Deriving Verb-cluster variation in Dutch and German

The difference in West-Germanic V(erb)-clusters, right-branching (Dutch) and left-branching (German), follows from a difference in the acquisition of V-second. That decisive factor had already been acquired before any V-cluster appeared in the child’s speech. Longitudinal Dutch child data show that modals and aspectuals develop a rightward selection that carries over into the V-cluster. The German child data do not show such a development. Automatic phrasal formation by the acquisition procedure may yield the V-cluster without assuming V-movement from an underlying structure. The minor order variations in Dutch triple V-clusters can be accounted for given the previously acquired binary V-clusters. The general perspective is that the acquisition procedure is a discovery procedure. Typological effects are the outcome of early local string-determined licensing/selection.

**Keywords**: West Germanic V-clusters, harmonic order, V-second acquisition, learnability, non-movement analysis

1. Introduction

The focus of the present paper is the order variation in West-Germanic V(verb)-clusters. Although there is a certain amount of variation in attested word orders in triple (three-verb) V-clusters (see the survey in Wurmbrand 2004), there is a main difference in branching order. Dutch has a dominant 1-2-3 rightward-selecting order (1a), whereas German has a 3-2-1 leftward-selecting order (1b) (Evers 1975). Nevertheless, the selection relation itself and its interpretation, remains the same. V₁ selects V₂ and V₂ selects V₃ which gets the cluster stress.

\[
\begin{align*}
(1) & \quad a. \text{dat hij een boek wil}, \text{kennen} \text{kopen} \\
& \quad b. \text{dass er ein Buch kaufen} \text{kennen} \text{will}
\end{align*}
\]

\[\text{‘that he will be able to buy a book.’}\]

What then causes this mirror order, Dutch versus German?

I will take a learnability approach and deal with V-cluster formation without assuming the restructuring in Evers (1975). I will propose a principle of phrasal formation that constructs the V-cluster without movement (section 2.3). The V-cluster branching order follows as a direct consequence of the right/left selection properties of the category V.

I will argue that the main branching difference in the Dutch and German V-cluster arises from a difference in the acquisition of V-second. Paradoxically, the two rules, V-second and V-cluster formation, have nothing to do with each other. One rule might hold without the other being present and vice versa, as is obvious in root sentences with a single verb (V-second only, no V-cluster) and in subordinate structures with more than one verb (V-cluster formation, no V-second). Yet, the direction of verb selection in the cluster derives from the acquisition path of the V-second rule.

Having established a fundamental reason for a selection order 1-2-3 for right-branching Dutch and 3-2-1 for left-branching German, I will indicate how the present analysis deals with some of the other order variations, surveyed in Wurmbrand (2004), without assuming V-movement from a default underlying structure (section 3).

Things are different when a past participle gets involved. Past participles in right-branching V-clusters appear freely in all in-between positions to the left of the tense auxiliary (Wurmbrand

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1 This paper has first been presented at the Workshop on Verb Clusters, Amsterdam 28-05-2015.
This reminds of the interruption of the Dutch V-cluster by particles, adjectives and other \(<-V>\) heads. Both the adjective \(\text{klaar}\) (‘ready’) and the past participle \(\text{gemaakt}\) (‘made’) can appear at any of the black dot positions within the V-cluster in (2). Past participles may be \(<-V>\) adjectival \(X^0\) “cluster creepers” as well, as argued for by Evers (2003).

\[
(2) \quad \text{dat Jan zijn huiswerk morgen gemaakt / klaar}
\]

\[
\text{that Jan his homework tomorrow made / ready}
\]

\[
\begin{itemize}
  \item zou_1
  \item kunnen_2
  \item hebben_3
\end{itemize}
\]

\`
\begin{itemize}
  \item zou
  \item kunnen
  \item hebben
\end{itemize}
\`

‘that John would be able to have finished his homework tomorrow.’

Just as the adjective \(\text{klaar}\), the \(<-V>\) participle \(\text{gemaakt}\) is not part of the verbal elements in the cluster. Section 4 will derive the categorial status of the past participle from acquisition steps and show why the Dutch child starts with the order participle-auxiliary despite a dominant auxiliary-participle in the maternal input.

The present analysis takes a different perspective on language acquisition in general. Phrasal formation by the acquisition procedure is not seen as an attempt to apply a priori a set of principles, say the X-bar principles, to an input string, and to add subsequently movement rules in order to reach the PF strings. Language acquisition is rather seen as a discovery of binary surface licensing relations in the most elementary structures. Grammatical categories arise in the same context (Evers & Van Kampen 2008, Van Kampen 2009).

2. The acquisition perspective. Two types of selection
I will first consider the order variation for binary V-clusters, which are acquired well before triple V-clusters. The order variation in triple V-clusters is subsequently explained given the order in binary V-clusters.

