

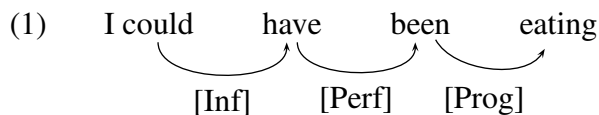
Displaced morphology in German. An argument for post-syntactic morphology

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1. Introduction: morphological selection

It is standardly assumed that non-finite morphology is canonically realized as follows: The morphology selected by V_n is realized on V_{n+1} , viz., on the immediately subordinate verbal element as in (1):



In this paper, I will discuss a case of morphological selection in German (varieties) where the morphology selected by V_n is not realized on V_{n+1} but on the last verb of a certain domain, which will be the verb cluster. Thus, we find a pattern as in (2), where the morphology appears to be displaced:



I will propose that this phenomenon does not involve any displacement operation as such but emerges as a side-effect of cluster reordering. This follows from the assumption that the morphological exponents are inserted into separate syntactic heads and are placed at PF by means of Local Dislocation. Since the placement of the morphology thus applies very late in the PF-branch, it can be affected by earlier (PF-) operations including those that lead to reordering in the verb cluster. This also explains why displacement only arises in certain cluster orders. In more general terms, displaced morphology in German arises from a conflict between the head-finality of the German VP and head-initial verb clusters. I will argue that the phenomenon thus provides straightforward evidence for post-syntactic morphology and the ordering of post-syntactic movement operations (cf. Embick & Noyer 2001, Arregi & Nevins 2012).

2. The phenomenon of displacement

A first important observation is that the behavior of non-finite morphology in the German verb cluster crucially depends on the order of the verbal elements. As long as it is strictly descending with the governed verb preceding the governing, the non-finite morphology occurs in the expected place, viz., on the immediately subordinate verb, e.g., as in (3), where V1 selects a *zu*-infinitive and V2 a participle:

- (3) dass er das Buch **gelesen**₃ **zu** haben₂ dachte₁
 that he the book read.PTCP to have.INF think.PST.3SG
 'that he thought he had read the book' 321 *Standard German*

The pattern we find in strictly descending orders can be illustrated schematically as in (4):

- (4) $\overset{\text{V3}}{\text{---}} \quad \overset{\text{V2}}{\text{---}} \quad \overset{\text{V1}}{\text{---}}$ *no displacement*

However, once the cluster order deviates from the strict 321 order, *zu* no longer occurs in the expected place, viz., on the verb immediately governed by the selector. In the following paradigm, the complementizer *ohne* 'without' selects a *zu*-infinitive and embeds a three-verb-cluster. While *zu* occurs on V1 in the 321 order, it does not in the 132 or the 312 order (at this point, we ignore the fact that V2 appears as a participle in (5a) but as an infinitive in (5b/c), which instantiate the so-called Infinitivus-pro-Participio-(IPP)-effect, cf. fn. 4):

- (5) a. ohne das Buch lesen₃ gekonnt₂ **zu** haben₁
 without the book read.INF can.PTCP to have.INF
 'without having been able to read the book' 32zu1
- b. ohne das Buch haben₁ lesen₃ **zu** können₂
 without the book have.INF read.INF to can.INF
 'without having been able to read the book' 13zu2
- c. ohne das Buch lesen₃ haben₁ **zu** können₂
 without the book read.INF have.INF to can.INF
 'without having been able to read the book' 31zu2

Thus, *zu* appears to be displaced in (5b/c). Crucially, placing *zu* on V1 leads to sharp ungrammaticality in (5b/c).

