A construction-based analysis of Dutch verb clusters

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1 Introduction

In Dutch, verbs form a cluster in verb-final clauses with two or more verbs, as in (1), and in verb-initial clauses with three or more verbs, as in (2).[1]

(1) ... dat ze die wedstrijd   heeft$_1$ gewonnen$_2$.
     ... that she that competition has   won

     '... that he has won that competition.'

(2) Ze zal die wedstrijd   kunnen$_1$ winnen$_2$.
     She will that competition can   win

     'She will be able to win that competition.'

The linear order of the verbs in a cluster canonically coincides with the order of selection, i.e. a verb selects its verbal complement to the right.[2] Alternative orders are possible though. In constructions with a past or passive participle, the participle may occupy any position in the cluster, but the order of the other verbs must be ascending:[3]

(3) In de tussentijd zouden de twee belangrijkste   getuigen ... moeten$_1$ worden$_2$ gehoord$_3$.
     in the meantime would the two most-important witnesses ... must   be   heard

     'In the mean time the two most important witnesses would have to be heard.' [LASSY]

(4) er   zijn toch   zo'n paar   boeken die ge moet$_1$ gelezen$_3$ hebben$_2$ in uw   leven.
     there are actually such couple books   that you must read   have   in your life

     'actually there are a couple of books that you should have read in your life.' [CGN]

(5) Diversiteit in onze samenleving zou   nog veel   meer benadrukt$_3$ moeten$_1$ worden$_2$.
     diversity   in our society   should still much more focussed   must   be

     'Diversity in our society should be much more focussed on.' [LASSY]

A second set of constructions that show word order variation are constructions with a substitute infinitive or *Ersatzinfinitiv*. In (6) the verb *kunnen* 'can' appears as an infinitive and not as the past participle *gekund* 'could'. For most speakers of Dutch the verbs always appear in the canonical ascending order, but in Belgian Dutch some speakers also allow the order in (7), in which the auxiliary of the perfect appears at the end of the cluster. Such constructions are also known as *Oberfeldumstellung*. In German it is obligatory in a number of cases, but in Dutch the phenomenon is always optional and not grammatical for all speakers.

(6) Pas nu   hebben we dat ook kunnen zien in de hersenen.
     only now have   we that also can.IPP see in the brains

     'Only now we have been able to see that in the brains.' [LASSY]

(7) ...terwijl dat 'k ik naar buiten gaan$_2$ kijken$_3$ ben$_1$.
     ...while   that I I to   outside go.IPP look   am

     '...while I was going to look outside.' [CGN]

A third type of word order alternation includes two-verb clusters with a finite modal verb, such as (8).

(8) ...om ervoor   te zorgen   dat dit nooit meer gebeuren$_2$ zal$_1$.
     ...to there-for to make-sure that this never again happen   will

     '...in order to make sure that this will never happen again.' [LASSY]

This type of variation is only possible in verb-final clauses, as the finite verb needs to be part of the cluster. In longer verb clusters of this type, word order variation is not allowed (9), and also in constructions with non-modal finite verbs the descending order is ungrammatical (10):

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[1]Verb-initial clauses comprise verb-first and verb-second clauses.

[2]The order of selection is indicated by subscripts, the hierarchically highest verb being 1.

[3]The examples in (3)-(8) are taken from treebanks for spoken (CGN) and written (LASSY) Dutch.

(9) * …om ervoor te zorgen dat dit nooit meer kunnen$_2$ gebeuren$_3$ zal$_1$.
    …to there-for to make-sure that this never again can happen will

    intended: '…in order to make sure that this will never be able to happen again.'

(10) * …om ervoor te zorgen dat hij dit nooit meer gebeuren$_2$ laat$_1$.
    …to there-for to make-sure that he this never again happen let

    intended: '…in order to make sure that he will never let this happen again.'

If the verbs in (9-10) are put in the canonical, ascending order, the sentences are well-formed.

