

Deriving verb-cluster variation in Dutch and German

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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. The decisive factor is a rightward selection of the <+Aux> verbs in Dutch main clauses. 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 allows a V-cluster without assuming V-to-V-movement from an underlying structure. The general perspective is that (i) the acquisition procedure is a discovery procedure, and that (ii) typological effects are the outcome of early local string-determined licensing/selection.

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

1. Introduction

The focus of the present paper is the order variation in West-Germanic V(erb)-clusters. Although there is a certain amount of word order variation in attested triple (three-verb) V-clusters (Wurmbrand 2004), there is a main branching difference. 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 remain the same. V_1 selects V_2 and V_2 selects V_3 .

- (1) a. dat hij een boek wil₁ kunnen₂ kopen₃
b. dass er ein Buch kaufen₃ können₂ will₁
that he a book wants₁ can₂ buy₃
'that he will be able to buy a book.'

What then causes this mirror order in Dutch versus German?

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

Sections 2-3 consider V-clusters with a modal/aspectual auxiliary + infinitive(s) as in (1). 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 (section 2).

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 2004:47). The less rigid distribution of past participles will be considered in section 4.

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 set of a priori principles to an input string, and to subsequently add movement rules in order to reach the PF strings. Instead, language acquisition is seen as a discovery of binary surface licensing relations in the most elementary structures (Evers & Van Kampen 2008, Van Kampen 2009).

2. The acquisition perspective. Two types of selection

I will first consider the child's order variation for binary V-clusters. The order variation in triple V-clusters is explained subsequently (section 3) given the order in binary V-clusters.

The different acquisition of V-second in Dutch and German is the centerpiece of the argument and it is quantitatively supported by data from longitudinal CHILDES corpora.

(2) *Dutch corpora*

Kampen-corpus	Sarah	(1;07–5;02)	utterances = 19.245
Groningen-corpus	Abel	(1;11–3;04)	utterances = 13.044
	Josse	(2;00–3;04)	utterances = 13.261
	Matthijs	(1;06–3;07)	utterances = 20.871

German corpora

Miller-corpus	Simone	(1;09–4;00)	utterances = 31.927
Leo-corpus	Leo	(1;11–4;11)	utterances = 182.339

The order preferences in subordinate V-clusters, 1-2 order (Dutch) or 2-1 order (German), follow from an input difference in the 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 into three stages. The stages are supported by acquisition graphs that show a percentual rise of the new property in the child's production.

Wijnen (1997), Jordens (2002), Blom (2003) all describe a first stage in which the finite verb is lacking. Verbs appear predominantly in sentence-final position as 'root infinitives' and they are all thematic. See (3).

- (3) pap eten_{<inf>}
porridge eat

These 'root infinitives' initially constitute >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, these finite modals/aspectuals rise from 20% to >50% of all sentences. Dutch children first use the modals/aspectuals as a kind of performative 'operator' (Jordens 2002, Van Kampen 1997) with a pragmatic value (wish/order/intention). They appear first without and subsequently also with a verbal complement (thematic infinitive) to the right.

- (4) a. kwil_{<fin>} pap (eten)
wanna porridge (eat)

It is only in a third stage that finite thematic verbs as in (5) 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 input. The ‘root infinitives’ disappear, but the lexicon preserves the infinitival property of selecting to the left.

- (5) beer eet_{<fin>} pap
 bear eats porridge

The acquisition of verb placement in German follows a different path. There is no distinction of a second and third stage. Like Dutch children, German children initially have the thematic verbs predominantly in sentence-final position as ‘root infinitives’ (Freudenthal et al. 2007). In a second stage, we see the rise of finite verbs in sentence-initial position, but in contrast to Dutch, the rise is not starting with modals. The German literature (correctly) does not mention a unique initial stage for finite non-thematic verbs. Most of the examples in early child German have a finite thematic verb. See Behrens (2006:19, Figure 7) for Leo.

The Dutch/German acquisition difference was paid little attention to in the literature, since a year later children in both languages apply the V-second rule to all verbs. The question now is: how did the same V-second phenomenon lead to the different acquisition path? The answer lies in quantitative differences in the input language.

2.2 Directionality of selection: A Dutch-German input difference

A first difference between the Dutch 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 input *gehen*+infinitive was virtually absent. The same difference holds for the verb *komen* (‘come’) and posture verbs like *zitten* (‘sit’) that in Dutch are used as aspectuals with an infinitive and have no equivalent in German. Sarah’s mother had 1061 instances of *gaan*+infinitive, 119 instances of *komen*+infinitive and 94 instances of *zitten*+infinitive. The effect is that German children receive more finite thematic verbs in their input, whereas Dutch children predominantly receive finite non-thematic verbs in their input.

