

The Non-Biological Evolution of Grammar: *Wh*-Question Formation in Germanic

Jacqueline van Kampen

The *wh*-marking of questions in child English is as early as the appearance of the *wh*-questions themselves. The *wh*-marking of questions in child Dutch (and the other Germanic languages) is delayed until the acquisition of articles and free anaphoric pronouns. An acquisition procedure is proposed that succeeds to set first a typological difference, V2 for Dutch and SV_{fin}O for English. The different setting of the typological parameters determines the *wh*-development in subsequent acquisition steps. The learnability approach relativizes Chomsky's poverty of the stimulus, but affirms his position that language is 'perfect' in the sense of being learnable as a cultural construct without the assumption of innate grammar-specific *a priori*s.

Keywords: acquisition of *wh*-questions; child Dutch/English; cultural evolution; learnability; lexicalism

1. The Acquisition of *Wh*-Questions

1.1. *Outline of the Article*

I will first draw the attention to an acquisition problem that has been noticed before. *Wh*-elements in Germanic V2 languages do not appear in child language questions before the acquisition of the V2 rule and the subsequent acquisition of articles and free anaphors. By contrast, the *wh*-elements in SV_{fin}O English appear as early as the constituent questions themselves. Both types of languages (SV_{fin}O English and V2 Dutch) use clause-initial *wh*-elements in the same way. There is no difference in the *wh*-parameter. The acquisition difference must be due to the different typological background. The presentation of that problem constitutes the first part of this article. The second part will sketch an acquisition procedure that derives the phenomenon from the basic typological difference.

In the third part, I will argue that typological alternatives (parameters) are just those grammatical properties that are the first to be derived from input. The

The skeptic remarks of two anonymous reviewers helped me sharpen my ideas. Thanks to the audiences at *BALE 2008* (York, July 2008) and at the *CUNY Syntax Supper* (New York, September 2008) for stimulating questions and useful suggestions. The research for this article was supported by NWO (grant 360-70-290) and the UiL OTS.



simple reason is that the learner applies a systematic input reduction based on ignorance. The residues of that reduction single out the major typological properties. Once set, they determine the further developmental track towards the target grammar. This reminds of evolution. Preceding stages determine the way in which the subsequent stages adapt to the environment. Environment in the case of first language acquisition is the adult input language that the child's system gradually adapts to. The fact that typological properties are derived from input, rather than being *a priori* parametric alternatives, does not prevent them from characterizing major alternatives in language design. To the contrary, the fact that they are the first to be acquired causes them to influence the further course of acquisition. It rather seems that the reason for language types to be there and to remain so is that they enable an acquisition strategy. It is not claimed here that the language type enters the acquisition procedure as a bunch of typologically representative patterns that are further elaborated upon as in Tomasello (2003). Rather, I will argue, *contra* Construction Grammar, that each acquisition step, including the ones towards a certain language type, develops a category that is stored in the lexicon and that is characterized by its combinatorial properties. No phrase is used by the child unless all its lexical elements have a provisional categorial label that specifies its elementary combinatorial property. The somewhat odd forms of early child language can be derived and explained from the principle 'Establish such a grammatical category first'.

The evolution of a minimalist grammar in language acquisition needs no more than two types of elementary acquisition steps, both based on a locality frame (Roberts 2001). One type of acquisition steps serves a *Merge* construction and its categories, and the other one a *Move* construction and its categories. Both steps derive a category and its combinatorial property from its most simple and local pattern. The intricacy of grammars follows from a combinatorial effect which needs neither be innate nor learned. It is just implied by previous acquisition steps. The successive grammatical categories show standardized semantic oppositions, for example < \pm definite> for reference marking or < \pm aspect> for predication. These oppositions reconstruct part of the pragmatic understanding into grammatical oppositions.

1.2. A Paradoxical Fact

Some properties of the target grammar are acquired before others. Initially, some children make more headway in matters of grammar than others, but in the end they all succeed and more importantly, they all succeed along the same line of partial acquisition steps that is implied by the target language. The order of acquisition steps gives an important indication how a first grammar is acquired (see also Brown 1973: 427). The empirical case presented here is the acquisition of root *wh*-questions in child Dutch (and other Germanic V2 languages) as opposed to the same procedure in child English (SV_{fin}O language).

The order of acquisition steps in the two languages is strikingly different. When acquiring *wh*-questions, English children use *wh*-pronouns from the start. The first *wh*-questions, though, as in (1), lack a finite verb (Klima & Bellugi 1966). The English child introduces the finite verb in a later acquisition step. See the

adult examples in (2) that appear later in the speech of the English child.

- (1) a. What that?
 b. Where bear go?
 c. How I get in?
- (2) a. What is that?
 b. Where does bear go?
 c. How will I get in?

Children acquiring a V2 language like Dutch, German, and Swedish, rather start their *wh*-questions with the finite verb in clause-initial position, and they avoid the *wh*-pronoun. See the early child language examples in (3).