While displacement is not very frequent in the standard language because verb clusters are predominantly strictly descending, it is rather prominent in German dialects, where ascending orders are pervasive and often constitute the default order (see Salzmann 2016 for empirical details). The following example from Zurich German illustrates displacement in a strictly ascending order (Weber 1987, 244,fn. 1):

- (6) Er schiint₁ nüüt wele₂ z wüsse₃ dervoo. 1 ... 23
 He seem.3SG nothing want.INF to know.INF about.it
 ‘He does not seem to be interested in it.’ *Zurich German*

Importantly, displaced *zu* is not an isolated phenomenon but a systematic property of various non-finite forms in German varieties: In the Middle High German example in (7a) (from Behaghel 1923-1932, Volume 2, 369, §750), the participle selected by V1 appears on V3, while V2, which selects a bare infinitive, appears in the infinitive itself (the so-called Participium-pro-Infinitivo-(PPI-)construction). Particularly relevant in this context are East-Middle-German dialects because they have a larger inventory of non-finite forms (different kinds of infinitives and gerunds). In (7b) (from Höhle 2006, 68), V1 selects a so-called *ge*-infinitive (an infinitive with a *ge*-prefix); V2 selects a bare infinitive, but V3 appears as a *ge*-infinitive (and V2 as a bare infinitive):

- (7) a. ob in diu edele vrouwen het(e)₁ lazen₂ daz getan₃
 if him the noble lady have.SBJV.3SG let.INF that do.PTCP
 ‘if the noble lady had let him do that’ *MHG, Nibelungenlied 634,2*
- b. kâsd₁ mæ heləf₂ gəschri:₃
 can.2SG me.DAT help.INF GE.write.INF
 ‘Can you help me write?’ *dialect of Kleinschmalkalden*

The distributional pattern is exactly the same with these other non-finite forms: Displacement only obtains if the cluster order deviates from 321. The descriptive rule for the placement of non-finite morphology is thus as follows: Non-finite morphology attaches to the last verb of the complement of the selector (and thus occurs at the end of the verb cluster in ascending orders).

3. The derivation of displaced morphology

The basic idea underlying *zu*-placement is rather simple (see also Salzmann 2013, 2016): The non-finite morphology originates in independent syntactic heads and is associated with its host post-syntactically by means of Local Dislocation, an operation that applies to linear structure and is constrained by adjacency (cf. Embick & Noyer 2001; cf. also Hinterhölzl 2009, to appear).

Concretely, I assume that there is a separate functional head F that hosts the features corresponding to *zu* (cf. also Den Dikken & Hoekstra 1997, 1062). This head (as well as functional heads for other morphological features such as the participle and the gerund) occurs above VP. Morphological selection is thus checked in syntax: A V1 that takes a *zu*-infinitive is syntactically combined with an FP hosting the relevant syntactic features (given a post-syntactic approach to morphology the morphological exponents are inserted late). This functional head has another important property: It is linearized after its VP-

complement, in accordance with the head-final nature of the German VP.¹ This captures the generalization that *zu* always affixes onto the last verb of the complement of the *zu*-selector. The mechanism that associates the morphology with its host is thus always the same, but since Local Dislocation applies to linear structure, it can have very different effects, depending on the order in the verb cluster: If the order is strictly descending (viz., 321), the morphology appears to be well-behaved. If, however, V1 is not final in the cluster, *zu* will appear to be displaced. Crucially, however, there is thus no displacement operation as such; rather, displacement is only a side-effect.

I will make the following assumptions about verb clusters: First, the coherence/restructuring effects are due to the fact that the relevant verbal projections contain less structure, viz., lack a CP-layer, cf., e.g., Wurmbrand (2007). In what follows, I will label all verbal projections as VPs for ease of readability even though they may slightly differ in size (i.e. corresponding to VP/vP/TP) and some may better be classified as functional. Second, I assume that the default order in the VP is head-final. As a consequence, VP-complements are ordered to the left of their governor, leading to a strictly descending 321 order; (partially) ascending orders are derived from it by means of a PF-operation, viz., by means of inversion of V with its sister, as proposed in Haegeman & van Riemsdijk (1986) and Wurmbrand (2004).² Importantly, the same results are obtained if the different orders are directly linearized as either left-branching or right-branching as in Abels (2016); I will nevertheless adhere to the descriptively more baroque account deriving (partially) ascending clusters from descending ones as this highlights the nature of displacement more transparently.