The different acquisition of V-second in Dutch and German is quantitatively supported by data from longitudinal corpora in CHILDES (MacWhinney 2006).

\[
(3) \quad \text{Dutch corpora}
\]

\[
\begin{array}{lll}
\text{Kampen-corpus} & \text{Sarah} & (1;07−5;02) \quad \text{utterances=19.245} \\
\text{Groningen-corpus} & \text{Abel} & (1;11−3;04) \quad \text{utterances=13.044} \\
& \text{Josse} & (2;00−3;04) \quad \text{utterances=13.261} \\
& \text{Matthijs} & (1;06−3;07) \quad \text{utterances=20.871} \\
\end{array}
\]

\[
\text{German corpora}
\]

\[
\begin{array}{lll}
\text{Miller-corpus} & \text{Simone} & (1;09−4;00) \quad \text{utterances=31.927} \\
\text{Leo-corpus} & \text{Leo} & (1;11−4;11) \quad \text{utterances=182.339} \\
\end{array}
\]

The order preferences in subordinate V-clusters, 1-2 order (Dutch) or 2-1 order (German) follow from an input difference in categorial selection in the root clause. The basic idea is that any acquisition procedure results in the formation of a lexicon such that all words of the lexicon are attributed to categories with a fixed syntactic licensing type.

2.1 The acquisition path for the root clause in Dutch and German
The development of verb placement in Dutch is divided in three clear stages. Admittedly children do not jump from one stage to another (Blom 2003). The stages are rather supported by acquisition graphs that show a gradual rise of the new property in the child’s production.

(4) beer pap eten<inf>  
    bear porridge eat

These ‘root infinitives’ initially make up >80% of all the utterances with a verb. A remaining 20% mainly consists of non-thematic modals, aspectuals and copulas that appear sentence-initially in finite form.

In a second stage, the finite modals/aspectuals rise from 20% to >50% of all sentences. Dutch children use at first the modal/aspectual auxiliaries as a kind of performative ‘operator’ (Jordens 2002, Van Kampen 1997, 2009) with a pragmatic value (wish, order, intention) and a fixed person value kwil (‘wanna’), (het) moet (‘it must’), (ik) magwel (‘I may indeed’). They are speaker/hearer oriented in the situation. They may appear first without and subsequently also with a verbal complement (a thematic infinitive) selected to the right. See (5).

(5) a. kwil<fin> pap (eten)  
    wanna porridge (eat)  
    b. kan<fin> ook liedje (zingen)  
    can also song (sing)

It is only in a third stage that finite thematic verbs as in (6) appear in sentence-initial (first/second) position and rise towards some 30% of all finite verbs. The other 70% constitutes the rise of finite non-thematic verbs, a percentage that matches the caretakers input. The root infinitives disappear.

(6) beer eet<fin> pap  
    bear eats porridge

The acquisition of the V-second rule in German follows a different path. There is no distinction of a second and third stage. Like Dutch children, German children initially have the theta-assigning verbs predominantly in sentence-final position as ‘root infinitives’ (Behrens 1993, among others). These root infinitives initially make up 60% of all utterances with a verb, which is 20% less than in Dutch (Freudenthal et al. 2007).

In a second stage, we see the rise of finite verbs in sentence-initial (first or second) position, but in contrast to Dutch, the rise is not at all restricted to modal auxiliaries. The German literature does (correctly) not mention a unique initial stage for finite modal auxiliaries. Many of the examples in early child German have a finite thematic verb. See for instance the claim in Ingram & Thompson (1996) that finite verbs in early child German are basically thematic and non-modal.

The Dutch/German acquisition difference was paid no or little attention to, since a year later both languages apply the V-second rule to all verbs anyway. The question now is: how did the same V-second phenomenon lead to the different acquisition path? The next section will show that quantitative differences between the use of finite ±theta verbs in the input language lead to the crucial differences between child Dutch and child German.

2.2 Directionality of selection: A Dutch-German input difference

A first difference between the Dutch input and the German input concerns the use of aspectual auxiliaries. In Dutch, gaan (‘go’) is used massively with a thematic infinitive, expressing an immediate future or inchoative aspect. German also uses gehen + infinitive, but in a semantically restricted way. It does not express future and is used less frequently.

Freudenthal et al (2007) analyzed the maternal input for Dutch Matthijs and German Leo. Around 8% of all Dutch sentences with a verb contained gaan + infinitive, whereas in the
German maternal speech *gehen* + infinitive was virtually absent. The same difference holds for the verb *komen* (‘come’) and posture verbs like *zitten* (‘sit’), *liggen* (‘lie’) and *staan* (‘stand’) that are used in Dutch as aspectuals with a thematic infinitive and have no equivalent in German. Sarah’s mother (Dutch) had 1061 instances of *gaan* + infinitive, 119 instances of *komen* + infinitive and 9 instances of *zitten* + infinitive in the CHILDES corpus. The effect is that the German children receive more finite thematic verbs in their input from the beginning on, whereas the Dutch children receive predominantly finite non-thematic verbs in their input.