In sum, Dutch syntax is marked by verb cluster formation, which shows word order variation which does not entail a change in meaning. There are different types of word order variation, depending on the form of the verbs in the cluster (infinitival, participial), and the type of the selecting verb (e.g. modal verb).

Section 2 discusses previous accounts of word order variation, while section 3 presents a new model. Section 4 concludes.

2   Previous models of word order variation

In HPSG verb clusters are canonically treated as binary-branching structures modelled in terms of *argument inheritance*, i.e. the non-subject arguments of unsaturated verbal complements are treated in a similar fashion as raised subjects, cf the lexical constraint in (11), after Hinrichs & Nakazawa (1994). If $\boxed{A}$ is an empty list, the constraint is similar to the one for subject raising proposed in Ginzburg & Sag (2000, 22).

$$(11) \quad \begin{bmatrix} \text{ARG-ST} & \langle\boxed{1}\rangle \oplus \boxed{A} \oplus \left\langle \begin{bmatrix} \text{LOCAL}\,|\,\text{CAT} & \begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle\boxed{1}\rangle \\ \text{COMPS} & \boxed{A} \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix}$$

In order to model word order variation in German verb clusters, Hinrichs & Nakazawa (1994) employ the binary head feature FLIP. Kathol (2000) replaces Hinrichs and Nakazawa's FLIP feature by G(O)V(ERN)OR in order to model the word order of the verbs in the cluster. If a verb has the feature [GVOR →], its governor should appear to its right, while the governor of verbs with the feature [GVOR ←] should appear to the left (e.g. in the case of German Oberfeldumstellung).

While constructions with auxiliary flip pose no problem for a binary-branching treatment of verb clusters, constructions such as (5), in which the selecting verb does not appear next to its complement, do. In order to account for all linearization possibilities, Bouma & van Noord (1998) analyse verb clusters as flat tree structures. The downside of their approach is that they need additional features and complex word order constraints in order to avoid overgeneration compared to binary-branching analyses.

Kathol (2000) tackles the problem in a different way. He employs an additional feature in order to model the linear order of verb clusters, i.e. the DOM(AIN) feature. The order of the elements in DOM may differ from the order of the elements of the tree structure. Also his approach overgenerates for Dutch. Kathol assumes that the GVOR value of Dutch infinitival complements is underspecified as [GVOR *dir*]. In this way he deals with verbs that can select their complement to the left or to the right, e.g. Dutch *wil lezen* versus *lezen wil* 'wants to read' (Kathol, 2000, 199–200). As mentioned in section 1, this word order alternation is possible in two-verb clusters with a finite modal, but if we add an additional verb to the cluster, the only grammatical order is the ascending one. An accurate modal of word order variation in Dutch should take this into account.

In what follows, it will be illustrated that Dutch verb clusters can be modelled in a binary-branching analysis, in which the linear order of the verbs in the cluster is similar to the order in which they appear in the phrase structure tree.

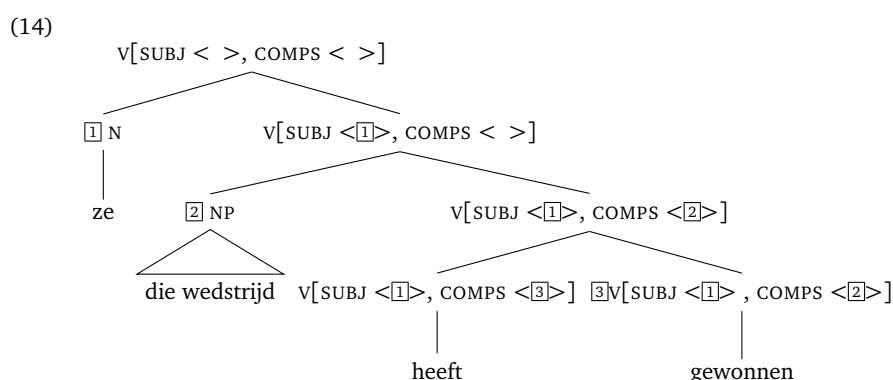## 3   A constructivist proposal

3.1   Complement raising

In Van Eynde & Augustinus (2013) and Augustinus (2015) it is motivated that subject and complement raising are different phenomena.[4] While subject raising is modelled using the canonical lexical constraint, a phrasal