- | | | | |
|-----|---|---|--|
| (3) | <i>Child Dutch</i> | <i>Child Swedish</i> | <i>Child German</i> |
| a. | Is dat nou?
<i>is that then</i>
'What is that?' | Är det den?
<i>is that then</i>
'What is that?' | Ist das denn?
<i>is that then</i>
'What is that?' |
| b. | Moet dat nou toe?
<i>must that now at</i>
'Where must that go?' | Är den andra bilen?
<i>is the other car</i>
'Where is the other car?' | Sitz du denn?
<i>sit you then</i>
'Where do you sit?' |
| c. | Gaat deze nou open?
<i>goes this now open</i>
'How does one open it?' | Öppnar man då?
<i>opens one then</i>
'How does one open it?' | Geht das denn?
<i>goes that then</i>
'How does it go?' |

Dutch, German and Swedish children introduce the *wh*-pronoun in the first position in a later acquisition step (Tracy 1994 for German, Santelmann 1995 for Swedish, van Kampen 1997 for Dutch). See the adult examples in (4), that appear later in the speech of the Dutch child.

- | | | | |
|-----|--|---|--|
| (4) | <i>Dutch</i> | <i>Swedish</i> | <i>German</i> |
| a. | Wat is dat?
<i>what is that</i>
'What is that?' | Vad är det?
<i>where is that</i>
'What is that?' | Was ist das?
<i>what is that</i>
'What is that?' |
| b. | Waar moet dat naartoe?
<i>where must that at</i>
'Where must that go?' | Var är den andra bilen?
<i>where is the other car</i>
'Where is the other car?' | Wo sitzt du?
<i>where sit you</i>
'Where do you sit?' |
| c. | Hoe gaat dit open?
<i>how goes this open</i>
'How does one open it?' | Hur öppnar man?
<i>how opens one</i>
'How does one open it?' | Wie geht das?
<i>how goes that</i>
'How does it work?' |

What causes the order preferences in child English (1) and child Dutch (3)? The acquisition difference cannot be due to a mere frequency difference in the input. All Dutch *wh*-questions start with a *wh*-element, as in English. I will argue that the difference in acquisition order can be explained as the solution to system-internal problems. Thereby, it will support my contention that grammar evolves

as a learnable non-biological construct. The order difference indicates that the acquisition device is attentive to the typological properties of the core grammar. The first question is how the child detects such typological properties, in the present case Dutch, as a V2 language, versus English, as a $SV_{fin}O$ language.

Let me formulate the kind of answer that I will develop. The child cannot attend to all data at once and she does not even try to. She applies a massive data reduction instead, and she subsequently builds a grammar for the residue only. That residue determines what new facts can be accommodated. The reduction procedure needs no innate, biologically pre-wired, knowledge. It is based on ignorance. Assuming that, a different acquisition path for *wh*-questions in English versus Dutch is still unexpected, since both languages have parallel constructions for their non-subject root questions. See the examples in (5):

- | | | | | | | | |
|-----|-----|-------|------|-----|--------------|----------------|----------------|
| (5) | a. | What | have | you | bought? | <i>English</i> | |
| | a'. | Wat | heb | je | gekocht? | <i>Dutch</i> | |
| | b. | Where | can | I | buy | a sandwich? | <i>English</i> |
| | b'. | Waar | kan | ik | een sandwich | kopen? | <i>Dutch</i> |

The constructions in (5) begin with a *wh*-phrase followed by an inversion of finite verb and subject. English and Dutch use the same shifts with the same categories. They move the *wh*-element to [Spec,CP] and the finite verb to C^0 .¹

- | | | |
|-----|----|-----------------------------------|
| (6) | a. | Move a <+wh> element to [Spec,CP] |
| | b. | Move a <+fin> element to C^0 |

Both languages get their root questions by the same two movement types. English, a 'residual V2' language, differs from other Germanic languages by allowing subject-verb inversion for a small group of functional verbs only (modal and auxiliary verbs, so-called 'Auxes'). The other Germanic languages ('regular V2') allow inversion for any finite verb, and moreover they allow it for questions as well as topicalizations. The subject-verb inversion indicates for both systems that the initial notion 'topic' turns into the notion 'subject'. 'Subject' is definable as a clause-internal argument in real grammar. It combines with a predicate category, whereas 'topic' is definable as a pragmatic distinction in proto-grammar. It prefers the initial position and names the aboutness of the utterance (cf. Krifka 2007). One would expect that the primary learners of non-English are better prepared than the learners of English to acquire *wh*-words and inversion. The examples presented in (1) and (3) show that this is not the case. Dutch, German, as well as Swedish children start to use V2 and subject inversion early, especially for modals and copulas, but they delay the introduction of *wh*-words. English children, by contrast, introduce *wh*-words early and rather delay the residual V2. Different primary systems (V2 Germanic, residual-V2 English) apparently invite different data-selections for *wh*-questions. This difference in acquisition paths between the two languages is intriguing, since the grammatical target forms themselves seem identical, cf. (5).