I will now go through the derivations for both ‘well-behaved’ 321 cases like (3) as well as examples with displacement such as (5b) and (5c). I repeat the first two for convenience:

- (8) ohne das Buch {lesen₃ gekonnt₂ **zu** haben₁ | haben₁ lesen₃ **zu** können₂}
 without the book read.INF can.PTCP to have.INF have.INF read.INF to can.INF
 ‘without having been able to read the book’ 321/132 *Standard German*

Given my assumption that in the verbal domain complements are linearized to the left of their governor, the default order is strictly descending as represented in (9). Depending on the language/the variety and the cluster type, inversions can apply to this structure. In standard German, Aux-Mod-Inf clusters can also appear in 132 order, which is derived by inverting V1 (boxed in the diagrams) with its complement, leading to (10). VP-inversion is thus an operation that applies at a stage of the PF-derivation when there is still hierarchical structure present (the verb on which *zu* eventually ends up is circled):³

¹F thus differs from other functional heads in the language, viz., C and D, which precede their complement. However, since F is essentially an inflectional/agreement head and thus belongs to a different section of the clausal spine than C and D, I take this to be unproblematic (note also that German is a suffixing language).

²For a comparison of left-branching and right-branching accounts and alternative reordering mechanisms at PF, see Salzmann (2013).

³Non-verbal material has been scrambled out of the lexical VP; this is optional in varieties that allow for Verb Projection Raising. In the tree diagrams in the text, scrambled material is located in a specifier of V1; a specifier of F would be a possible landing site as well; since the two options are difficult to tease apart analytically, I will not dwell on this.

- (12) a. VP-inversion: V3 V2 zu V1 \Rightarrow V1 V2 V3 zu
 b. z(u)-placement: V1 V2 V3 zu \Rightarrow V1 V2 **zu**+V3
 \uparrow LD \downarrow

Displacement with 312 orders as in (5c) proceeds similarly. If this order involves syntactic movement of VP3 to a position above V1 and PF-inversion between V1 and its sister as proposed in Wurmbrand (2004) and Abels (2016), the derivation of (5c) will be as in (13) (for concreteness' sake, I assume that VP3 moves to SpecFP):

- (13) a. VP3-movement: [FP [VP1 [VP2 [VP3P V3] V2] V1] F] \Rightarrow
 [FP [VP3 **V3**] [F' [VP1 [VP2 t_{VP3} V2] V1] F]] \Rightarrow
 b. VP-inversion: [FP [VP3 **V3**] [F' [VP1 **V1** [VP2 t_{VP3} V2]] F]]
 c. zu-placement: V3 V1 V2 zu \Rightarrow V3 V1 **zu**+V2
 \uparrow LD \downarrow

It should have become clear that displacement is just a side-effect of cluster-reordering; there is crucially no displacement rule as such. Rather, there is just a single mechanism that associates the non-finite morphology with its host. Put more generally, displacement arises from a conflict between the head-finality of the German VP (as expressed by the head-final linearization of the functional heads with respect to their VP-complements) and (partially) ascending verb clusters.

The facts thus all fall out from independently motivated principles: The head-finality of the German VP motivates the cluster-final position of the functional head F and the selectional properties of the vocabulary item *zu*, i.e. its prefixal nature, determine its exact position. An explicit rule for the placement of non-finite morphology is thus unnecessary. Finally, the various cluster order possibilities are independent properties of a given variety.

This section has already provided a first argument in favor of a post-syntactic treatment, viz., the fact that the placement of non-finite morphology is partly governed by linear notions. The phenomenon strongly argues against pre-syntactic morphology as one would expect violations of the verbs' selectional properties during structure building. The following sections provide further evidence for the PF-perspective.