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[4]Arguments against the lexical constraint in (11) include the occurrence of complement raising without subject raising, interaction with the binding principles and the passive lexical rule.

constraint is employed for raised complements. The *Complement Raising Principle* (CRP) in (12) states that in a headed phrase, the COMPS list of the non-head daughter is added to the COMPS list of the mother.[5] Cancellation of elements from the COMPS list is modelled in the definition of phrases of type *head-complement*. The constraint is given in (13), after Müller (2002, 16). As *head-complement phrase* is a subtype of *headed-phrase*, it follows that the COMPS list can expand and shrink at the same time. The application of (12) and (13) to (1) is illustrated in (14). In the argument inheritance approach Hinrichs-Nakazawa style, the unsaturated complement of *gewonnen* 'won' would be shared with the selecting verb *heeft* 'has', but in the complement raising approach it is directly propagated to the mother node. Only the verbal complement appears on the COMPS lists of the selecting verb.

(12)

$$
\textit{hd-ph} \Rightarrow \begin{bmatrix} \text{SYNSEM}\,|\,\text{LOC}\,|\,\text{CAT}\,|\,\text{COMPS} & \boxed{A} \ \oplus \ \boxed{B} \\ \text{HD-DTR}\,|\,\text{SS}\,|\,\text{LOC}\,|\,\text{CAT}\,|\,\text{COMPS} & \boxed{A} \\ \text{NONHD-DTR}\,|\,\text{SS}\,|\,\text{LOC}\,|\,\text{CAT}\,|\,\text{COMPS} & \boxed{B} \end{bmatrix}
$$

(13)

$$
\textit{hd-comp-ph} \Rightarrow \begin{bmatrix} \text{SYNSEM}\,|\,\text{LOC}\,|\,\text{CAT}\,|\,\text{COMPS} & \boxed{A} \\ \text{HD-DTR}\,|\,\text{SYNSEM}\,|\,\text{LOC}\,|\,\text{CAT}\,|\,\text{COMPS} & \boxed{A} \ \oplus \ \langle \boxed{1} \rangle \\ \text{NONHD-DTR}\,|\,\text{SS} & \boxed{1} \ \textit{synsem} \end{bmatrix}
$$

(14)

3.2 Word order variation

Ginzburg & Sag (2000) advocate a constructivist version of HPSG, in which they propose a bidimensional type hierarchy for phrase types, differentiating clausality from headedness. In order to accurately model Dutch verb clusters, we extend the phrase type hierarchy proposed in Ginzburg & Sag (2000, 38-45). The proposed extension deals with the non-clause type. It is given in (15).

(15)
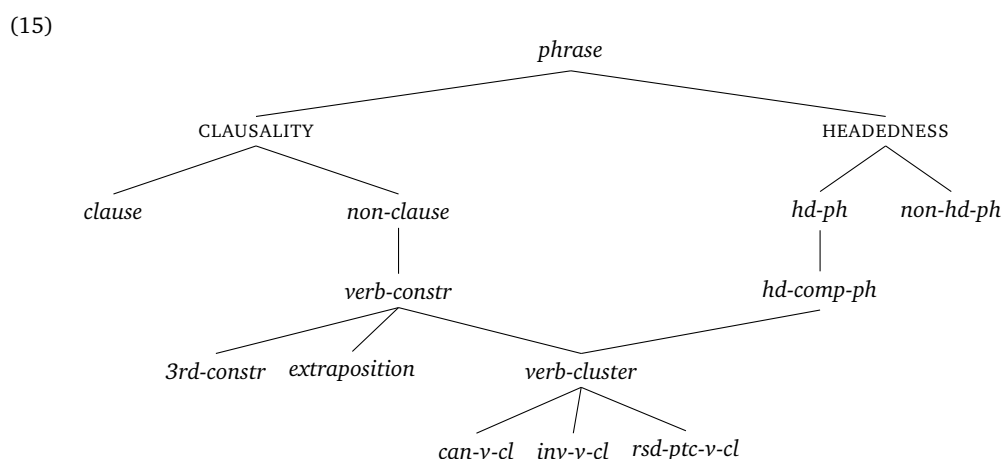
The types that are relevant in this discussion are *verb-constr(uction)* and *verb-cluster*. The former includes phrases with a head daughter of type *verb* and a non-head daughter which has a nonfinite verb as its head, cf (16).[6] The type *verb-cluster* is a subtype from *verb-constr* and *hd-comp-ph* and therefore inherits properties from those types. Its defining property is given in (17).