¹ English subject *wh*-questions are left out. A questioned subject does not move in English ('vacuous movement', Chomsky 1986: 48), and fits into the general $SV_{fin}O$ pattern.

1.3. The Longitudinal Picture

The claims about the different order of acquisition steps in English and Dutch are not based on impressions. For each acquisition step and each child one may construct a longitudinal graph. Once scattered data begin an irreversible rise towards the adult norm, the child gets the pattern. I will assume that the child has reached the acquisition point when the graph is around the 85–90% conform to the adult norm (Brown 1973: 305). I have constructed longitudinal graphs of the development of *wh*-pronouns and finite verb movement to C⁰ for American-English Sarah (Brown corpus) and for Dutch Sarah (van Kampen corpus). See Evers & van Kampen (2001: 23–28) for a detailed account of the data. The findings are based on the language development of two children, but the picture is confirmed by a longitudinal study of other children. The acquisition speed of children may differ, but the order of the steps is fixed and typologically determined. Typological features are simply those that are acquired first (van Kampen, in press).

English only applies a movement of the finite verb to the C-position in root questions for the restricted set of Auxes. This so-called ‘residual V2’ (Rizzi 1990) is acquired late. It obviously is a difficult thing to get and the children delay it until the second half of their third year, which is late in child language. By contrast, the English *wh*-pronoun appears one-and-a-half years earlier, which is early in child language. Even more important is the fact that the use of the *wh*-pronoun is instantaneous. There is no period in which the English learning child omits the *wh*-pronoun.² See Graph A in Figure 1.³

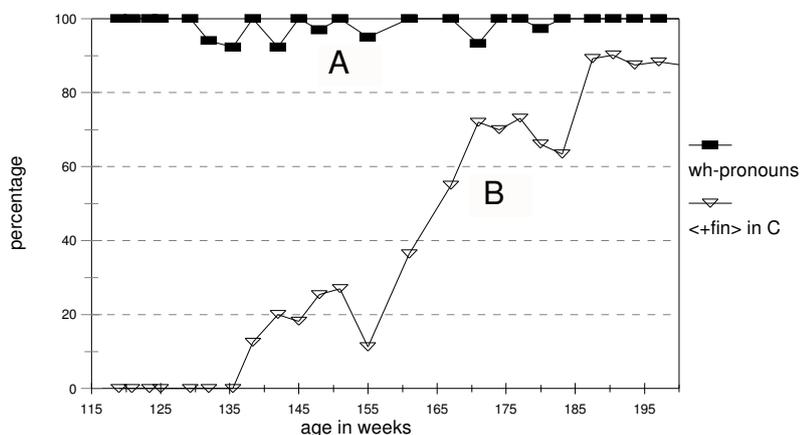


Figure 1: English: A<+wh> → B <+fin> in C⁰ (Sarah, Brown corpus)

Graph A <+wh> in front: at 2;3 (instantaneously)

Graph B <+fin/+aux> to C⁰: 2;3–3;7 (its rise takes more than a year)

² Graph A in Figure 1 shows that child English sometimes drops the *wh*-pronouns, but as an exception only.

³ Repetitions and imitations were left out.

The Dutch acquisition path is completely different. Since Dutch is a V2 language, the finite verb always moves to the C-position. The Dutch children begin with the V2 rule around their second birthday, and it may take them some 4–5 months to establish the V2 rule. During that half year, questions are posed by the child, but the use of *wh*-pronouns is avoided. It is only after the establishment of the V2 rule that the *wh*-pronouns come in. When the *wh*-pronouns come in, they are not acquired instantaneously. It takes again some 4–5 months for Dutch Sarah before all constituent questions appear with a *wh*-element. See the graphs in Figure 2.

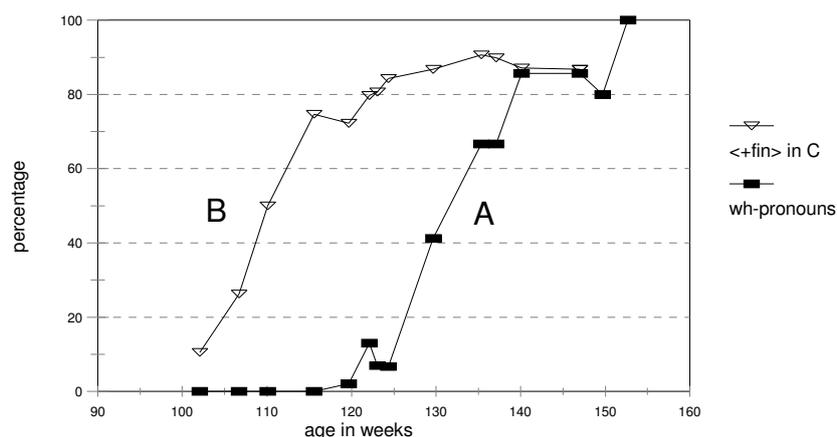


Figure 2: Dutch: B <+fin> in C⁰ → A <+wh> (Sarah, van Kampen corpus)

