Order Variability in German and Dutch Verb Clusters *

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1 Introduction

In recent years, many HPSG-based analyses of nonfinite complementation in head-final languages have relied in one way or other on the notion of 'argument composition', first proposed for German by Hinrichs and Nakazawa (1989). Argument composition can be seen as a straightforward extension of the common nontransformational analysis of raising in terms of structure-sharing between an overt subject and the understood subject of a VP complement. Hinrichs and Nakazawa's idea is to broaden the linkeage between the valence of the embedding and embedded predicates to include *all* arguments, not just the subject. As the description in (1) illustrates, the whole valence value is shared among the raising verb itself and the verbal constituent subcategorized for by the latter. The entire list of selected arguments then consists of the singleton list containing the verbal complement appended (notated as '$\circ$') to the list of arguments 'attracted' from the lower predicate.

(1) $\left[\ldots|\text{SUBCAT}\ \boxed{1} \circ \left\langle \text{V}\left[\ldots|\text{SUBCAT}\ \boxed{1}\right]\right\rangle\right]$

In their original proposal, Hinrichs and Nakazawa assume that a cluster of verbal elements[1] related by argument composition is the result of a sequence of binary combinations of an embedding verb with its verbal complement to the exclusion of any inherited ('proper') arguments. Canonical sequences

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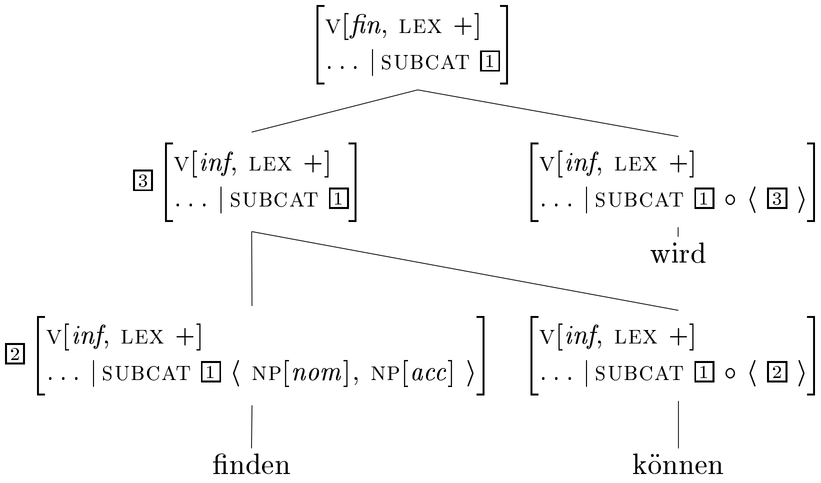
[1]In this paper, *verb cluster* will be used as a descriptive term to refer to the accumulation of verbal material in German and Dutch clauses. By contrast, the term *verbal complex* more specifically indicates that the verb cluster (or at least parts thereof) is also given constituent status in the syntactic analysis.

of governors following governed verbs will then arise from left-branching structures, as the following example illustrates:

(2) a. daß Peter das Buch finden können *wird*.
that Peter the book find can will
'that Peter will be able to find the book.'

b.



In order to obtain combinations of verbal elements to the exclusion of regular, phrasal complements, verbal projections need to be distinguished according to whether they contain any nonverbal, phrasal arguments. Following Rentier (1994) we will employ the attribute LEX for this purpose, albeit with a somewhat different function than in ordinary HPSG.[2] Instead of lining up [LEX +/−] with HPSG's sortal distinction of *signs* into *word* and *phrase*, respectively, Rentier also allows verbal combinations such as *finden können* to bear the specification [LEX +]. Being of sort *word* is then a sufficient, but no longer necessary, condition of a positive value of the LEX attribute. We can therefore regard elements with such a positive specification as possessing '(quasi)-lexical' status. This means that even though syntactically, the status of (partial) verbal complexes is phrasal, the amalgation of verbal elements nevertheless behaves as a single element with regard to selecting phrasal arguments.[3]

The main evidence in support of Hinrichs and Nakazawa's left-branching analysis of the verb cluster comes from *Oberfeldumstellung* constructions, to be discussed later, and frontings of subclusters. Thus, examples such as (3a) show that fronting affects precisely those constituents postulated by a left-

[2]In Hinrichs and Nakazawa's original proposal, the distinction is made in terms of NPCOMP.

[3]A rather similar idea is pursued by Haider (1993), who analyses verbal complexes as recursive X^0 structures (*komplexe Projectionsbasis* ('complex projection base')) with merged argument structure.

branching analysis. Fronting may also affect smaller complexes, such as single governed verbs, as in (3b). However, topicalization of a predicate which itself governs a subcomplex is strongly ungrammatical, as shown in (3c):