To see the factual effect of these input data, I counted the child’s instances of *gaan* + infinitive in the Dutch corpora over the total period of the recordings. The numbers are given in Table 1. I also calculated out how many utterances the child used a *gaan* + infinitive. For Sarah this was 19.245/611=32. On the average once every 32 utterance, which is around 3%. This is less than the adult percentage, but the total of child utterances in (3) includes a large number of utterances without a finite verb.

<table>
<thead>
<tr>
<th>Child Dutch <em>gaan</em> + infinitive</th>
<th>Sarah</th>
<th>Abel</th>
<th>Josse</th>
<th>Matthijs</th>
</tr>
</thead>
<tbody>
<tr>
<td>611 n.</td>
<td>388 n.</td>
<td>280 n.</td>
<td>277 n.</td>
<td></td>
</tr>
<tr>
<td>every 32 u.</td>
<td>every 34 u.</td>
<td>every 47 u.</td>
<td>every 75 u.</td>
<td></td>
</tr>
</tbody>
</table>

The frequencies calculated over the total number of utterances in the German corpora is only a fraction of the frequencies in the Dutch corpora. See Table 2.

<table>
<thead>
<tr>
<th>Child German <em>gehen</em> + infinitive</th>
<th>Leo</th>
<th>Simone</th>
</tr>
</thead>
<tbody>
<tr>
<td>72 n.</td>
<td>6 n.</td>
<td></td>
</tr>
<tr>
<td>every 2.533 u.</td>
<td>every 4.707 u.</td>
<td></td>
</tr>
</tbody>
</table>

A second input difference that may put weight on the percentage of finite ±theta verbs in root clauses, is the use of the imperative in Dutch and German. For short orders, the German mother often uses a finite thematic verb (Salustri & Hyams 2006). The Dutch mother, by contrast, predominantly uses a finite modal with the thematic infinitive in final position.

The claim is not that the German input lacks modal verbs. The claim is that the lower input amount of auxiliaries + infinitive in German leads to a different acquisition path. The German child does not, as the Dutch child does, develop temporarily a separate non-thematic auxiliary that selects to the right. That difference is supported by two factual findings in the Dutch and German corpora.

First, more than two-third of all finite verbs in early child German are thematic (non-modal/aspectual). By contrast, more than two-third finite verbs in child Dutch are non-thematic (modal/aspectual). I counted for all children the ratio between finite modals/aspectuals and finite thematic verbs in root clauses just before the age the first subordinate clauses with sentence-final finite verb appeared. See Tables 3 and 4. The temporal auxiliaries and copulas were excluded from the count.

<table>
<thead>
<tr>
<th>Sentence-initial finite verbs in child Dutch: &gt;2/3 –theta verbs; &lt;1/3 theta verbs</th>
<th>Finite –theta verbs</th>
<th>Finite +theta verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarah</td>
<td>2:05.22-2:06.18</td>
<td>297</td>
</tr>
<tr>
<td>Abel</td>
<td>2:07.15-2:07.29</td>
<td>142</td>
</tr>
<tr>
<td>Josse</td>
<td>2:07.06-2:07.20</td>
<td>195</td>
</tr>
<tr>
<td>Matthijs</td>
<td>2:08.05-2:09.15</td>
<td>182</td>
</tr>
</tbody>
</table>
Table 4  Sentence-initial finite verbs in child German: <1/3 –theta verbs; >2/3 +theta verbs

<table>
<thead>
<tr>
<th></th>
<th>Finite –theta verbs</th>
<th>Finite +theta verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leo</td>
<td>2:02.00-2:02.21</td>
<td>75</td>
</tr>
<tr>
<td>Simone</td>
<td>2:01.20-2:02.21</td>
<td>102</td>
</tr>
</tbody>
</table>

The percentage of modals is initially quite low in child German. It rises only later on, but then the selecting order of V-clusters has already been established.

A second argument comes from the number of verb types that are used both as non-finite verb in sentence-final position and as finite verb in sentence-initial (first/second) position, the so-called ‘overlap’ in the acquisition of the V-second rule (Blom & Wijnen 2013). A high number of such overlap is evidence for a generalized V-second rule for all verbs. The numbers in Table 5 are the cumulative total in all files up to that age, i.e. the age the first subordinate clauses with sentence-final finite verb appeared.