Graph B <+fin> to C⁰: between 2;0–2;5 (rise graph 4–5 months)

Graph A <+wh> fronted: between 2;0–2;8 (rise graph 4–5 months)

When comparing the instantaneous English graph A for *wh*-pronouns in Figure 1 and the developmental Dutch graph A for *wh*-pronouns in Figure 2, one may notice how outspoken the English/Dutch differences are. In a nice counter-balance see the graphs B for V<+fin> movement in Figure 1 and Figure 2. English residual V2 (graph B in Figure 1) is slow and delayed when compared to Dutch V2 (graph B in Figure 2). It takes American-English Sarah a full year. The acquisition of V2, graph B, for Dutch Sarah is around week 125. Shortly after that point, the Dutch graph for *wh*-pronouns begins to rise. The point I want to make here is the A/B acquisition order, not the timing differences between the two Sarahs. Some children make more headway in matters of grammar than others, but that is not interesting. The relevant point is elsewhere. The order of acquisition steps is the same for all children given a target language. That order betrays the child's decoding procedure.

The question why residual V2 is slow as compared to full V2 gets even sharper if one looks at the finite verbs that establish the V2 type in early child Dutch. These are all the very Auxes (modals, copula; and in addition for Dutch the aspectual *gaan* 'go') English applies residual V2 movement to. Dutch children start with finite denotational verbs only later (de Haan 1987; graphs from Evers & van Kampen 2001). Graph B in Figure 2 can therefore be refined as in Figure 3.

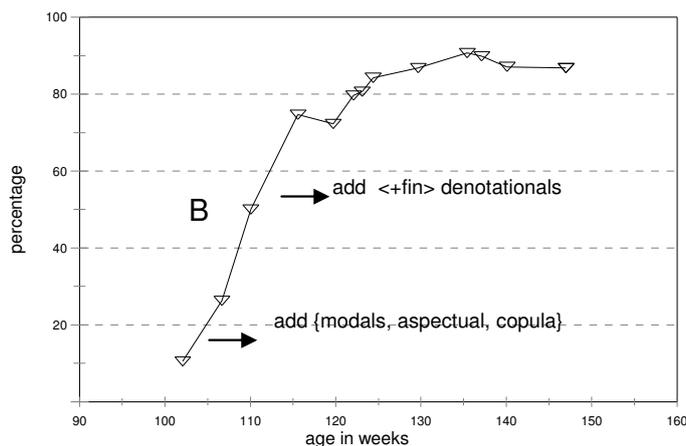


Figure 3: Dutch Sarah: Rise of <+fin> marked predicates in C⁰

The graph for Dutch in Figure 3 reflects <+fin> for early *wh*-questions, but also <+fin> for declaratives: (*papa*) *moet* *doen* '(daddy) must do', *k-ga* *even* *kleuren* ('I go just color' = I will color), *dit* *is* *beer* ('this is bear').

I will now argue that the English SV_{fin}O type leads child language towards a topic-oriented proto-grammar, whereas the Dutch V2 type leads towards a clause-operator proto-grammar. That difference in proto-grammar dictates the difference in the <+wh> acquisition order.

2. The Child's Strategy

2.1. Input Reduction

The central idea is that the child begins with a massive reduction of the input. It should be possible to predict the reduction stages given an adult target grammar. The learning strategy consists of constructing intermediate grammars that overcome the reduction in a stepwise fashion (cf. Dresher 1999 for phonology). The reductions are part of a decoding procedure: leave out temporarily all elements that you cannot sufficiently identify yet. Initially, the child starts with learning single word-signs. Subsequently, the child combines two words to binary structures. The initial strategy is formulated in (7).

- (7) *Input-Reduction Filter*
- a. Leave out all that you do not recognize.
 - b. Restrict yourself to single binary combinations of pragmatically interpretable items.