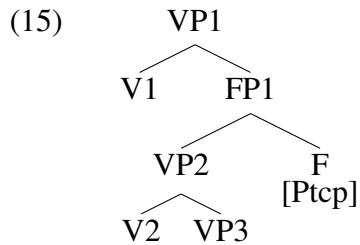
4. Absence of semantic effects

One crucial property of displaced morphology is that it is not interpreted in its surface position. This can be illustrated with the PPI-construction, repeated from above:

- (14) ob in diu edele vrouwen het(e)₁ lazen₂ daz getan₃
 if him the noble lady have.SBJV.3SG let.INF that do.PTCP
 'if the noble lady had let him do that' *MHG, Nibelungenlied 634,2*

Although the participle occurs on V3, it semantically applies to VP2. This follows straightforwardly under the post-syntactic approach pursued here: At spell-out, which forms the

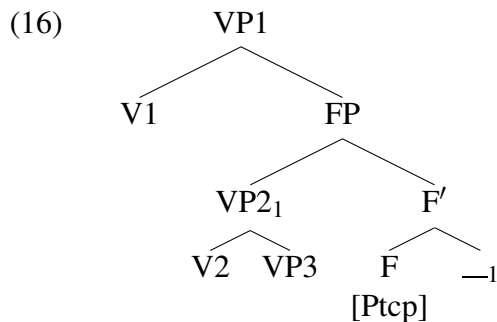
input to LF, the participial features are located in an FP above VP2 and thus will be interpreted in the correct position, cf. (15):



Crucially, local dislocation at PF cannot have any effect on the interpretation. Note that this argument presupposes that the participle contributes to the meaning of the present perfect (Wurmbrand 2004).

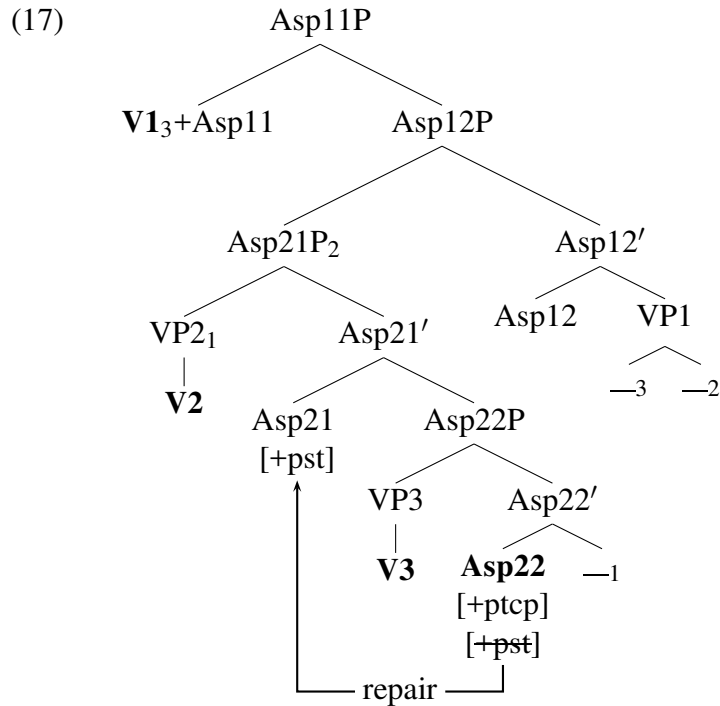
The fact that displacement does not have any semantic effects constitutes a serious problem for pre-syntactic morphology since the participle would be located on the ‘wrong’ verb from the start and thus should be interpreted there, contrary to fact.

In approaches where displacement is derived by means of syntactic operations, serious problems arise for semantic interpretation as well: This is particularly obvious in antisymmetric XP-movement approaches: For an F-head like Ptcp to occur at the end of the verb cluster, the entire verb cluster has to be moved into its specifier. For instance, in the approach by Barbiers (2005), which is based on Agree + VP-movement (to derive non-123 orders), VP2 has to be moved to derive an example like (14) (even though 123 orders are otherwise directly base-generated):



To obtain the correct interpretation, VP has to undergo obligatory reconstruction, a complication that is not necessary under the post-syntactic approach.