(3) a. Finden können wird Peter das Buch.
find can will-FIN Peter-NOM the book-ACC

b. Finden wird Peter das Buch können.
find will-FIN Peter-NOM the book-ACC can

c. *Können wird Peter das Buch finden.
can will-FIN Peter-NOM the book-ACC find

On the standard assumption that all types of selectional dependencies arise from standard valence features — that is, either the unitary SUBCAT feature or a combination of SUBJ and COMPS features — the formulation of the constraint against fronted argument attractors turns out to be rather problematic (see Kathol (Forthcoming; 1995) for discussion). No such difficulties arise, on the other hand, if we adopt the idea, first proposed by Chung (1993) and Rentier (1994), that a different valence feature is responsible for the construction of verbal complexes than the combination of heads with ordinary phrase-level arguments. We therefore propose to employ the new valence feature VCOMPL for the binary combination of verbal elements in the verbal complex. The lexical description of a predicate controlling argument composition is hence as along the lines given in (4):

(4) $$\left[\ldots | \textsc{valence} \begin{bmatrix} \textsc{vcompl} & \langle \textsc{v}[\ldots | \textsc{subcat}\ \boxed{1}] \rangle \\ \textsc{subcat} & \boxed{1} \end{bmatrix} \right]$$

This gives us a straightforward way of characterizing frontable constituents, in fact as the natural class of elements that bear the specification [VCOMPL ⟨ ⟩]. This description covers ordinary phrasal arguments at the same time that it excludes predicates such as *können* or other verbal sequences bearing a nonempty VCOMPL value. As will be seen shortly, the adoption of VCOMPL will also allow a rather succinct formulation of ordering regularities within the verb cluster.[4]

2 Linearization

Despite their close syntactic similarity in other respects, German and Dutch differ in the organization of the elements in the verb cluster. In particular, verb clusters in German are typically head-final, whereas those in Dutch

[4] The interested reader is referred to Kathol (1995; Forthcoming), where two additional arguments for the valence feature VCOMPL are given, involving extraposition and cases of impersonal constructions with accusative objects.

are head-initial. This observation has prompted Rentier (1994) to use his complex-building valence attribute to set up the distinction between orderings in German vs. Dutch along the lines sketched in (5):

(5) a. German

$$\left[\text{SYNSEM } \boxed{1}\right] \prec \left[\ldots \mid \text{VCOMPL} \quad \langle\boxed{1}\rangle\right]$$

b. Dutch

$$\left[\ldots \mid \text{VCOMPL} \quad \langle\boxed{1}\rangle\right] \prec \left[\text{SYNSEM } \boxed{1}\right]$$

Thus, while the configuration of clusters in German and Dutch is the same, the two languages differ in that the first places the governor after the governed subcomplex, whereas the opposite order is observed in Dutch.

However, this formulation is obviously too simplistic. As the examples of *Oberfeldumstellung* in (6) demonstrate, there are indeed instances in which the governor precedes, rather than follows, its verbal complement in German:

(6) daß Peter das Buch **wird** finden können/ **hat** finden können.
that Peter the book will find can has find can
'that Peter will be able to find the book.'/
'that Peter has been able to find the book.'

In addition, the treatment of Dutch in terms of (5b) is equally deficient as it ignores the phenomenon, sometimes referred to as *inversion*, cf. van Noord and Bouma (Forthcoming), in which the order between governor and governee exhibits right-headedness. This is a frequently attested possibility for tense auxiliaries, such as the perfectivizer *hebben* (7a), and is to a lesser extent also seen with (modal) control verbs (7b), such as *willen* (*want*):

(7) a. dat Joop de krant heeft gelezen/ gelezen heeft.
that Joop the newspaper has read read has
'that Joop has read the newspaper.'

b. dat Joop de krant wil lezen/ lezen wil.
that Joop the newspaper wants read read wants
'that Joop wants to read the newspaper.'

It is therefore necessary to make reference to more fine-grained distinctions than simply the government relationships.

As a second approximation toward an adequate account of ordering relations within the verb cluster, we consider a solution which is essentially isomorphic to the one Hinrichs and Nakazawa propose to account for German *Oberfeldumstellung* cases in (6). Their central idea is to record on nonfinite verbs the possible relative position of any embedding governor. This is achieved via the binary-valued head feature FLIP. Negative specification indicates canonical government to the left, whereas a positive value requires government by a 'flipped', i.e. *preceding*, governor. To avoid unwanted connotations regarding markedness or exceptionality, we replace FLIP with the head attribute of nonfinite verbs GVOR whose value directly indicates the required placement of a governor.[5] Thus, [GVOR $\rightarrow$] records on a verb that in a verb cluster, its governor has to appear to the right, whereas [GVOR $\leftarrow$] encodes the opposite ordering relation. The correlated LP constraints are then straightforward and are given in (8):

(8) a. $\left[\text{SYNSEM } \boxed{1} \left[\ldots|\text{GVOR} \;\; \rightarrow\right]\right] \prec \left[\ldots|\text{VCOMPL} \;\; \langle\boxed{1}\rangle\right]$

b. $\left[\ldots|\text{VCOMPL} \;\; \langle\boxed{1}\rangle\right] \prec \left[\text{SYNSEM } \boxed{1} \left[\ldots|\text{GVOR} \;\; \leftarrow\right]\right]$

Apart from being able to make the requisite fine-grained distinctions regarding order, this formulation has the obvious advantage over Rentier's system that German and Dutch can be treated on a par with respect to the LP constraints involved, while differing in the possible values that (classes of) lexical items may bear. For instance, nonfinite main verbs in Dutch are underspecified in terms of their value for GVOR while German main verbs are obligatorily [GVOR $\rightarrow$]:

(9) Classification of nonfinite main verbs:

a. German

$\left[\ldots|\text{HEAD}|\text{GVOR} \;\; \rightarrow\right]$

b. Dutch

$\left[\ldots|\text{HEAD}|\text{GVOR} \;\; \mathit{dir}\right]$

This gives us an immediate account of why inversion with main verbs is never possible in Standard German, cf. (10):

(10) a. *daß Lisa die Zeitung hat gelesen.
that Lisa the newspaper has read

b. *daß Lisa die Zeitung will lesen.
that Lisa the newspaper wants read

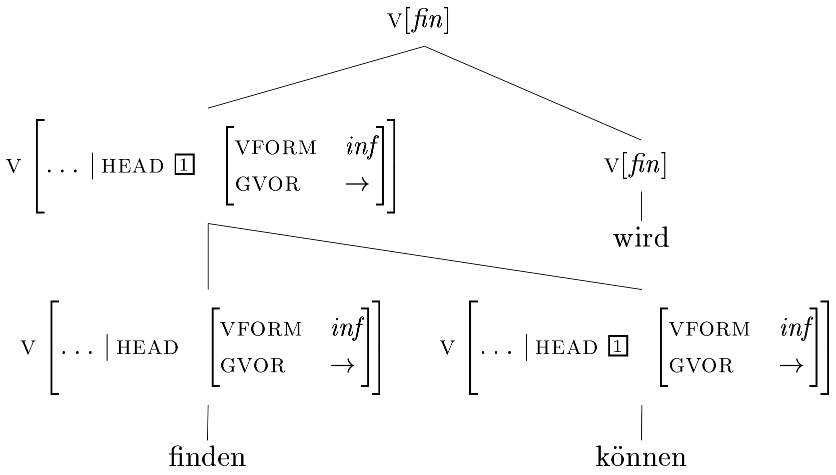
Turning to auxiliaries in German, we note that their nonfinite forms display different behavior with respect to the positioning of a higher governor. In particular infinitival modals and a few other predicates which themselves take a bare-infinitival complement are underspecified regarding their GVOR value:

[5] Furthermore, we do not require values of GVOR to be binary. This will provide us with a way to deal with adjacency effects, to be discussed in Section 3.

(11) $\left[\ldots|\text{HEAD}\ \begin{bmatrix}\text{VFORM} & \textit{inf}\\ \text{GVOR} & \textit{dir}\end{bmatrix}\right]$

This underspecification provides the lexical basis for the kind of analysis of *Oberfeldumstellung* proposed by Hinrichs and Nakazawa. Since GVOR is a head feature, the value chosen on the infinitival auxiliary will be the same as the one borne by the subcomplex headed by a verb such as *können* in cases like (6). The resulting distribution of values is given for the canonical order in (12a) and the *Oberfeldumstellung* case in (12b):[6]

(12) a.



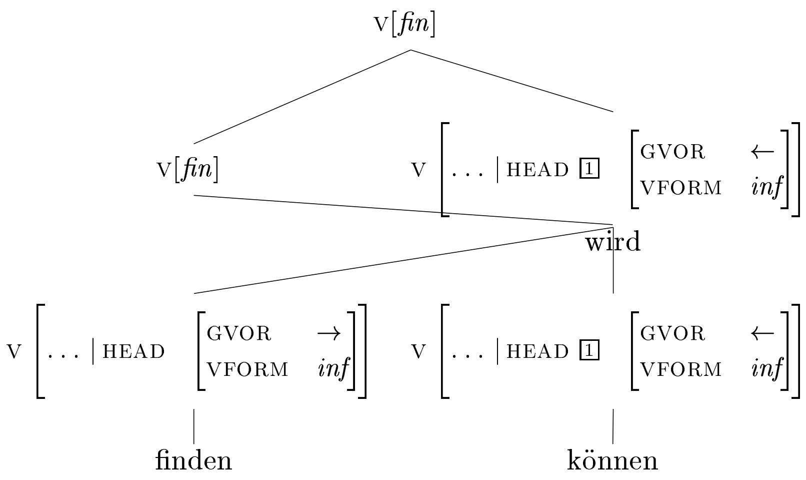
[6]As Hinrichs and Nakazawa observe, the positional behavior of *haben* and *werden* interacts if they both occur in the same verbal complex. If *haben* precedes its governed complex, *werden* must do the same, as shown in (ia,b). This can directly be accounted for by tying *haben*'s GVOR value to that of its selected complement, as in (ic):

(i) a. *daß er das Buch [[haben [finden wollen]] wird].
that he the book [[have [find want will

b. daß er das Buch wird [[haben [finden wollen]].
that he the book will [[have [find want
'that he will have wanted to find the book.'

c. $\begin{bmatrix}\text{GVOR}\ \boxed{1} & \\ \text{VCOMPL} & \left\langle\begin{bmatrix}\text{GVOR} & \boxed{1}\\ \text{VFORM} & \textit{psp}\end{bmatrix}\right\rangle\end{bmatrix}$

b.