The input-reduction filter formulated in (7) is based on the grammatical ignorance of the acquisition procedure, not on innate knowledge that informs the acquisition procedure which material to leave out where. The child is now bound to leave out all grammatical markings as not interpretable. The residue then consists of words that are either (i) denotational words that are interpretable in

the pragmatic situation or (ii) pragmatic deictic and illocution elements, like demonstratives and modals. The first grammar arises when two pragmatically interpretable words are combined in a binary construct. This initial proto-grammar without grammatical markings or categories appears in the schema in (8) as G_0 . The target grammar appears as G_n . The acquisition series of intermediate grammars G_i elaborates on a corresponding picture in Chomsky (1975: 119f.).

$$(8) \quad G_0 \text{ ---- } G_i \Rightarrow G_{i+1} \text{ ---- } G_n$$

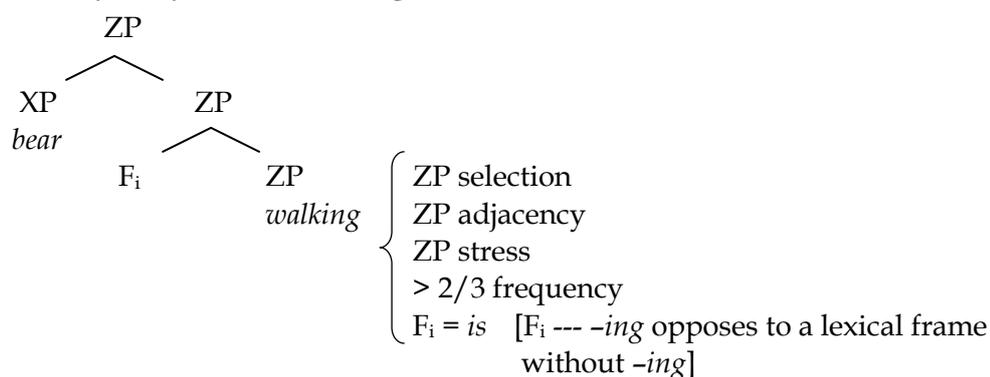
The transitions in the series are discrete. Each transition step adds a functional feature F_i and stores it as a property of a lexical item or a property of a category of lexical items. Longitudinal graphs show how an addition is optional first, becomes more frequent and then turns into a grammatical obligation. As long as the possible constructional contexts are still limited, no more than one single grammatical feature is learned at a time together with its distribution. This recapitulates the Single Value Constraint in formal learnability (Berwick & Weinberg 1984: 208, Berwick 1985: 108, Clark 1992: 90, Gibson & Wexler 1994). A more careful analysis of acquisition steps may show how certain grammatical features cannot be acquired before others have been established. To offer a trivial example, agreement on the finite verb cannot be acquired before the category <+D> has the features for person and number. See van Kampen (2005, 2006b) for quantitative support of this claim. The acquisition procedure re-traces a category-learnability hierarchy that is imposed by the system.

Each new acquisition step is a pattern recognition, defined an 'evidence frame' in (9) (Evers & van Kampen 2001, 2008). From a somewhat more abstract way of looking at the acquisition steps the language acquisition procedure needs two types of evidence frames in parallel with the generative devices 'Merge' and 'Move'.

- (9) a. Adding a new category/grammatical feature to a reduced pattern.
(Merge)
- b. Moving an additionally marked category within the reduced pattern.
(Move)

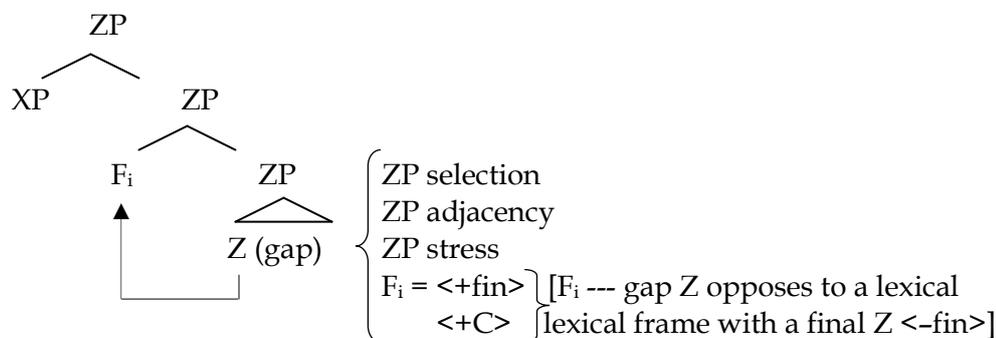
Hopefully, the acquisition procedure will only need these two types of maximally simple pattern-recognition ('treelets'; Fodor 1998, Sakas & Fodor 2001) to derive grammar from input. This is not meant as a procedure for rote-learning of grammatical distinctions. The cognitive distinction is recognized and then as such automatized as a grammatical reaction.

Adding a new category/grammatical feature F_i to a reduced pattern by Merge is illustrated in (10) for the English auxiliary *is*.

(10) *Treelet for <+fin>/<+aux> Merge*

The child must already have pragmatically understood that *walking* was about the “person *bear* actually moving around.” Adding the grammatical marking turns the ‘comment’ into a grammatically identifiable predicate. The grammatical marking (F_i) and its function is input identifiable. It need not be selected from an *a priori* set, but is acquired on ‘robust evidence’. The addition becomes obligatory when the evidence frame supports the feature for >65%. The rest {bear loves walking; bear walking along found the honey; etc.} is disregarded by the acquisition procedure.⁴

It is claimed here that the lexicon inspires the underlying structure (cf. Evers & van Kampen 2001, Tracy 2002, van Kampen, to appear). Due to the lexicon the learner returns to the original frame from which the new and perceived pattern can be derived.