Table 5  Number of finite/non-finite verbal overlap

<table>
<thead>
<tr>
<th></th>
<th>Overlap verb types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dutch Sarah till 2:06.18</td>
<td>13</td>
</tr>
<tr>
<td>German Simone till 2:02.21</td>
<td>41</td>
</tr>
</tbody>
</table>

Table 5 shows that the overlap by Simone is three times the overlap by Sarah.

The general picture for early child Dutch is that the sentence-initial position is for non-thematic verbs and these select their complement to the right. The sentence-final position is for thematic verbs and these select to the left. The modal/aspectual verbs and the thematic verbs are stored as two distinct categories in the child’s lexicon (De Haan 1987).

(7)  a. <+Aux> category. Selects its complement (the infinitive/predicate) to the right.
    b. <+V> category. Selects its complement (the arguments) to the left.

In adult Dutch and German, modals and aspectuals belong, just like thematic verbs, to the category <+V> (Broekhuis & Corver 2015:1.2.1). Eventually, and due to the subordinate clause construction, the Dutch modal/aspectual auxiliary is reanalyzed as <+V> and therefore it may select to the left as well. Yet, the initially acquired selection property to the right remains the dominant option in standard Dutch (Barbiers et al 2008:1.3.1.3; Broekhuis & Corver 2015:1095).2 This yields the binary cluster as [Vaux Vθematic]v.

Thematic verbs in child German are acquired in sentence-final position as root infinitives, but soon after they appear as easily in sentence-initial (first/second) position, as may be seen from the number of overlap in Table 5. Modal verbs appear at the same time, but their percentage is too low to store them as a separate category. It is plausible that from the beginning the German child generalizes over all verbs. All verbs in German, thematic or not, may appear in sentence-initial position and there they select their complements (infinitives or arguments) to the right. All verbs, thematic or not, may also appear in the sentence-final position and there they select their complements (infinitives or arguments) to the left. This yields the binary German cluster as [Vθematic Vaux]v. All verbs, thematic or non-thematic belong unexceptionally to the category <+V> from the beginning. The German child does not temporarily develop a <+Aux> category that selects to the right. The Dutch child, by contrast, does just that, given her/his input.

---

2 Map 1.3.1.3 in the Sand corpus includes Flemish (1-2 order) and Frisian (2-1 order). Standard Dutch allows both orders, but “the 1-2 order is usually considered the standard Dutch order” (Barbiers et al. 2008). Sarah’s mother produced 112 V-clusters of which 110 had the 1-2 order (in the files up till 2:06.18).
2.3 Subordinate clauses and V-clusters

The first subordinates in child Dutch offer no problem as to the position of the finite verb. The children place the finite verb in sentence-final position right away. See (8).

(8) Dat zijn twee kinders die in de water speelt<fin> (Sarah 2;08.19)
     That are two children that in the water play
     ‘That are two children who play in the water.’

If there are two verbs in sentence-final position, the Dutch child has no problem with the order 1-2. The auxiliaries maintain the selection direction to the right that they had in the root clause.

(9) als je dit niet meer wilt<fin> doen (Sarah 3;02.21)
     when you this not anymore want do
     ‘when you don’t want to do this anymore.’

Quite another question is why the child would choose to form a V-cluster at all. I propose a general principle of phrasal formation in (10).

(10) When two elements (words or phrases) α and β are adjacent and α selects β, the selector projects [α β]α

Phrasal formation and the subsequent categorial licensing conditions are seen as the central procedure of the acquisition device. All elements in a sentence must be licensed and have the corresponding category. The trigger is (some kind of) adjacency and the selector projects. The verbs in the V-cluster form a phrase according to (10). They have the selection relation already known from the root clause and they are adjacent. The automatic phrasal formation for V-clusters in Dutch yields an exclusive selection to the right for modals/aspectuals as in root clauses. The selector projects and we get the V-cluster [V1 V2]V1. See (11).

(11) boekje [wilV1 kopenV2]V1
     booklet will buy

In (11) wil selects kopen to the right as before. The thematic infinitive kopen selects its argument to the left as before, be it now as part of a V-cluster. The licensing distance of kopen in (11) must somehow be stretched up in order to reach the object boekje. The analysis in Evers (1975) did this by a selection in the underlying structure and a subsequent V-to-V raising. A direct generation of V-clusters must somehow qualify the adjacency in (10). All movement avoiding analyses have stretched up the context conditions in the actual surface structure, as in Bouma & Van Noord (1998), Culicover (2014:160f).