3 Discontinuous verbal complexes

Hinrichs and Nakazawa (1994a) account can be shown to correctly capture all the grammatical permutations of verbs and their verbal complements listed in (Bech, 1955, p. 63). However, Bech's theory of order within the verb cluster is to some extent a sanitized version of the facts. For one thing, it ignores the possibility of nominal elements occurring among cluster elements in what are commonly referred to as V-Projection Raising constructions such as in (13):[7]

(13) daß Lisa dem Jungen wird das Buch geben wollen.
that Lisa the boy-DAT will the book give want
'that Lisa will want to give the book to the boy.'

In this study, however, we will focus on another set of apparent counterexamples to the implicit claim that governors may never occur inside the sequence of cluster elements corresponding to the governed verbal complex. There exists substantial evidence that this view is too strict, as such interspersals do indeed occur in a number of dialects.[8] Meurers (1994) gives a number of attested examples in which the preposed auxiliary's placement is within the governed part of the verb cluster. Examples of this construction, occasionally referred to as *Zwischenstellung* ('intermediary position') or *Verbal Complex Split*, are given in (14), from (Meurers, 1994):

[7] For discussion on how to account for V-projection raising cases, see Hinrichs and Nakazawa (1994a, pp. 27–33) and Kathol (1995, pp. 252–259). A somewhat different proposal can be found in Hinrichs and Nakazawa (1994b).

[8] Such constructions have often been attributed to Southern German dialects such as Franconian (cf. (Kroch and Santorini, 1991, p. 304)), yet, even though I am not a native speaker of such a dialect myself, I tend to find such examples fairly good.

(14) a. daß er das Examen bestehen$_3$ *wird/hat*$_1$ können$_2$.
that he the exam pass will/has can
'that he will be/has been able to pass the the exam.'

b. zu dem Zeitpunkt an dem ich mich entscheiden$_3$ *hätte*$_1$ müssen$_2$.
at the point at which I me decide had must
'at the point at which I should have made a decision.'

Furthermore, as we noted earlier, Standard Dutch displays the *inversion* order with tense auxiliaries, that is the reversal of the typical governor-governee serialization. As has been pointed out, for instance by van Noord and Bouma (Forthcoming), inversion is also possible with nonfinite forms of the tense auxiliary *hebben*. This means that in addition to the canonical order in (15a), the examples in (15b,c) are possible as well:

(15) a. dat Jan dit boek moet$_1$ hebben$_2$ gelezen$_3$.
that Jan this book must-FIN have-INF read-INF
'that Jan must have read the book.'

b. dat Jan dit boek moet$_1$ gelezen$_3$ hebben$_2$.
that Jan this book must-FIN read-PSP have-INF

c. dat Jan dit boek gelezen$_3$ moet$_1$ hebben$_2$.
that Jan this book read-PSP must-FIN have-INF

Under the assumption that the same government and constituency relations are involved in these examples as in the German cases, the cluster in (15b) is structurally isomorphic to a German *Oberfeldumstellung*, whereas (15c) is a variant of the German *Zwischenstellung* cases in (14). Thus, a strictly phrase structure-based view would predict that only (15a,b) should be possible, while the governor's occurrence internal to the governed cluster in (15c) should be illicit. However, the judgements in these cases are the exact reversal of the predictions of the theory. As van Noord and Bouma (Forthcoming) point out, sentences like (15c) are judged to be grammatical in all dialects of Dutch, those similar to (15b) appear to be rather limited in acceptance and are possible for the most part only in Flemish dialects.

A rather similar observation can be made with respect to the placement of separable prefixes. In contrast to most German dialects, separable prefixes in Dutch may 'float' to earlier positions away from the main verb they cooccur with. For instance the prefix *aan* in *aanspreken* (*talk to*) may occur not only in immediate adjacency with the main verb *spreken* (16a), but may also be separated from the latter by one or more intervening auxiliaries; cf. also den Besten and Edmondson (1983, p. 193):[9]

[9] Again, there is quite a bit of dialectal variation involved here. For many non-Flemish speakers, the structure in (16b) is at best marginal. There is a similarity between this

(16) a. dat Jan Marie zou hebben aangesproken.
that Jan Marie would have PREF.spoken
'that Jan would have spoken to Marie.'

b. dat Jan Marie zou aan hebben gesproken.
that Jan Marie would PREF have spoken

c. dat Jan Marie aan zou hebben gesproken.
that Jan Marie PREF would have spoken

Since prefix + verb combinations in West Germanic exhibit many of the properties of partial verbal clusters (for instance with respect to stress assignment, non-intervention of adverbs), theses cases again arguably involve the discontinuous linearization of the verbal complement of a governor inside the verb cluster (here: *hebben*) — contrary to the predictions made by the Hinrichs/Nakazawa model of the verbal complex.

While one may try to deal with these problematic ordering phenomena in terms of a reanalysis of the constituent structure in the spirit of Evers (1975) and much subsequent transformationalist work, a different line will be pursued here which takes the problematic cases as involving a discontinuous realization of a (partial) verb complex. As the requisite framework we adopt a variant of HPSG that possesses *order domain*s, developed in (Kathol, 1995), which in turn is based on ideas first advanced by Reape (1993).