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[5]The CRP is a phrasal constraint and is, hence, a very powerful mechanism. In order to avoid overgeneration, complement raising is blocked in CPs, V-initial VPs, and P-initial PPs. For a detailed discussion, see Augustinus (2015).

[6]The type *verb-constr* comprises instances of verb clusters, extraposition and the third construction.

(16)

$$\textit{verb-constr} \Rightarrow \begin{bmatrix} \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{HEAD} \quad \textit{verb} \\[4pt] \text{NON-HD-DTR} \mid \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{VFORM} \; \textit{nfin} \end{bmatrix} \end{bmatrix}$$

(17) $\textit{verb-cluster} \Rightarrow \begin{bmatrix} \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{HEAD} \quad \textit{cl-verb} \end{bmatrix}$

A verb cluster is a construction which has a clustering verb (*cl-verb*) as its head. Clustering verbs are verbs that may select another verb in a verb cluster, as opposed to non-clustering verbs (*non-cl-verb*). In (3), the verbs *moeten* 'must' and *worden* 'be' are clustering verbs. *Gehoord* 'heard' is also part of the verb cluster, but it is not a clustering verb since it does not select another verb. The set of clustering verbs in Dutch is limited. Augustinus (2015) has identified different types of clustering verbs, such as modals, perception verbs, auxiliaries of the perfect etc. We introduce the feature VTYPE to differentiate between those types, cf (19). In addition to VTYPE, Dutch clustering verbs never appear as a participle, as participles cannot select another verb in the cluster.

(18)
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          verb
         /    \
   cl-verb   non-cl-verb
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(19) $\begin{bmatrix} \textit{cl-verb} \\ \text{VFORM} \quad \neg\textit{ptc} \\ \text{VTYPE} \quad \textit{vtype} \end{bmatrix}$

In order to model word order variation in verb clusters, three subtypes are introduced: *canonical verb clusters*, *inverted verb clusters*, and *raised participle verb clusters*. The most general cluster type is the **canonical verb cluster** (*can-v-cl*). Its formal properties are given in (20).

(20)

$$\textit{can-v-cl} \Rightarrow \begin{bmatrix} \text{PHON} \quad \boxed{A} \oplus \boxed{B} \\ \text{HD-DTR} \mid \text{PHON} \boxed{A} \\ \text{NON-HD-DTR} \mid \text{PHON} \boxed{B} \end{bmatrix}$$

Canonical verb clusters inherit from (17) that they have a head daughter with a clustering verb as its head, and a nonfinite non-head daughter (which may be a word or a phrase). As indicated in PHON, the clustering verb ($\boxed{A}$) appears before its non-head daughter ($\boxed{B}$). (20) accounts for constructions such as (1) and (3).