Initially, all binary sentence-final V-clusters in Dutch are learned as right-branching and the subordinate V-cluster order turns into 1-2. See Table 6.
Table 6

<table>
<thead>
<tr>
<th>Dutch MOD-INF</th>
<th>1-2 order</th>
<th>2-1 order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarah</td>
<td>36</td>
<td>2</td>
</tr>
<tr>
<td>Abel</td>
<td>10</td>
<td>---</td>
</tr>
<tr>
<td>Josse</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Matthijs</td>
<td>10</td>
<td>---</td>
</tr>
</tbody>
</table>

At some point, the modal/aspectual is analyzed as <+V> selecting an infinitival complement to the right or to the left. This opens the way to a left-branching 2-1 V-cluster. The dominant modal-infinitive order remains 1-2 in adult Dutch, but the 2-1 order is also fully grammatical.

The German children also place the subordinate finite verb in sentence-final position. See example (12).

(12) weil du gerade damit selber spielst<fin> (Leo 2;05.00)
    because you just with that yourself play
    ‘because you just play with that yourself.’

All finite elements, thematic and non-thematic, have been stored in the lexicon as <+V>. They select their complement to the right when they are in V-second position and to the left when they are in sentence-final position. When subsequently binary V-clusters with an infinitive appear, this delivers accordingly the leftward-directed (prototypical German) V-cluster 2-1 order. See Table 7.

Table 7

<table>
<thead>
<tr>
<th>German MOD-INF</th>
<th>1-2 order</th>
<th>2-1 order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leo</td>
<td>---</td>
<td>410</td>
</tr>
<tr>
<td>Simone</td>
<td>---</td>
<td>58</td>
</tr>
</tbody>
</table>

The reason is that for German children all verbs switch their selection from rightward to leftward according to the sentence-initial/sentence-final position.

3. Triple V-clusters

An analysis of triple V-clusters by Barbiers, Bennis & Hendriks (2016) takes the dialect geography (SAND corpus, Barbiers et al. 2008) as data-base. They argue that the co-occurrence patterns in Dutch dialects explain all variation assuming three descriptive parameters {±descending; ±verbal participles; ±nominal infinitives}. They derive the order variations by binary ‘Merge’ without movement. Only the truly harmonic orders, descending 3-2-1 and ascending 1-2-3, are syntactically verbal clusters (Bennis & Barbiers 2010). The two other descriptive ‘parameters’ both concern the last selected element in the cluster, and these are <+V> elements, respectively <+A> (past participle) and <+N> (infinitive). See Evers (2003, 2008), Den Besten & Broekhuis (1989).

My approach is related in that no movement is involved. However, the main point of the present paper is that the ‘±descending parameter’, i.e. ±leftward selection, follows from a difference in the acquisition of the V-second rule. All other (im)possible order variants with triple V-clusters can be explained given the order in the primarily acquired binary V-clusters. The SAND-corpus constitutes the database for the (un)attested triple V-clusters below. There
are no sufficient triple V-clusters in the CHILDES corpora to work with. By the time triple V-clusters appear, the child has reached the adult grammar.

Hence, I am bound to argue that the acquired left/right order in the binary clusters suffices to get the harmonic V-cluster orders, left-branching 3-2-1 in German (13a), and right-branching 1-2-3 in Dutch (13b).

(13)  a. German harmonic 3-2-1  b. Dutch harmonic 1-2-3

\[
\begin{array}{c}
V_1 \\
\downarrow \\
V_2 & V_1 \\
\downarrow & \downarrow \\
V_3 & V_2 \\
\end{array}
\quad
\begin{array}{c}
V_1 \\
\downarrow \\
V_2 & V_1 \\
\downarrow & \downarrow \\
V_3 & V_2 \\
\end{array}
\]

\begin{align*}
V_2 & \quad \textit{muss} \quad \textit{must} \\
\textit{tanzen} & \quad \textit{können} \quad \textit{can} \\
\textit{dance} & \quad \textit{can} \\
\end{align*}

\begin{align*}
V_2 & \quad \textit{moet} \quad \textit{must} \\
\textit{kunnen} & \quad \textit{dansen} \quad \textit{can} \\
\textit{can} & \quad \textit{dance} \\
\end{align*}

The rightward-directed selection of the dependent binary V-projection primarily acquired with the V-second root construction, continues within the V-cluster and imposes the ‘harmonic’ rightward branching V-cluster in Dutch. The leftward-directed selection of the dependent binary V-projection in German determines likewise the ‘harmonic’ leftward branching in the German V-cluster.

The present view also explains why a selection reversal takes place for the last selected element (V₃) only. Given the previously acquired binary clusters, (14a) should be grammatical, but (14b) should be ungrammatical (indicated by the *).