Order domains can be understood as totally ordered lists of information bundles which each contain phonological and syntactic–semantic information.[10] Simplifying somewhat, at each application of a combinatorial schema, a corresponding order domain is built up involving the domains of the constituents thus far derived. Depending on general principles of domain construction, two basic scenarios need to be distinguished. The first possibility is that a constituent is entered into the resulting domain of the mother as a single phonologically encapsulated informational chunk. Consider for instance the combination of a verb and an NP object in (17):

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example and the one in (15b) in that both involve the interruption of a governor-governee sequence (*moet hebben* and *zou hebben*). The ungrammaticality of (16b) seems significantly less severe (or even nonexistent) for many speakers than that of (15b) (Gosse Bouma, p.c.). On the other hand, as an anonymous referee points out, judgments are opposite for many Flemish speakers, who find (15b) impeccable, but rate (16b) worse than (16a,b).

[10]In Reape's proposal the list elements are taken to be *sign*s. In the theory assumed here, on the other hand, domains are populated with *domain-object*s, that is information bundles whose information content is significantly reduced as compared to *sign*s. The distinction will not be significant for present purposes.

(17)

$$\begin{bmatrix} \text{VP} & \\ \text{DOM} & \left\langle \begin{bmatrix} \langle \textit{sieht} \rangle \\ \text{V}[\textit{fin}] \end{bmatrix}, \begin{bmatrix} \langle \textit{die Rose} \rangle \\ \text{NP}[\textit{acc}] \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \text{V}[\textit{fin}] & \\ \text{DOM} & \left\langle \begin{bmatrix} \langle \textit{sieht} \rangle \\ \text{V}[\textit{fin}] \end{bmatrix} \right\rangle \end{bmatrix} \quad \begin{bmatrix} \text{NP}[\textit{acc}] & \\ \text{DOM} & \left\langle \begin{bmatrix} \langle \textit{die} \rangle \end{bmatrix}, \begin{bmatrix} \langle \textit{Rose} \rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

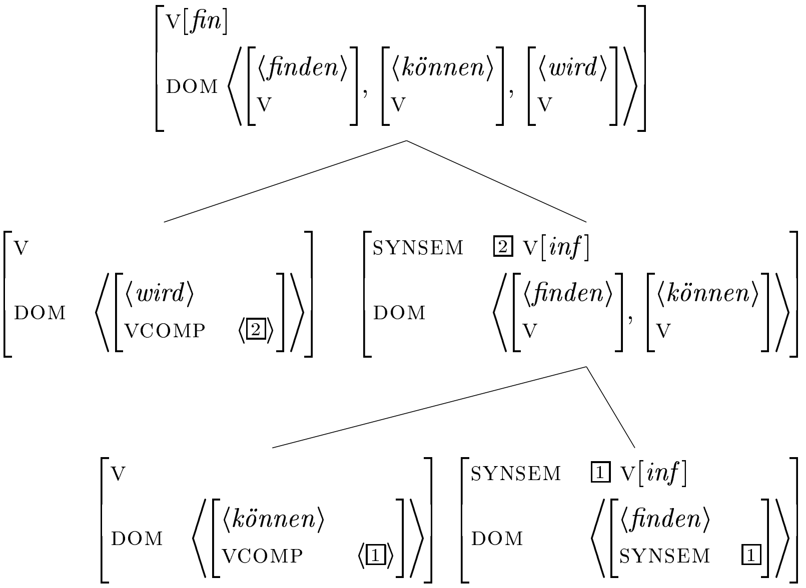
Here, the domain of the VP consists of two elements, one for the head (*sieht*) and one constructed from the complement (*die Rose*). In the domain resulting from the verb-object combination, the internal linear composition of *die Rose* can no longer be referenced. In the terminology of Kathol (1995), the object has been *domain-inserted* into that of the head. As with the construction of local trees in G/HPSG, no assumption about order is made at this level; instead, this will be the task of general LP constraints. As as result, LP constraints such as the one in (8) are thought to order domain elements, as opposed to arranging the PHON values of daughters in local trees.

As the second domain construction possibility the domain of the mother can be computed as the *domain union* obtained from the domains of the daughters. Domain union is equivalent to the *shuffle* operation, that is, given two lists A and B, a *shuffling* of A and B will contain the same members as A and B and preserve the ordering originally holding among members of each of the component lists. What is not guaranteed, however, is that A and B will necessarily be represented as contiguous sublists of the resulting list. Even though the notion of *shuffle* was first introduced by Reape (1993) under the name *sequence union* for the analysis of nonfinite complementation structures in West Germanic, we will employ domain union only in the linearization component while remaining faithful to argument composition and Hinrichs and Nakazawa's constituent structure for the verb cluster.[11]

The heart of our approach to the linearization of verbal complexes lies in the assumption that the binary governor-governee combinations do not involve the insertion of the governee complex into that of the governor — as is in effect assumed in Hinrichs and Nakazawa's tree-based model. Instead, if the combination involves domain union, then as a result, the internal components of the governee will still be "visible" for the purposes of linearization. As a concrete example, consider the domain construction associated with a "canonical" German verb cluster, as in (18):

[11]See Kathol (1995; Forthcoming) for a discussion of empirical shortcomings of Reape's proposals for the constituent structure of West Germanic verb clusters.