Even more serious issues arise with the remnant movement approach by Hinterhölzl (2009, to appear). Simplifying somewhat (see Salzmann 2016 for more discussion), XP-movement takes place in the derivation of verb clusters for temporal licensing and subcategorization checking. The displaced morphology is a phrasal affix in Asp2 of the extended projection of V2. The derivation of an example like (14) then proceeds as follows: VP3 moves to SpecAsp2 of V2, and VP2 moves to its own SpecAsp1. Finally, the entire Asp1P of V2 is moved into SpecAsp2P of V1 (Hinterhölzl 2009, 208–211):



The problem with this derivation is quite obvious: In (17) the participle would apply to V(P)3, deriving the wrong interpretation. To avoid that, Hinterhölzl proposes a repair operation which copies the *semantic* feature [+pst] from Asp22 to Asp21 (which then applies to the VP in its specifier). Note that this is a semantic repair in syntax; there is nothing wrong with the syntax as such, which casts doubts on the viability of this repair operation. A slightly different repair can be found in Hinterhölzl (to appear, section 5.1): Here, the semantic feature is copied onto a head above VP2, which then enters Agree with V2. This strikes me as equally problematic as the previous repair solution.

It should have become clear that approaches to verb clusters that rely on syntactic operations to derive different cluster orders and displacement run into serious difficulties once the semantic interpretation of the displaced morphemes is taken into account. The post-syntactic approach is at a clear advantage here.

5. Restrictions on displacement

Importantly, displacement is not freely available but restricted in systematic ways. The descriptive generalization in (18) provides a good initial approximation:

- (18) *Restrictions on displacement:*
 Displacement is possible if the non-final verb(s) selects a bare infinitive

By non-final verb(s) I refer to those verbs of the cluster that occur between the selector of the displaced morphology and the cluster-final verb.

In the rest of this section, I will first introduce a case where displacement fails. This will motivate my treatment of the infinitive as being syntactically absent. In the last part, I

will discuss cases where displacement is felicitous even though the non-final verb(s) does not select a bare infinitive. Importantly, the restrictions to be observed follow from the independently established selectional properties of the exponents. This provides yet another argument for a post-syntactic treatment.

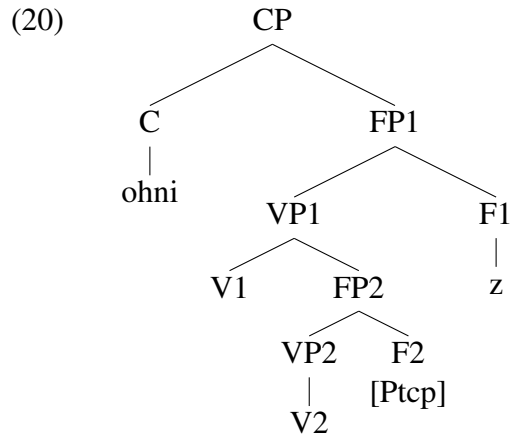
5.1 Selectiveness

At first sight, the free positioning of *zu* is reminiscent of that of clitics: It occurs at the edge of the verb cluster, viz., in second to last position. However, *zu* (as well as the other displaced morphemes) crucially differs from regular clitics in that it has selectional properties. It only attaches to verbs in the bare infinitive. Because of this property, it is sometimes referred to as a phrasal affix, see Vogel (2009), Hinterhölzl (2009). Given the many problems with the clitic-affix dichotomy (Embick & Noyer 2001), I will refrain from using the term in the remainder of this paper.