To see the factual effect of these input data, I counted the instances of *gaan*+infinitive for the Dutch children. The numbers are given in Table 1. I also calculated out how many utterances the child used *gaan*+infinitive. For Sarah this was $19.245/611 = 32$. On the average once every 32 utterance.

Table 1. Child Dutch *gaan*+infinitive

Sarah	Abel	Josse	Matthijs
611	388	280	277
every 32u.	every 34u.	every 47u.	every 75u.

The frequencies in the German corpora are only a fraction of the frequencies in the Dutch corpora. See Table 2.

Table 2. Child German *gehen*+infinitive

Leo	Simone
72	6
every 2.533u.	every 4.707u.

A second input difference that may influence the percentage of finite \pm theta verbs in root clauses is the use of the imperative. For short requests, 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, but 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, temporarily develop a separate non-thematic auxiliary that selects to the right. That difference is supported by two factual findings in the child corpora.

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

Table 3. Sentence-initial finite verbs in child Dutch

		Finite -theta verbs > 2/3		Finite +theta verbs < 1/3	
Sarah	2;05.22-2;06.18	297	70%	127	30%
Abel	2;07.15-2;07.29	142	71%	58	29%
Josse	2;07.06-2;07.20	195	76%	61	24%
Matthijs	2;08.05-2;09.15	182	71%	75	29%

Table 4. Sentence-initial finite verbs in child German

		Finite –theta verbs < 1/3		Finite +theta verbs > 2/3	
Leo	2;02.00-2;02.21	75	21%	284	79%
Simone	2;01.20-2;02.21	102	27%	278	73%

The percentage of modals is initially quite low in child German, cf. Behrens (2006:19). It rises later on, but then the leftward-selecting order of German V-clusters has already been established.

A second argument comes from the number of verb types that are used both sentence-finally as non-finite verb and sentence-initially as finite verb, the so-called ‘overlap’ in the acquisition of V-second (Blom & Wijnen 2013). A high amount 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.

Table 5. Amount of finite/non-finite verbal overlap

		Overlap verb types
Dutch Sarah	till 2;06.18	13
German Simone	till 2;02.21	41

The amount of overlap in Simone’s speech is three times as high as the overlap in Sarah’s speech.

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).

- (6) 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/aspectuals, just like thematic verbs, belong to the category <+V> (Broekhuis & Corver 2015:19ff). Eventually, the Dutch modal/aspectual auxiliary is reanalyzed as <+V> and therefore it selects in the subordinate to the left as well. Yet, its initially acquired property ‘select to the right’ remains the dominant option in standard Dutch (Barbiers et al. 2008:1.3.1.3). This yields the binary cluster as $[V_{\text{aux}} V_{\text{thematic}}]V$.

Thematic verbs in child German are acquired in sentence-final position as root infinitives, but they soon appear in sentence-initial (first/second) position, as may be seen from the amount 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. For binary clusters this yields the order $[V_{\text{thematic}} V_{\text{aux}}]_v$. All verbs belong unexceptionally to the category $\langle +V \rangle$ from the beginning. The German child does not temporarily develop a $\langle +\text{Aux} \rangle$ category that selects to the right.

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. See (7).

- (7) Dat zijn twee kinderen 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.’

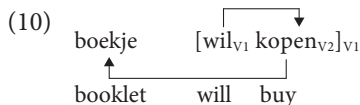
If there are two verbs in sentence-final position, the Dutch child has no problem with the order 1-2. The auxiliaries maintain the selection direction to the right that they had in the root clause.

- (8) 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 (9).

- (9) When two elements (words or phrases) α and β are adjacent and α selects β , the selector projects $[\alpha \beta]_{\alpha}$

Phrasal formation and 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 (9). They have the selection relation already acquired for 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 $[V_1 V_2]_{V_1}$. See (10).



In (10) *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 (10) must be ‘stretched up’ in order to reach the object *boekje*. The analysis in Evers (1975) does 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 (9). All movement-avoiding analyses have stretched up the context conditions in the surface structure, as in Culicover (2014:160f).

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

Table 6.

Dutch MOD-INF	1-2 order	2-1 order
Sarah	36	2
Abel	10	–
Josse	17	1
Matthijs	10	–

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 order remains 1-2 in adult Dutch, but the 2-1 order is also grammatical.

The German children also place the subordinate finite verb sentence-finally. See (11).

- (11) 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 verbal 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 results in the leftward-directed 2-1 order. See Table 7.

Table 7.