(14)  a. Dutch mixed 1-3-2  b. Dutch mixed *2-3-1

\[
\begin{array}{c}
V_1 \\
\downarrow \\
\textit{moet} \quad \textit{must} \\
\downarrow \\
V_2 \\
\downarrow \\
V_3 \\
\end{array}
\quad
\begin{array}{c}
V_1 \\
\downarrow \\
\textit{moet} \quad \textit{must} \\
\downarrow \\
V_2 \\
\downarrow \\
V_3 \\
\end{array}
\]

\begin{align*}
V_1 & \quad \textit{must} \\
\textit{dansen} & \quad \textit{kunnen} \quad \textit{can} \\
\textit{dance} & \quad \textit{can} \\
\end{align*}

\begin{align*}
V_2 & \quad \textit{kunnen} \quad \textit{dansen} \quad \textit{can} \\
\textit{can} & \quad \textit{dance} \\
\end{align*}

In (14a) V₁ selects (c-commands) V₂ to the right. The dominant directionality of Dutch clusters is maintained. By contrast, V₂ selects V₃ to the left. This was a possible order in binary V-clusters and becomes possible as well in triple clusters, but only under mutual c-command as in the binary clusters. The ordering depends on the initial acquisition step in binary cluster formation, but since both selection orders are learned before triple clusters appear, the 1-3-2 order is in principle possible.³ In fact, it is an attested order, although it is less preferred than harmonic branching 1-2-3.

In (14b) V₂ selects V₃ to the right and V₁ asymmetrically selects V₂ to the left. The selection order does not rely on a previously acquired binary V-cluster, and there is in (14b) no mutual

³The present view also explains why such selection reversal does not take place in German where selection is to the left anyway. It is true that German does allow the finite tense auxiliary selecting to the right. That seems to involve a selection reversal of V₁, but I suggest that this may be due to the frequency of rightward-selecting tense auxiliaries in V-second position.
c-command between V₁ and V₂. Since this switch in asymmetric selection is not learned in binary cluster formation, the structure should be ungrammatical/dispreferred.⁴ Again, the analysis is confirmed by the non-occurrence of V-clusters as in (14b).

The present non-movement approach cannot assume an underlying order that establishes the selection relation and interpretation (V₁ selects V₂ and V₂ selects V₃) to be followed by V-to-V movement. The surface order is derived directly by binary licensing relations. Therefore, the mixed branching configurations *2-1-3 and *3-1-2 are ruled out since V₃ is not selectable by V₁. See (15).

(15)  a. *2-1-3  

\[ \begin{array}{ccc}
\text{V₁} & \text{moet} & \text{must} \\
\text{V₂} & \text{kunnen} & \text{can} \\
\text{V₃} & \text{dansen} & \text{dance}
\end{array} \]

b. *3-1-2  

\[ \begin{array}{ccc}
\text{V₁} & \text{moet} & \text{must} \\
\text{V₂} & \text{kunnen} & \text{can} \\
\text{V₃} & \text{dansen} & \text{dance}
\end{array} \]

The order 2-1-3 does indeed not occur in Dutch, nor in any West-Germanic dialect. However, the order 3-1-2 does exist in Dutch. Therefore, the attested order 3-1-2 is a problem within the present approach when analyzed as a triple V-cluster. And indeed, it has been argued that the infinitive *dansen in (15b) is normalized and is not part of the verbal cluster (3)-1-2 (Den Besten & Broekhuis 1989; Broekhuis & Corver 2015:1059ff).⁵

The order 3-1-2 is even preferred when 3 is a past participle. Again, the past participle is not part of the verbal cluster (3)-1-2 when interpreted as <-V> and an adjective (Evers 2003, 2008). I will derive the <-V> status of the past participle from acquisition steps in the next section. The interesting point is that child language repeats the historical development of *hebben from a resultative small clause selecting verb into a tense auxiliary for periphrastic past tense (Van den Berg 1949:163, Van der Horst 1998:104, Coussé 2006:262).

4. The categorial status of the past participle.
The Dutch V-clusters are further complicated by <-V> X⁰ elements, the so-called “cluster creepers”. They are idiomatically selected to the left by the last (most embedded) verb.

Past participles may be <+V> and <-V> (adjectives). If the past participle is a <-V> adjective, it is a cluster creeper in the same way as particles and adjectives and licensed in front of...

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⁴ The (un)grammaticality of the V-cluster orders in (13)-(14) is in accordance with the Final-over-Final Constraint (Biberauer et al. 2014). Head-final structures may be dominated by head-final (13a) or head-initial (14a) structures. Head-initial structures may only be harmonically dominated by head-initial structures (13b). This rules out head-initial structures dominated by head-final structures (14b). I hope that this constraint follows from an acquisition path as well.