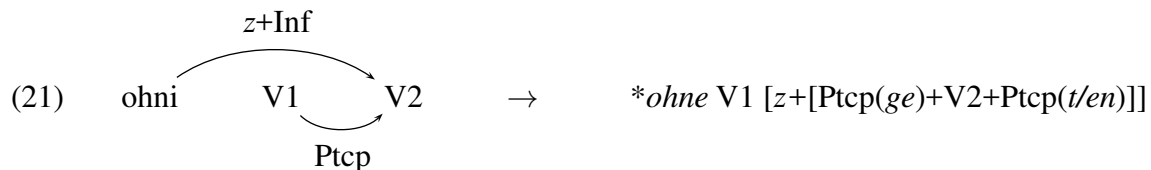
The selectiveness of *zu* can be illustrated as follows: In some Western Swiss German dialects (e.g., Fribourg German), 2-verb clusters with V1 = perfective auxiliary and V2 = participle allow for both the 12 and the 21 order when V1 is finite, see (19a). However, if V1 is non-finite, e.g. when selected by the complementizer *ohni* ‘without’, only the descending order is possible, see (19d). The ascending order is ungrammatical, irrespective of whether *zu* is placed on V1 (i.e. not displaced), see (19b), or whether it undergoes displacement to V2, see (19c) (Raffaella Baechler, p.c.):

- (19) a. das er s Buech hät₁ gläse₂/ gläse₂ hät₁
 that he the book have.3SG read.PTCP read.PTCP have.3SG
 ‘that he read the book’ 12/21; *Swiss German, Western dialects*
- b. *ohni s Buech z ha₁ gläse₂
 without the book to have.INF read.PTCP
 ‘without having read the book’ 12; *Swiss German, Western dialects*
- c. *ohni s Buech ha₁ z gläse₂
 without the book have.INF to read.PTCP
 ‘without having read the book’ 12; *Swiss German, Western dialects*
- d. ohni s Buech gläse₂ z ha₁
 without the book read.PTCP to have.INF
 ‘without having read the book’ 21; *Swiss German, Western dialects*

The reason why displacement is blocked here is the following: In the syntax, there will be a functional projection above the verb cluster for *z*, selected by *ohni* ‘without’. In addition, there will be another functional projection for the participle selected by V1 between V1 and VP2:



At linearization, the exponents for *Ptcp* and *zu* are attached cyclically, viz., bottom-up/inside-out (Embick & Noyer 2001). Consequently, the participle exponent is attached to V2 first (I will treat it as a circumfix for ease of illustration, but nothing really hinges on this). Since the participle selects a stem, this will be felicitous. Thereafter, however, *z*, which is a prefix and selects a bare infinitive (more precisely, the stem, see below), cannot be affixed onto the participle. In other words, the derivation crashes at the linearization of the FP because the selectional properties of *zu* are not respected. The failed displacement is schematically represented in (21):

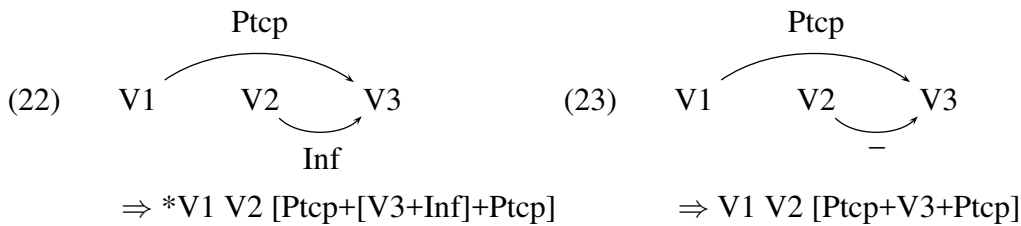


This problem obtains whenever there is more than one governor with a right-hand FP-complement and thus more than one cluster-final F-head: There will be more than one exponent that needs to be attached to the final verb of the cluster. Since the selectional properties of the morphemes often conflict with each other, this will frequently lead to a clash in the morphology and thus a crash of the derivation.