(11) *Treelet for <+fin> head movement*

The reduction procedure then triggers the two steps in (12).

⁴ A discussion about the learnability of island effects in Pullum (1997) and Yang (2002: 112) mentions input data percentages of 1.2% versus 0.03%. Such percentages seem to me unfortunate. The amount of data that reaches the child’s eardrums is basically irrelevant. For example, the percentage supporting the Dutch V2 rule is near to 100% and the use of articles before nouns is perhaps 75%. Yet, the child manages to disregard all that evidence until she gets hold of the relevant evidence frames, respectively a frame for illocution marking (C⁰/V2) and a frame for argument marking (D⁰). Quantities of input data are relevant only if related to an evidence frame. For an alternative analysis of the island effects mentioned in Pullum (1997) and Yang (2002), see van Kampen & Evers (2006), Evers & van Kampen (2008). For an analysis along these lines of long *wh*-movement, see van Kampen (2009).

- (12) a. Reduction of the input yields a simplified binary basic set to get the elementary pattern for F_i .
 b. The reduced pattern highlights a minimal extension F_i that makes the pattern more 'adult', i.e. less reduced.

The minimal distinctions between the reduced pattern and the perceived one function as a data selection mechanism for the step towards F_i (see Berwick & Weinberg 1984: 208). This overcomes the notorious poverty of the stimulus.

Merge and Move treelets like (10) and (11) are given as pattern-recognition schemes. They are not necessarily grammar-specific. The recognition of a category F_i (grammatical feature) in a set of utterances is the truly innovating step. It need not come 'easy'. The merging of the new category also involves an abstract semantic function. These functions may be based on a few simple oppositions of tense, aspect and definiteness, at the same time they are abstract, language-specific and very hard to come by in second language acquisition later in life. Yet, further acquisition steps are blocked until the F_i has been incorporated. The amount of elementary input structures that are needed in the beginning may run into six digits of elementary acquisition opportunities (Hart & Risley 1995, van Kampen, in press). Binariness, recursion, headedness and locality of movement or the local reach of functional categories follow from the locality of the evidence frame. In section 2.2, I will show how binarity and recursive stacking may emerge in early child language.

In short, the input reductions do not yield some sloppy set of deficient forms. One may rather define them as stages in a procedure for systematic decoding. The system is designed for that kind of decoding for reasons of survival by learnability fitness. Let each acquisition step be equivalent to adding a grammatical feature F_i to the lexicon. That addition (morphological, syntactic and semantic) takes place within an elementary syntactic 'treelet' as in (10) and (11). Once the acquisition step has been made, the elementary treelet disappears and the grammar enriched lexicon remains (*contra* Construction Grammar).

- (13) The grammatical feature F_i infects a lexical item due to a repetitive local context that unites
- (i) a morpho-phonological form,
 - (ii) a binary syntactic context,
 - (iii) a semantic distinction.

The images of an acquisition 'treelet' infected by features are taken from Fodor (1998, 2001) and Roberts (2001). An important difference is that both these authors still assume that treelets/features are determined by innate factors, a line of reasoning not followed here. The early structures may demonstrate the relevant categories and their combinatorial rules in minimal treelets. A subsequent rapid expansion into more complex patterns need no longer be based on additional categorial properties or new combinatorial rules. Complex constructions may simply emerge from re-combinations of already established categories and rules. If so, discussions about the learnability of grammar can be restricted to a basic set of early acquisition steps. These may reconstruct the categories with

their minimal combination properties and add them to the items in the lexicon. Once the basic category configurations are acquired and stacked in the lexicon, further complexity effects are implied rather than being learned or innate. Such properties in grammar need therefore not be innate in the sense of organs like the eye or the ear. Typological properties are at first simple solutions selected in history for their learnability, and as such they appear unambiguously in the input, given the input reduction filter. See van Kampen (2009) for an analysis that derives long *wh*-movement and island constraints from elementary steps that have a minimalist orientation.

In the remaining of this article, I will show the plausibility of the present approach by a longitudinal picture of *wh*-question formation in the speech of Dutch Sarah and American-English Sarah. The acquisition model presented here is empirically supported by the stepwise acquisition as shown in the child data. The advantage over the approach taken in Fodor (1998, 2001) and Roberts (2001) is then twofold. The treelets as assumed here are not innate but input-derived, and they force predictions about the order of acquisition steps.

2.2. Proto-Grammar

The binary constructions by which children start their grammatical career in Dutch and in English are different due to corresponding differences from the typologically different inputs (V2 and SV_{fin}O). The first maximal reductions to binary types show a denotational that characterizes the situation while being supported and preceded either by a topic name, or by an illocution operator. These reductions may be analyzed as a kind of topic adorned comment or an operator adorned comment, see (14). The combination of a comment with an operator or a topic has again the pragmatic status of a 'comment', that is, a simplex or binary characterization of the situation at hand.