(18)



When *finden* and *können* are combined, each contributes only one domain element, hence the effect of domain union will be the same as if *finden* had been inserted into *können*'s domain. However, when the resulting subcomplex is combined with *wird*, there are now three placement options: before *finden können*, between *finden* and *können* and following *finden können*. In the case of canonical orderings, only the last is grammatical, as required by the specification [GVOR →] on the subcomplex as inherited from *können*. Yet, that subcomplex can no longer be referred to as a separate element within the order domain. As a result, we need to revise our LP constraints in (8) to reflect this fact by making reference not to the entire governed complex, but only its head. The following LP constraint achieves the desired effect and hence supersedes the earlier formulation in (8a):[12]

(19) $\left[\ldots \mid \textsc{head}\ \boxed{1}\quad [\textsc{gvor}\ \rightarrow]\right] \prec \left[\textsc{v}[\textsc{vcomp}\quad \langle[\textsc{head}\ \boxed{1}]\rangle]\right]$

If the governor has to follow the head of the governed verbal complex, it necessarily has to follow *all* elements of the verbal complex, hence reference to the head in a head-final structure has the same effect as reference to the entire cluster as in (8a).

At this point, we may also want to briefly consider how linearized verbal complexes are embedded into larger clausal structures. Kathol (1995) proposes a linear model of German clause structure which is closely related in spirit to the traditional "topological fields" model (cf. for instance (Drach, 1937), (Engel, 1970)). In that formalization, a topological field constitutes

[12] As a subtle technical complication, we need to assume that in general, domain objects are distinct in their HEAD values. See (Kathol, 1995, pp. 229–230) for discussion on this point.

an equivalence class of elements within a clausal domain. While some of these equivalence classes have cardinality restrictions (at most one *Vorfeld* element, exactly one domain element instantiating *linke Satzklammer*) others do not have such restrictions. We may then regard the verb cluster simply as one topological field, here marked by sorting the domain element as *vc*. An example of a topological organization for a subordinate clause is given in (20):[13]

(20)
$$\begin{bmatrix} \textsc{dom} & \left\langle \begin{bmatrix} \textit{cf} \\ \langle \textit{daß} \rangle \\ \textsc{compl} \end{bmatrix}, \begin{bmatrix} \textit{mf} \\ \langle \textit{P.} \rangle \\ \textsc{np} \end{bmatrix}, \begin{bmatrix} \textit{mf} \\ \langle \textit{das B.} \rangle \\ \textsc{np} \end{bmatrix}, \begin{bmatrix} \textit{vc} \\ \langle \textit{f.} \rangle \\ \textsc{v} \end{bmatrix}, \begin{bmatrix} \textit{vc} \\ \langle \textit{k.} \rangle \\ \textsc{v} \end{bmatrix}, \begin{bmatrix} \textit{vc} \\ \langle \textit{wird} \rangle \\ \textsc{v}[\textsc{fin}] \end{bmatrix} \right\rangle \end{bmatrix}$$

'dass Peter das Buch finden können wird'

As was argued by Kathol (Forthcoming; 1995), the linear organization can also serve as the basis for a positional, albeit non-movement-based account of verb placement variability in German. Thus, a verb-initial clause such as in (21) is distinguished from the verb-final one in (20) solely on the basis of the positional assignment of the finite verb *wird* to *cf* instead of *vc*.

(21)
$$\begin{bmatrix} \textsc{dom} & \left\langle \begin{bmatrix} \textit{cf} \\ \langle \textit{wird} \rangle \\ \textsc{v}[\textsc{fin}] \end{bmatrix}, \begin{bmatrix} \textit{mf} \\ \langle \textit{P.} \rangle \\ \textsc{np} \end{bmatrix}, \begin{bmatrix} \textit{mf} \\ \langle \textit{das B.} \rangle \\ \textsc{np} \end{bmatrix}, \begin{bmatrix} \textit{vc} \\ \langle \textit{f.} \rangle \\ \textsc{v} \end{bmatrix}, \begin{bmatrix} \textit{vc} \\ \langle \textit{k.} \rangle \\ \textsc{v} \end{bmatrix} \right\rangle \end{bmatrix}$$

'wird Peter das Buch finden können'

Even though on the analysis adopted here, both fronted verbs and members of the verb cluster are part of the same clausal domain, the frontal occurrence does not interact with the linear constraints operative within the verb cluster. This becomes immediately apparent if one compares the relative order possibilities ther governor (*kann*) can bear with respect to the governee (*finden*), depending on whether the first occurs fronted or in clause-final position, cf. (22):

(22) a. Kann er das Buch finden?
can he the book find
'Can he find the book?'

b. *daß er das Buch kann finden.
that he the book can find

[13] Here, the topological subsorts are (in part) inspired by the terms used in the traditional literature: *vf*: *Vorfeld* ('initial field'); *cf*: *Comp/Finite*, *linke Satzklammer* ('left sentence bracket'); *mf*: *Mittelfeld* ('middle field'); *vc*: *verb cluster*, *rechte Satzklammer* ('right sentence bracket'); and *nf*: *Nachfeld* ('final field').