5.2 Infinitive as the default

As mentioned at the beginning of this section, displacement is generally possible if the non-final verbs select an infinitive. To account for this effect, I propose that infinitival features are not present syntactically, i.e., there is no separate functional projection for them (note that this does not rule out the presence of semantically relevant projections like *wollP* that are always silent, cf. Wurmbrand 2014). Consequently, in ascending orders, verbs selecting a bare infinitive will not contribute an additional clause-final exponent so that a clash at linearization is prevented. Importantly, this assumption is independently necessary to allow for the PPI-construction as in (14): If there were a functional projection for the infinitive, the infinitive marker would first attach to V3. The displaced participle, selected by V1 could then not be affixed as it selects a verbal stem and not an infinitive, see

(22). If, instead, V2 effectively selects nothing, there will only be one clause-final exponent, the participle, which can then felicitously be affixed onto the verbal stem, see (23):



It remains to be explained how infinitive morphology is introduced. This is particularly pressing for morphemes which themselves select an infinitive, viz., *z(u)* as well as the gerund and the *ge*-infinitive, which both morphologically contain an infinitive. I will assume that the vocabulary items for these categories have an additional feature triggering insertion of an infinitive morpheme (cf. Halle & Marantz 1993 for other cases of inflectional morphology where this is necessary). Additionally, the infinitive feature is assigned by default to verbs that are not associated with any functional morphemes during the PF derivation. Apart from verbs in descending order that are governed by infinitive-selecting verbs, the default rule is also important for non-final verbs in ascending order (cf. those mentioned at the beginning of this section), even if they are governed by non-infinitive-selecting verbs, because they fail to receive functional morphemes due to displacement of the morphology selected by higher heads. This directly accounts for the generalization that these non-final verbs (in the relevant sense) generally occur in a default form, usually in the infinitive or, especially in the dialects described by Höhle (2006), as supines.

5.3 Combinatorial possibilities

While displacement often fails if there is more than one governor that selects a non-infinitival form in ascending order, it is sometimes possible if the selectional restrictions of the exponents are compatible with each other. So far there seem to be two basic types:

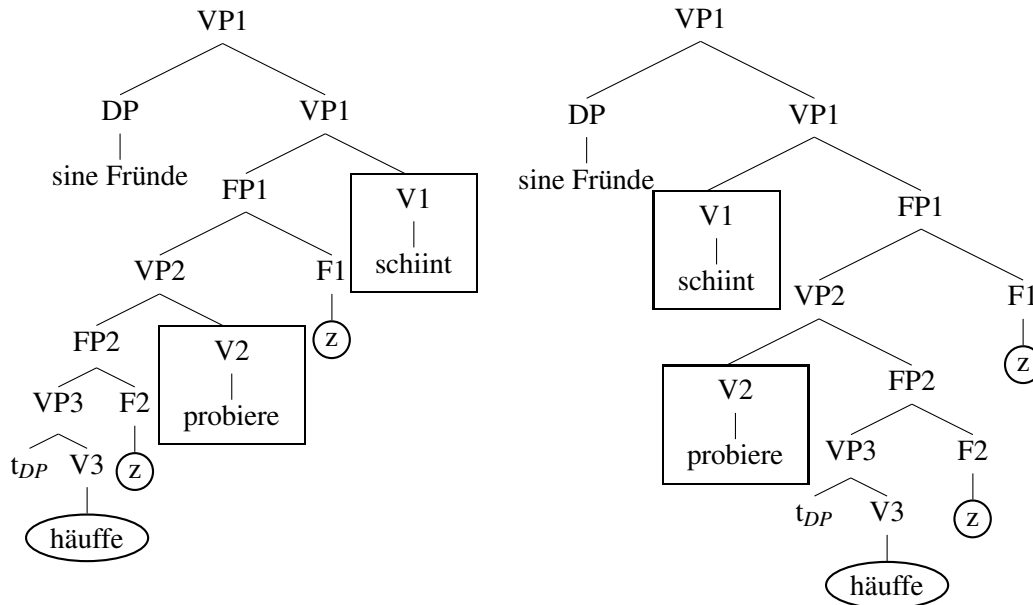
5.3.1 V1 and V2 select the same form: haplology/deletion under identity

In the first type, the two governors select the same form. In the so-called missing-*z* construction described for Bernese German (cf. Bader 1995, 22,26), there are two *z*-selectors in ascending order ('seem' and 'try' in (24)), but we find only one *z*, on V3, the last verbal element of the cluster (while V2 appears in the bare infinitive):