⁵ There are complicating factors with the 1-3-2 order in (14a). For instance, they are excluded with te-infinitives. Te-infinitives always follow their governing verb. A possible solution is suggested by Arnold Evers (p.c.). The change in (14a) in the selection direction of *kunnen indicates that *dansen is a <-V> infinitive that rejects the prefix te (cf. Broekhuis & Corver 2015:1055f). Dutch then maintains a strict rightward selection for <+V> elements. All leftward-selecting order variations must apply to the last selected element, which is automatically reinterpreted as <-V> if licensed by a <+V> licensor on the right-hand side, and hence a "cluster-creeper" (Evers 2003). See also Barbiers & Bennis (2010). The leftward selection of the <-V> cluster creepers fits a general V-final (SOV) language type. I do not follow this line here. The leftward selection (2-1 order) of modal verbs in binary clusters is rather smooth and acquired well before the nominalization of infinitives, which remains rather strained.
of any verb of the cluster (Evers 2003). See (16). Both the adjective klaar (‘ready’) and the past participle gemaakt (‘made’) can appear at any of the black dot positions within the V-cluster.

(16) dat Jan zijn huiswerk morgen gemaakt / klaar
that Jan his homework tomorrow made / ready
• zou1 • kunnen2 • hebben3
would can have
‘that John would have been able to make/finish his homework tomorrow.’

In (16) there is a V-cluster with only three verbal heads. Evers (2003) argues that the categorial status of the cluster creeper is a <-V> predicative head, which includes participles, particles, adjectives, adverbs and bare nouns. When the past participle appears to the right of the auxiliary, the past participle seems more like <+V> and it is a true part of the V-cluster. In (17) there is a V-cluster with four verbal heads, as indicated by the four subscripts.

(17) dat Jan zijn huiswerk zou1 kunnen2 hebben3 gemaakt4 / *klaar
that Jan his homework would can have made / ready

How do we derive the <-V> cluster creeper status of the Dutch past participle from the acquisition steps?

The Dutch children start with the order participle-auxiliary, just like the German children. See the numbers in Tables 8-9 for Sarah and Josse. The number of past participle constructions for Abel (before 3;01: 3x 2-1 and 1x 1-2) and Matthijs (5x 2-1 order) were too low, but they confirm the <-V> analysis.

Table 8

<table>
<thead>
<tr>
<th>Dutch Sarah AUX-PART</th>
<th>1-2 order</th>
<th>2-1 order</th>
</tr>
</thead>
<tbody>
<tr>
<td>age 3:00-4:05</td>
<td>Auxhebben</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Auxzijn</td>
<td>10</td>
</tr>
<tr>
<td>age 4:05-5:02</td>
<td>Auxhebben</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Auxzijn</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 9

<table>
<thead>
<tr>
<th>Dutch Josse AUX-PART</th>
<th>1-2 order</th>
<th>2-1 order</th>
</tr>
</thead>
<tbody>
<tr>
<td>age 2:07-3:01</td>
<td>Auxhebben</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Auxzijn</td>
<td>2</td>
</tr>
<tr>
<td>age 3:01-3:05</td>
<td>Auxhebben</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Auxzijn</td>
<td>3</td>
</tr>
</tbody>
</table>

Sarah’s 8 instances with a 1-2 order appear late. The same holds for the 3 instances with a 1-2 order in the Josse files.

The 2-1 order is not just a reflection of the input. There is a more dominant 1-2 order in the speech of the mothers (except for Josse’s mother). See Table 10.

Table 10

<table>
<thead>
<tr>
<th>Dutch AUX-PART</th>
<th>1-2 order</th>
<th>2-1 order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother Sarah</td>
<td>35</td>
<td>64%</td>
</tr>
<tr>
<td>Mother Josse</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>Mother Matthijs</td>
<td>48</td>
<td>63%</td>
</tr>
<tr>
<td>Mother Abel</td>
<td>15</td>
<td>56%</td>
</tr>
</tbody>
</table>
Sarah’s maternal input has some 2/3 of all past participles selected to the right, but Sarah resisted for more than a year. The Groningen children do not reproduce the maternal mixed input either, but they also start with the 2-1 order.

The data in Tables 8-10 fit in with the experimental results in Zuckerman (2001) and Meyer & Weerman (2015). Three-year-olds in Zuckerman’s study prefer the 2-1 order, but the five-year-olds prefer the 1-2 order. The Zuckerman switch is confirmed by Meyer & Weerman. They argue that the early participle-auxiliary 2-1 orders are not clusters, on the assumption that the Dutch child initially analyses past participles as adjectives. Their perspective differs from the present one in that they assume a V-to-V-movement to derive the cluster order, but they retrace and explain the child’s development of the past participle in the same manner, as a matter of category assignment for the past participle.

Part of the explanation lies again in the order of acquisition steps. Hebben (‘have’) appears first and predominantly as thematic verb, before it is used as a tense auxiliary. It starts in child Dutch (roughly around 2:0) as root infinitive selecting the arguments to the left as in (18). This holds for all four children.

(18) (ik) niet beertje hebben
(I) not bear have

The next acquisition step of hebben differs from other thematic verbs. Hebben appears early and very frequently as finite verb in V-second position. It expresses a possessive relation between the subject of hebben and the direct object. See (19).