In other words, a fronted verb is outside the scope of any constraint on order that applies to verb cluster elements. For that reason, we need to assume that the LP constraint in (19a) only applies to elements that are topologically marked as part of the verb cluster. The requisite refinement given in (23a) yields the final version of the verb cluster LP constraints, together with its head-initial mirror version in (23b):

(23) a.
$$\begin{bmatrix} \textit{vc} \\ \ldots \mid \textsc{head}\ \boxed{1}[\textsc{gvor}\ \rightarrow] \end{bmatrix} \prec \begin{bmatrix} \textit{vc} \\ \textsc{v}[\textsc{vcomp}\ \langle[\textsc{head}\ \boxed{1}\ ]\rangle] \end{bmatrix}$$

b.
$$\begin{bmatrix} \textit{vc} \\ \textsc{v}[\textsc{vcomp}\ \langle[\textsc{head}\ \boxed{1}]\rangle] \end{bmatrix} \prec \begin{bmatrix} \textit{vc} \\ \ldots \mid \textsc{head}\ \boxed{1}[\textsc{gvor}\ \leftarrow] \end{bmatrix}$$

What then are the valid serializations that comply with the constraint in (23b)? Considering first the case of Dutch, where it is possible—in fact the default—to build verbal complexes from sequences of head-initial combinations, we notice that such situations result in the precise mirror image of the German case in (18). That is, if the governor must precede the head of a head-initial structure, then this will have the same linear effect as if the governor had been linearized with respect to the entire governed complex. In (24), an example is given in which arrows link each governor and the head of the governed subcomplex:

(24)
$$\left[\textsc{dom}\ \left\langle \big[\langle \textit{zal}\rangle\big], \begin{bmatrix}\langle \textit{kunnen}\rangle \\ \textsc{gvor}\ \leftarrow\end{bmatrix}, \begin{bmatrix}\langle \textit{vinden}\rangle \\ \textsc{gvor}\ \leftarrow\end{bmatrix} \right\rangle\right]$$

Once we have mixed precedence requirements, the linearization-based approach is clearly more flexible than one based on deriving order from tree encodings directly. Thus consider what happens when *können*'s GVOR value is instantiated as ←. Any governor will have to precede it, but there is prima facie no requirement that precedence has to be *immediate* and therefore the lowest governed verb, *finden*, may intervene between the two. This is possible so long as *finden*'s linear relation to its governor is in accordance with its own GVOR value. As a German main verb, it requires the governor to follow — as a result, both precedence requirements are satisfied in the order domain in (25):

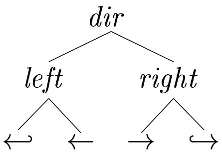
(25)
$$\left[\textsc{dom}\ \left\langle \big[\langle \textit{wird}\rangle\big], \begin{bmatrix}\langle \textit{finden}\rangle \\ \textsc{gvor}\ \leftarrow\end{bmatrix}, \begin{bmatrix}\langle \textit{können}\rangle \\ \textsc{gvor}\ \leftarrow\end{bmatrix} \right\rangle\right]$$

However, this is not the only solution to the linearization constraints among the elements of the pairs *finden–können* and *wird–können*. A second possibility that is consistent with the LP requirements involves placement of the highest governor *wird* immediately before the head of the governed complex, *können*. The latter in turn only has to follow the dependent verb *finden*, but not immediately. As a result, we obtain a situation in which the governed subcomplex is linearized in a discontinuous fashion:

(26) $\left[\textsc{dom}\ \left\langle \begin{bmatrix}\langle \textit{finden}\rangle \\ \textsc{gvor}\ \leftarrow\end{bmatrix}, \begin{bmatrix}\langle \textit{wird}\rangle\end{bmatrix}, \begin{bmatrix}\langle \textit{können}\rangle \\ \textsc{gvor}\ \leftarrow\end{bmatrix} \right\rangle\right]$

What now about those dialects in which linear intrusion of a governor into a verb cluster is only marginally possible or outright bad? This is where we can exploit the shift from Hinrichs and Nakazawa's binary-valued FLIP feature to the multi-valued attribute GVOR. While we have so far only encountered $\rightarrow$ and $\leftarrow$ as subsorts of *dir*, we assume that in addition to these values there are (at least) two more possibilities, for *adjacent* precedence to a higher governor to the *right* or *left*, respectively. For notational perspecuity, these values will be given here as $\hookrightarrow$ and $\hookleftarrow$, organized in the type hierarchy in (27):[14]

(27)



Values of GVOR requiring adjacent linear relations are referenced by the correlated immediate LP constraints, notated as "$\prec\!\!\prec$" in (28):[15]