(14)

	comment<+topic>		comment<+operator>		
	topic	comment	operator	comment	
English SV _{fin} O	<i>daddy</i>	<i>do</i>	<i>wanna</i>	<i>bear</i>	
	<i>door</i>	<i>open</i>	-----		
	<i>rabbit</i>	<i>on</i>			
Dutch V2	<i>papa</i>	<i>doen</i>	<i>wil</i>	<i>beer</i>	'wanna bear'
	<i>deur</i>	<i>open</i>	<i>kannie</i>	<i>dicht</i>	'cannot close'
	<i>nijntje</i>	<i>op</i>	<i>is/zit</i>	<i>op</i>	'is on'
			<i>moet</i>	<i>doen</i>	'must do'
			<i>magwel</i>	<i>kleuren</i>	'may color'

The comment is some denotational characterization of the situation whether adorned by a topic or an operator or not. The operator may be defined as a standard addition for an illocutive orientation (*wil* wish, *moet* requirement, *kannie* denial, *is/zit* statement, *magwel* permission; see van Kampen 2005). The

topic may be defined as a standard addition for an aboutness orientation. The grammatical development sets in when the comment begins to require a topic or an operator of a certain kind. This is modeled by the context features added in (14) to 'comment'. The relation between the two elements in the binary construction is pragmatic and need not be different from the relation between utterances of two single words in a discourse. That pragmatic relation may develop into a standardized grammatical one, when the properties mentioned in (13) become obligatory and define the combination as a phrase (projection of grammatical features). In this way, recursion (applying words to words and phrases) emerges naturally.

The difference between $SV_{fin}O$ and V2 input reduction causes that $SV_{fin}O$ child English tends to begin all declaratives with a subject, that is, the topic. Dutch *may* begin a declarative with a topic/subject, but it need not do so. Questions and declaratives may as well start with a finite modal-like verb. Remember that before the acquisition point of V2 (week 125) the finite verbs are not yet denotionals, compare the graph in Figure 3. Therefore, they may be classified as modal 'illocution operators' in child language. This 'format' is typical for V2 languages. It sets the stage for the later (syntactic) clause-typing property of V2. The illocution operators will not become finite verbs until after the acquisition of V2, that is, the rise of an elementary lexical paradigm based on the $\langle \pm fin \rangle$ distinction for a set of items, the prospective verbs. See Evers & van Kampen (2008) and van Kampen (in press).

The topic/subject in early child Dutch declaratives is far less likely (28%) to appear in clause-initial position than the operator/ $V\langle +fin \rangle$ (72%).⁵ Sarah's score for declaratives in weeks 110–125 is listed in (15) (from van Kampen, in press). Week 125 is the acquisition point of V2 for Dutch Sarah. The high amount (51%) of subject/topic-less utterances (15c) is due to the modals that appear as subject-implied factors (van Kampen 2006a).⁶ See also Yang (2002: 107) who reports 40–50% V_{fin} -initial sentences in the speech of the child Hein.

⁵ Strictly speaking, the topic from proto-grammar can be reinterpreted as subject only after it is obligatorily present and after its position and its case and ϕ -features become predictable given the comment. The systematic relevance of case and ϕ -features appears after week 145 for Dutch Sarah with the acquisition of D^0 . See graph D in Figure 6 (van Kampen, in press). Early child language turns thereby into later child language. All pragmatic (situation-oriented) categories are replaced by syntactic (clause-internal definable) categories. I propose that the child arrives at that stage when all lexical items are appropriately marked as $\{\langle \pm C \rangle, \langle \pm I \rangle, \langle \pm V \rangle, \langle \pm D \rangle, \langle \pm N \rangle\}$.

⁶ One reviewer suggests that the (72%) child Dutch V1 utterances (15b–c) are caused by topic-drop, i.e. the dropping of a topic in [Spec,CP], a possibility in adult Dutch. I would rather argue that topic-drop is a discourse-related phenomenon that can only develop with the acquisition of $\langle +D \rangle$ /argument structure and crucially after the acquisition of V2, not before. See for the theoretical and empirical arguments that early child Dutch do not exhibit topic-drop but mode-implied subjects, van Kampen (2006a). See also Yang (2002: 107, fn. 6).