- (24) wüu dr Hans sine Fründe schiint₁ probiere₂ **z** häuffe₃
 because the John his.DAT friends seem.3SG try.INF to help.INF
 'because John seems to try to help his friends' *Bernese German*

The missing-*z* construction can be derived as follows: Starting from a strictly descending order, two instances of VP-inversion (between V1 and FP1 and V2 and FP2) generate a strictly ascending order, cf. (25):

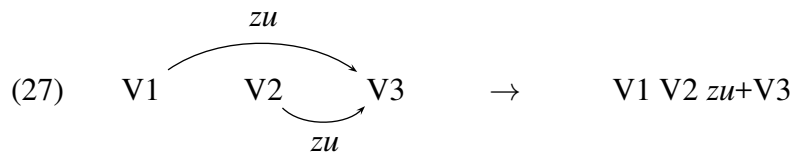
(25) Missing z before inversion: → Missing z after inversion:



After linearization, both zs follow the verb cluster, cf. (26a). I propose that the two zs are reduced to one by (morphological) haplology. More precisely, given cyclicity, the z adjacent to V3 is attached first, cf. (26b). The second z is then deleted under identity with the z already attached to V3, cf. (26c):

- (26) a. V1 V2 V3 z z
 b. V1 V2 z+V3 z first z undergoes Local Dislocation
 ↑ LD ↓
 c. V1 V2 z+V3 z Deletion under identity

The haplology effect can be schematically illustrated as follows:

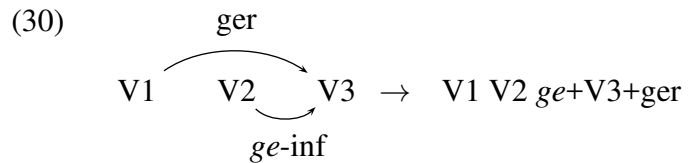
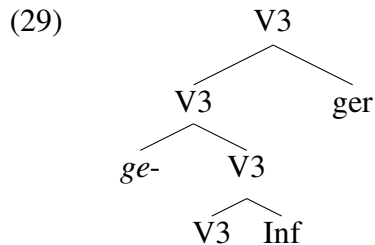


5.3.2 V1 and V2 select forms that attach on different sides of V: cumulativity

One of the strongest arguments for a post-syntactic perspective comes from examples like (28): Here, V1 selects a gerund, V2 selects a *ge*-infinitive and, crucially, V3 bears both the *ge*-prefix and the suffix for the gerund, see Höhle (2006, 68f., fn. 24):

- (28) ich wüür₁ dās net könnt₂ ge-spräch-e₃, (ban ich 's net seiwer häd gesie)
 I would.1SG this not can.SUP GE-say-GER if I it not self had see.PTCP
 'I couldn't say this (if I hadn't seen it myself).' *dialect of Steinbach-Hallenberg*

Thus, a non-finite form arises on V3 that is never selected by a single verb: *ge-Inf+V3+ger*. Such a form cannot be generated pre-syntactically but can arise post-syntactically because the exponents attach on different sides of the stem, thereby avoiding a clash. (28) provides evidence that the selectional restrictions of the exponents are checked linearly: Under a hierarchical representation with elements that undergo Local Dislocation being adjoined (as in Embick 2007, 331f.), affixation of the gerund would arguably be blocked as it could not attach to a complex head bearing features other than [+inf], cf. (29). What happens in this example with cumulative non-finite morphology is schematically illustrated in (30):



6. Conclusion

I have argued that displaced morphology in German results from a conflict between the head-finality of the German VP and the possibility of head-initial verb clusters. The phenomenon provides a straightforward argument for post-syntactic morphology: First, the placement of the non-finite morphology is not solely governed by hierarchical notions but crucially affected by linear notions such as adjacency (and thus argues against treating all instances of morphological selection in terms of upward Agree as in Wurmbrand 2012). Second, displacement has no semantic effects. Third, the restrictions on displacement follow from the selectional properties of the exponents, which are checked linearly.

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