(28) a. $\begin{bmatrix}\textit{vc} \\ \ldots\mid\textsc{head}\ \boxed{1}\ [\textsc{gvor}\ \hookrightarrow]\end{bmatrix} \prec\!\!\prec \begin{bmatrix}\textit{vc} \\ \textsc{v}[\textsc{vcomp}\ \langle[\textsc{head}\ \boxed{1}]\rangle]\end{bmatrix}$

b. $\begin{bmatrix}\textit{vc} \\ \textsc{v}[\textsc{vcomp}\ \langle[\textsc{head}\ \boxed{1}]\rangle]\end{bmatrix} \prec\!\!\prec \begin{bmatrix}\textit{vc} \\ \ldots\mid\textsc{head}\ \boxed{1}\ [\textsc{gvor}\ \hookleftarrow]\end{bmatrix}$

If in the less tolerant dialects, the linear constraints on main verbs given in (9a) are instead as in (29), the ungrammatical status of (14) is then straightforwardly accounted for. For instance in (14a), the main verb *bestehen* requires its governor to follow immediately, yet the intrusion of *wird/hat* makes it impossible to comply with this constraint:

(29) $\begin{bmatrix}\ldots\mid\textsc{gvor}\ \hookrightarrow\end{bmatrix}$

Furthermore, this allows us to correctly characterize differences in discontinuity effects depending on the lexical class of governees. Thus, many

[14]This particular organization was suggested to us by Gosse Bouma and Gertjan van Noord.

[15]For a proposal giving formal content to the notion of immediate precedence in HPSG, see (Kathol, 1995, pp. 130–134).

German dialects are significantly less tolerant toward discontinuous prefix + verb combinations than in the case of purely verbal governees, as seen in the badness of (30b):

(30) daß Hans Maria wird ansprechen können.
that Hans Maria will PREF.speak can
'that Hans will be able to talk to Maria.'

*daß Hans Maria an wird sprechen können.
that Hans Maria PREF will speak can

Consequently, the specification of separable prefixes as [GVOR $\hookrightarrow$] in most German dialects will ensure that their linear distribution is more restricted than that of regular main verbs which for many speakers allow for discontinuities more readily via [GVOR $\rightarrow$].

As another example of how the behavior of lexical classes can be captured in the present approach, consider the ordering possibilities of argument raisers in Dutch. As we observed earlier, a tense auxiliary such as *hebben* may display inversion with a governed predicate even if the first is nonfinite. For this reason, both *hebben-gelezen* and *gelezen-hebben* are possible in the examples in (15) above. However, if a nonfinite tense auxiliary is itself governed by a modal such as *moeten*, no inversion is possible, as is shown in (31):

(31) a. dat Jan het boek **moet**$_1$ **hebben**$_2$ gelezen.
that Jan the book must have-INF read-PSP
'that Jan must have read the book.'

b. *dat Jan het boek **hebben**$_2$ **moet**$_1$ gelezen.
that Jan the book have-INF must read-PSP

This fact is correctly captured if nonfinite tense auxiliaries in Standard Dutch are required to comply with the partial lexical description in (32):

(32)
$$\left[\ldots|\textsc{cat}\ \left[\begin{array}{ll}\textsc{head}|\textsc{gvor} & \leftarrow \\ \textsc{val}|\textsc{vcomp} & \left\langle\left[\ldots|\textsc{gvor}\quad \textit{dir}\right]\right\rangle\end{array}\right]\right]$$

Turning to nonfinite modals now, as van Noord and Bouma (Forthcoming) observe, their linearization possibilities are more restricted than those of tense auxiliaries. An infinitival modal such as *moeten* disallows inversion with a governed predicate such as *lezen*. As a result in the examples in (33), only the governor-governee order *moeten–lezen* is grammatical, whereas the reverse order results in unacceptability:

(33) a. dat Jan dit boek zou$_1$ **moeten**$_2$ **lezen**$_3$.
that Jan this book would must-INF read-INF
'that Jan would have have to read the book.'

b. *dat Jan dit boek zou$_1$ **lezen**$_3$ **moeten**$_2$.
that Jan this book would read-INF must-INF

c. *dat Jan dit boek **lezen**$_3$ zou **moeten**$_2$.
that Jan this book read-INF would must-INF

This suggests that nonfinite modals are required to conform to the following description:

(34) $$\left[\ldots \mid \textsc{cat} \quad \begin{bmatrix} \textsc{head} \mid \textsc{gvor} & \boxed{1} \leftarrow \\ \textsc{val} \mid \textsc{vcomp} & \left\langle \left[\ldots \mid \textsc{gvor} \quad \boxed{1} \right] \right\rangle \end{bmatrix} \right]$$

To some extent, nonfinite modals in Dutch are similar to German tense auxiliaries in *Oberfeldumstellung* constellations (cf. footnote 6). Just as infinitival *haben* requires governing *werden* to precede it the former precedes its infinitival subcomplex, an infinitival modal like *moeten* also links up the ordering possibilities of both governing and governed predicates resulting in an ascending sequence of governing verbs.

4 Conclusion

As we have demonstrated, much, if not all,[16] of the possible orderings in West Germanic verb clusters are reducible to lexical variation. At the same time, however, the constituency and government relations, as well as the formal means (in particular the (immediate) linear precedence constraints) can be taken to be identical across all West Germanic dialects.

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[16]However, we currently have nothing of insight to offer as for how to capture the distinctions in acceptability between the Dutch sequences in (15b) *moet gelezen hebben* vs. (16b) *zou aan hebben gesproken*.

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