German MOD-INF	1-2 order	2-1 order
Leo	–	410
Simone	–	58

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

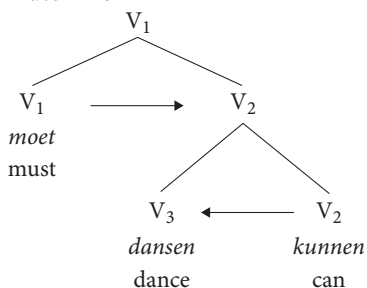
An analysis of triple V-clusters by Barbiers, Bennis & Hendriks (2016) takes the dialect geography (SAND corpus, Barbiers et al. 2008) as data-base. They argue that the co-occurrence patterns in Dutch dialects explain all variation assuming three descriptive parameters { \pm descending; \pm verbal participles; \pm nominal infinitives}. They derive the order variations by binary ‘Merge’ without movement. Only the truly harmonic descending 3-2-1 and ascending 1-2-3 orders are syntactically V-clusters (Barbiers & Bennis 2010). The two other descriptive ‘parameters’ both concern the last-selected element in the V-cluster, and that one is claimed to be $\langle -V \rangle$, $\langle +A \rangle$ (participle) and $\langle +N \rangle$ (infinitive), when selected to the left by Evers (2003, 2008).

My approach is related in that no movement is involved and category assignment may be manipulated. However, the main point of the present paper is that the \pm descending ‘parameter’ (\pm leftward selection), follows from a difference in V-second acquisition. All other (im)possible order variants with triple V-clusters can be explained given the licensing order in the primarily acquired binary V-clusters. The SAND-corpus constitutes the database for the (un)attested V-clusters below. There are no sufficient triple V-clusters in the CHILDES corpora.

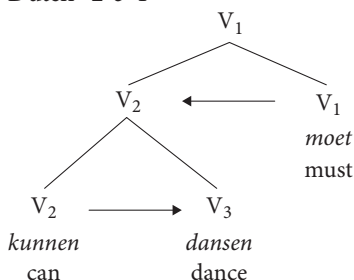
Hence, I am bound to argue that the acquired order in the binary clusters suffices to get the harmonic V-cluster orders, left-branching 3-2-1 in German and right-branching 1-2-3 in Dutch. The selection directionality of the dependent binary V-projection continues within the triple/multiple V-cluster and imposes the ‘harmonic’ branching order.

The present view may also explain why a selection reversal is possible for the last-selected element (V_3) only. Given the previously acquired binary clusters, (12a) should be grammatical, but (12b) should be ungrammatical (*). This is according to fact.

(12) a. Dutch 1-3-2



b. Dutch *2-3-1

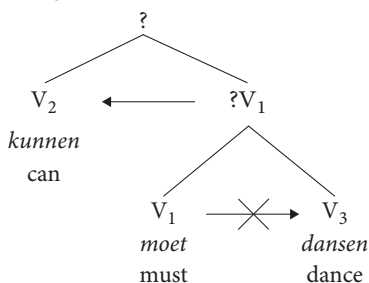


In (12a) V₁ selects (c-commands) V₂ to the right. The dominant directionality of Dutch V-clusters is maintained. By contrast, V₂ selects V₃ to the left. This is a possible order in binary V-clusters and becomes possible as well in triple clusters, but only under mutual c-command as in the binary clusters. Since both selection orders are learned before triple V-clusters appear, the 1-3-2 order is in principle possible. In fact, it is an attested order, although it is less preferred than harmonic branching 1-2-3.

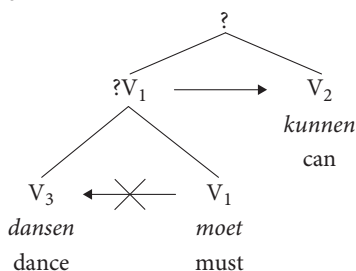
In (12b) V₂ selects V₃ to the right and V₁ asymmetrically selects V₂ to the left. The selection order does not rely on a previously acquired binary V-cluster, and there is no mutual c-command between V₁ and V₂. Since this switch in asymmetric selection is not learned in binary cluster formation, the structure should be ungrammatical/dispreferred. Again, the analysis is confirmed by the non-occurrence of V-clusters as in (12b).

The present non-movement approach derives the surface order directly by binary licensing relations. This excludes the 2-1-3 and 3-1-2 orders, since V₃ is not selectable by V₁. See (13).

(13) a. *2-1-3



b. *3-1-2



The order 2-1-3 indeed does 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 (14b) is nominalized and is not part of the V-cluster (3)-1-2 (Den Besten & Broekhuis 1989; Broekhuis & Corver 2015:1059ff).