The second cluster type is the **inverted verb cluster** (*inv-v-cl*):

(21)

$$\textit{inv-v-cl} \Rightarrow \begin{bmatrix} \text{PHON} \quad \boxed{B} \oplus \boxed{A} \\[6pt] \text{HD-DTR} \begin{bmatrix} \text{PHON} \boxed{A} \\[4pt] \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{HEAD} \begin{bmatrix} \textit{cl-verb} \\ \text{VTYPE} \quad \textit{auxiliary} \vee \textit{modal} \end{bmatrix} \end{bmatrix} \\[10pt] \text{NON-HD-DTR} \mid \text{PHON} \boxed{B} \end{bmatrix}$$

(21) states that the head-daughter should be a clustering verb of type *auxiliary* or *modal*.[7] The verbal non-head daughter appears in front of its head sister, as indicated in the PHON feature. In order to account for constructions such as (4), (7) and (8), we introduce three subtypes.[8] 1) If the selecting verb is of type auxiliary, the non-head daughter should be a past or passive participle to form constructions like (4). 2) In order to deal with *Oberfeldumstellung*, the head daughter is of type auxiliary, whereas the non-head daughter should be a canonical verb cluster to ensure the other verbs appear in the ascending order. This yields constructions like (7) and excludes ungrammatical orders such as * *kijken₃ gaan₂ ben₁*. For variants of Dutch that do not accept Oberfeldumstellung, the non-head daughter of (21) should be of type *word*. 3) If the selecting verb is a modal verb, the non-head daughter should be an infinitive of type *non-cl-verb*. This avoids the embedding of longer clusters, which would yield ungrammatical constructions such as (9).

The third cluster type is the **raised participle verb cluster** (*rsd-ptc-v-cl*). It deals with constructions in which the main verb does not appear next to its head, such as the construction in (5). In those constructions, not only the nonverbal complement is raised, but also the participle *benadrukt* 'focussed' is raised. As (12) does not put any restrictions on the type of complement that can be raised, it also accounts for constructions like (5). The formal specification of this cluster type is given in (22).

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[7]Clustering verbs of type *auxiliary* include the auxiliaries of the perfect and the passive.
[8]The formal details of the subtypes will be spelled out in the full paper.

(22)

$$rsd\text{-}ptc\text{-}v\text{-}cl \Rightarrow \begin{bmatrix} \text{PHON } \boxed{B} \oplus \boxed{A} \\ \text{HD-DTR} \begin{bmatrix} can\text{-}v\text{-}cl \\ \text{PHON } \boxed{A} \end{bmatrix} \\ \text{NON-HD-DTR} \begin{bmatrix} word \\ \text{PHON } \boxed{B} \\ \text{SS} | \text{LOC} | \text{CAT} | \text{HEAD} \begin{bmatrix} verb \\ \text{VFORM} \quad ptc \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

(22) accounts for the combination of a participial non-head daughter with a *can-v-cl* head daughter. As only participles can occur in a raised position in Dutch, the non-head daughter should be a participle. The requirement that the head daughter should be a canonical verb cluster accounts for the fact that the order of the verbs in the cluster is ascending. It furthermore avoids spurious ambiguity between the *rsd-ptc-v-cl* construction and the *inv-v-cl* construction in which a past participle occurs right in front of the selecting verb, as in (4). Another reason that raised constructions need to be differentiated from inverted clusters with a past participle, is that some varieties of Dutch accept a raised participle construction, but not an inverted verb cluster in constructions with more than two verbs.[9] For those varieties, one could restrict the inverted cluster construction with a past participle to finite constructions, in a similar fashion as the inverted modal verb clusters.

4 Conclusion

This paper proposes a constructivist account of word order variation in Dutch verb clusters. In this model the linear order of the verbs in the cluster is similar to the order in which they appear in the phrase structure tree. Linearization is not modelled in terms of the GVOR feature of the verbal complement. Instead, it crucially relies on the bidimensional phrase hierarchy initiated by Ginzburg & Sag (2000), which is extended for the analysis of constructions with verb clusters. This proposal accounts for the most common instances of word order variation in Dutch verb clusters, but it can be easily adapted in order to model a specific variety or dialect.

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[9]For instance, 1-3-2 constructions are typically accepted in Belgian Dutch, whereas in the Netherlands they generally prefer 3-1-2 constructions (next to the canonical 1-2-3 constructions), see Barbiers (2005).