triggers feature impoverishment	triggers obliteration
Root allomorphy?	yes	yes	no	no
Form of fronted verb	finite	pseudo-infinitive	true infinitive	bare

We argued in this section that, even though fronted predicates are often inflectionally deficient, there is evidence that the fronted verb contains the inflectional node (here T_m). These facts support a particular aspect of GenHM: a unification of upward and downward displacement implemented

as sharing of an M-value by multiple syntactic positions. It is this sharing that predicts the presence of a morphological T_m node in the fronted VP. The usual deficiency of this node crosslinguistically (its absence or infinitival realization) is also predicted by our theory since T_m in the fronted VP is an orphan, which affects its spellout to various degrees.

6 Conclusion

We proposed a theory of head displacement which unifies upward and downward head displacement under a single syntactic operation of Generalized Head Movement. In this theory, the effect of upward or downward displacement is postsyntactic, involving a high or low spellout of a single complex head. The proposed unification is motivated by the fact that upward and downward head displacement share fundamental properties: i) they create identical, Mirror-Principle-obeying complex heads (evidenced by the morphophonology of Ndebele relative prefixes), ii) they both feed further upward displacement (giving rise to apparent long head movement in MSc) and iii) they are blocked in the same syntactic configurations (negation blocking both T-to-C and C-to-T displacement in Romance imperatives). We argued that previously observed differences between upward and downward displacement (their interaction with object shift and *do*-support) are postsyntactic asymmetries, and thus do not provide evidence that upward and downward displacement are distinct in narrow syntax.

The Generalized Head Movement theory takes a particular stand in the debate on the proper classification of displacement phenomena in language. It unifies different types of head displacement to the exclusion of phrasal movement. We concentrated on providing arguments for this unification, thus making an indirect argument against assimilating upward head displacement to phrasal movement. We believe that direct arguments against such an assimilation can be made, as well. There exist (at least) two puzzling asymmetries between upward head displacement and phrasal movement. First, they impose different identity requirements for ellipsis licensing. Traces of phrasal movement are ignored by the calculation of identity, allowing a mismatch between an antecedent phrase and a phrase moved out of the ellipsis site (Merchant 2001, Goldberg 2005, Saab 2008). In contrast, a head moved out of an elided constituent still requires an identical antecedent (McCloskey 1991, 2011, Goldberg 2005, Saab 2008, Gribanova 2013). And second, the two types of movement appear to have different rules governing the spellout of their traces/lower copies. This can be seen in V-stranding VP fronting (discussed in sections 4 and 5): the trace of a verb is pronounced in the fronted remnant, giving rise to verb doubling; on the other hand, an extracted DP (e.g. a subject or object) can only be pronounced in the matrix clause and cannot have a double in the fronted VP (Gärtner 1998, Abels 2001, Nunes 2004, Landau 2006, Vicente 2007, LaCara 2016). These facts show that upward head displacement does not create traces or copies of the same kind as phrasal movement and thus support their dissociation, as is done in the GenHM framework. In fact, our theory predicts the spellout asymmetry between upward head displacement and phrasal movement in VP fronting as only phrasal movement chains involve assignment of [-P] to lower copies. As far as the identity requirement in ellipsis licensing, GenHM does not predict head displacement to interact with ellipsis the same way phrasal movement does as the two are distinct operations. We believe that the interaction of GenHM and identity conditions on ellipsis is a promising avenue of research, which we leave for future work. For an explicit analysis in this spirit (though couched in a framework employing traditional Head Movement) see Saab 2008:348–385.

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