The order 3-1-2 is even preferred when 3 is a past participle. It has been argued that historically the past participle is a <-V>, an adjectivized verb, and hence not part of the V-cluster in the strict sense (not a V_3). I will derive the <-V> status of the past participle from acquisition steps. The interesting point is that child language repeats the historical development of the past participle construction (Van den Berg 1949:163, Coussé 2006:262).

4. The categorial status of the past participle

The Dutch V-clusters are further complicated by <-V> predicative elements, such as particles and adjectives, the so-called “cluster creepers” (Evers 2003, 2008). The <-V> past participle is a cluster creeper in the same way as particles and adjectives and is licensed to the left of any verb of the cluster (Evers 2003:77f). See (14). In (14) there is a V-cluster with three verbal heads. Both the adjective *klaar* (‘ready’)

and the past participle *gemaakt* ('made') can appear at any of the positions within the V-cluster marked by black dots.

- (14) dat Jan zijn huiswerk morgen niet gemaakt/klaar zou₁ kunnen₂
 that Jan his homework tomorrow not made/ready would can
 hebben₃
 have
 'that John not would have been able to make/finish his homework tomorrow.'

How do we derive the <-V> status of the past participle from 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 and Matthijs were too low, but they confirm the <-V> analysis.

Table 8.

Dutch Sarah AUX-PART		1-2 order	2-1 order
3;00-4;05	Aux _{hebben}	-	10
	Aux _{zijn}	-	6
4;05-5;02	Aux _{hebben}	8	2
	Aux _{zijn}	-	3

Table 9.

Dutch Josse AUX-PART		1-2 order	2-1 order
2;07-3;01	Aux _{hebben}	-	2
	Aux _{zijn}	-	5
3;01-3;05	Aux _{hebben}	3	1
	Aux _{zijn}	-	3

Sarah's 8 instances and Josse's 3 instances with a 1-2 order appear later.

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. See Table 10.

Table 10.

Dutch AUX-PART	1-2 order		2-1 order	
Mother Sarah	35	64%	20	36%
Mother Josse	10	50%	10	50%
Mother Matthijs	48	63%	28	37%
Mother Abel	15	56%	12	44%

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. 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 (in press). Three-year-olds in Zuckerman's study prefer the 2-1 order, but 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.

Part of the explanation lies again in the order of acquisition steps. *Hebben* starts in child Dutch as a thematic root infinitive selecting the arguments to the left as in (16). This holds for all four children.

- (16) beertje hebben
bear have

In a next acquisition step, *hebben* differs from other thematic verbs. It appears early and frequently as finite verb sentence-initially (early 'overlap'). It expresses a possessive relation between the subject of *hebben* and the direct object. See (17).

- (17) a. heb je ook [vingers vies]? <-V> adjective (Sarah; 2;04.02)
have you too fingers dirty?
'do you also have dirty fingers?'
b. hij heb [hoed af] <-V> particle (Sarah 2;04.27)
he has hat off
'he has (his) hat off.'
c. ik heb [appel (ge)kleurd] <-V> participle (Sarah 2;09.07)
I have apple colored
'I have colored an apple.'

The past participle in (17c) denotes the state of a structural argument (object). *Hebben* functions as a thematic verb with the possessor as subject.

Hebben in (17c) need not be a tense auxiliary yet, but the appearance of the past participle to the right of its selector *hebben* as in (18a) indicates a category change, since licensing a <+A> to the right is impossible. A category change of the past participle from <+A> to <+V> is not helpful, though, since the past participle cannot license the dependent verb *schrijven* in (18b) (the IPP *Infinitivus-pro-participio* effect).

- (18) a. dat Jan zijn huiswerk niet heeft gemaakt/*klaar
that Jan his homework not has made/*ready
'that Jan has not made/finished his homework.'

- b. dat Jan zijn huiswerk niet heeft laten/*gelaten maken
 that Jan his homework not has let_{inf}/*let_{pp} make
 'that Jan has not let make his homework.'

Hence, we better claim that the past participle is still a category of <+A> that *by exception* allows a licenser on the left as well. This is reflected in child language. The Dutch children resist the past participle licensed to the right of *hebben* for some time as shown in Tables 8-9.

5. Conclusion

The Dutch-German mirror difference between right-branching and left-branching V-clusters follows from a difference in the acquisition of V-second.

The initially acquired binary V-clusters cause a 'harmonic' general selection direction in multiple V-clusters, rightward-selecting in Dutch and leftward-selecting in German. 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.

The present view is 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.

- (19) Swiss German: 'dummy' *tun*, aspectual *gehen*
 West Flemish: aspectual *gaan*
 Afrikaans: aspectual *gaan*, posture verbs

Frisian has left-branching V-clusters, like German. It had no aspectual *geageann* 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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