(19) a. heb je ook [vingers vies]? <+A> (Sarah; 2;04.02)
    have you too fingers dirty?
    ‘do you also have dirty fingers?’

b. hij heb [hoed of] <particle> (Sarah 2;04.27)
    he has hat off
    ‘he has (his) hat off.’

c. ik heb [appel (ge)kleurd] <participle> (Sarah 2;09.07)
    I have apple colored
    ‘I have colored an apple.’

The external argument in the examples in (19) is not interpreted as the subject of the small clause predicate. The past participle in (19) denotes the state of a structural argument (object). Hebben functions as a thematic verb with the possessor as subject. Hebben is not a tense auxiliary yet.

The examples in (20) are examples attested around the age of the first use of subordinate V-clusters with hebben + past participle.

(20) a. als we [koffie op] hebben (Josse 3;00.20)
    when we coffee have
    ‘when we have finished the coffee.’

b. als ik [deze naam geschreven] heb (Sarah 3;00.19)
    when I this name written have
    ‘when I have written this name.’

c. als ik [sokje uit] heb (Abel 3;00.23)
    when I sock have
    ‘when I have taken off sock.’

d. of ik [dit trui gebreid] heb (Abel 2;10.14)
if I this sweater knitted have
‘whether I have knitted this sweater.’

In (20b,d) the past participle is a $<-V>$ element and no V-cluster is involved.
The past participle is acquired as a $<-V>$ category and consequently a cluster creeper, but its appearance to the right of the selector in Dutch as in (17) suggests a $+V>$ category change, since an $+A>$ category licensed by a selector on the left is (extremely) exceptional. However, the category change of the past participle into $+V>$ does not explain why the past participle cannot select a dependent infinitive to the right (the IPP Infinitivus-pro-participio effect). This categorial problem of the past participle remains unsolved.

5. Conclusion
It has been argued by a quantification of acquisition facts that the Dutch-German mirror difference between right-branching and left-branching V-clusters follows from a difference in the acquisition of V-second. The V-second distribution in early child Dutch appears predominantly with modals and aspectuals, selecting the thematic infinitive to the right. The rightward selection of the auxiliaries carries over to the binary V-clusters.

Early child German makes a less frequent use of modal/aspectual auxiliaries. From the beginning on all verbs, thematic and non-thematic, may appear in child German in the V-second position selecting to the right and all verbs, thematic and non-thematic, may appear in the sentence-final position selecting to the left. The leftward selection in sentence-final position carries over to all binary V-clusters.

The previously acquired binary V-clusters cause a ‘harmonic’ general selection direction in triple/multiple V-clusters, rightward-selecting in Dutch and leftward-selecting in German. Other minor order variations in Dutch only apply to the last selected element (Evers 2003). These order variations are accounted for by the present non-movement analysis. Whereas the traditional generative analyses assume an underlying structure followed by V-to-V-movement, the present analysis derives the V-cluster order directly by binary licensing and different category assignments. The present account of the Dutch-German acquisition facts is incompatible with the view that V-second and V-cluster formation both derive from a underlying structure that delivers the selection relation followed by movement rules to meet further licensing conditions.

The present view is strongly supported by the fact that all West-Germanic dialects with a right-branching V-cluster have a hype for aspectual or light verb auxiliaries in the V-second position.

(21) Swiss German: ‘dummy’ *tun, aspectual *gehen (Schönenberger & Penner 1995)
West Flemish: aspectual *gaan (Fehringer 2015)
Afrikaans: aspectual *gaan, posture verbs (Breed & Brisard 2015)

Frisian has left-branching V-clusters, like German. It had no aspectual *gean to express future/inchoative aspect and posture verbs retain their locative interpretation (Hoekstra 2016). It is then to be expected that the acquisition of V-second starts with modal/aspectual auxiliaries only in languages with right-branching V-clusters.

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* In Frisian, the motion verb *gean (‘go’) is at present changing from a lexical motion verb into an infinitive selecting aspectual auxiliary (Bergstra 2016). The same holds for posture verbs. Frisian develops a productive aspectual use of posture verbs selecting a te infinitive only recently (Hoekstra 2016). This development takes place under the influence of Dutch. All Frisians are Dutch/Frisian bilinguals nowadays. It is then under the present approach to be expected that Frisian develops at the same time a rightward-selecting auxiliary and that verb clusters will show more and more 1-2 orders. See Meyer & Weerman (2015) for two-verb clusters in child Frisian.
References


Culicover, Peter. 2014. “Constructions, complexity and word order variation.” Measuring Linguistic Complexity ed. by Frederick Newmeyer & Laurel Preston, 148-178. OUP.