- (15) *Dutch Sarah week 110 till 125 ('acquisition point' V2)*
 (relative % of all declarative V<+fin> sentences; out of 595)

a. Subject-V<+fin>	28%	clause-initial <i>topic</i> : 28%
b. V<+fin>-Subject	21%	clause-initial <i>operator</i> : 72%
c. V<+fin> (no subject)	51%	

The attention to the modal illocution operator is supported by the maternal input. More than half of the declaratives of the Dutch input (52%) do not start with a subject topic. The percentages in (16) show the prominence of subject-finite verb inversion in speech of (Dutch) Sarah's mother (from van Kampen, in press).⁷

- (16) *Adult Dutch ±subject-initial clauses*

Subject +V<+fin> ([Spec,CP] = subject)	257	48%		
Non-subject+V<+fin>+subject ([Spec,CP] = non-subject)	162	30%		
V<+fin>+subject (no/empty [Spec,CP])	97	18%	4%	topic-drop
			14%	narrative inversion
V<+fin> (no subject)	21	4%		

English children, by contrast, pay more attention to the topic+comment types. (Almost) all declaratives brought in by English Sarah's mother are subject-initial and even 63% of her (real) *yes/no*-questions had no subject-Aux inversions at all. They were simply statement frames with a question intonation.⁸

This will soon determine the further development. Typological factors derived from input take effect as (non-biological) determinants for the evolution of grammar.

Both elements in the front-field, topic and operator, are optional in proto-grammar. The presence of the comment is in principle obligatory. The topic and

⁷ Another reviewer remarks that Lightfoot (1999: 153) reports a high percentage (70%) of sentence-initial subjects in adult Dutch. The percentages in (16) then seem to contradict the ones in Lightfoot (1993/1995: 42, 1999: 153). Citing Gerritsen (1984: 110), Lightfoot (1993/1995: 42) states that V2 languages show some 60% subject+V_{fin} order in conversational speech. For unstated reasons, this percentage has risen to 70% in Lightfoot (1999). Gerritsen (1984: 110), though, citing Jansen (1978, 1981), reports about 40% non-subject+V_{fin} order. Note that this is not the same as Lightfoot's statement, witness my table (16) that includes also clause-initial V_{fin} (cf. Yang 2002: 107). However, suppose Lightfoot has good reasons to (silently) leave out the constructions with V_{fin}-initial, then his 60%/40% matches the percentages in my count in (16). These percentages are 48% subject+V_{fin} versus 30% non-subject+V_{fin}, which comes to a ratio of 48/78 = 62% versus 30/78 = 38%.

⁸ I counted 209 *yes/no*-questions for English Sarah's mother in the files 11-26. Only 77 of them (37%) had an Aux in C⁰. Only 'real' *yes/no*-questions, i.e. questions that asked for a confirmation or a denial, were counted.

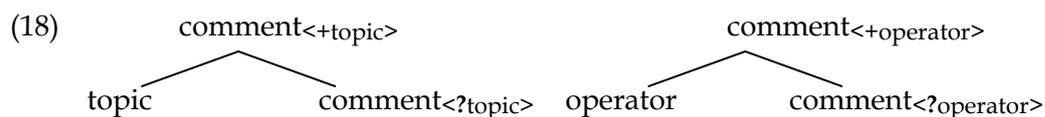
operator are word-status elements (no clitics or affixes) and they are added to a denotational comment.⁹ Proto-grammar for both language types shows de facto (mainly) a single front field element, either a single topic or a single operator. The topic may be informally characterized as a word with a pragmatic aboutness function. It defines what the binary combination is about. The operator may be informally characterized as a word that signals a pragmatic illocution.

(17) Optional front field

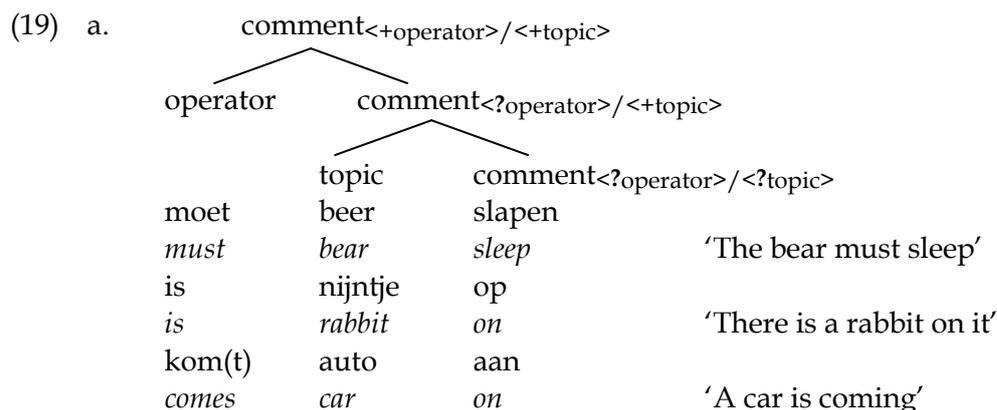
<i>single topic</i>	<i>single operator</i>
function: aboutness	function: illocution (wish, permission, etc.)
type: name	type: designated constant

The distinction between unadorned and adorned 'comment' evolves into a new system when topic and operator become obligatory in discourse-free statements (the non-answer statements).¹⁰

The either single topic or single operator for a comment can be modeled as in (18).

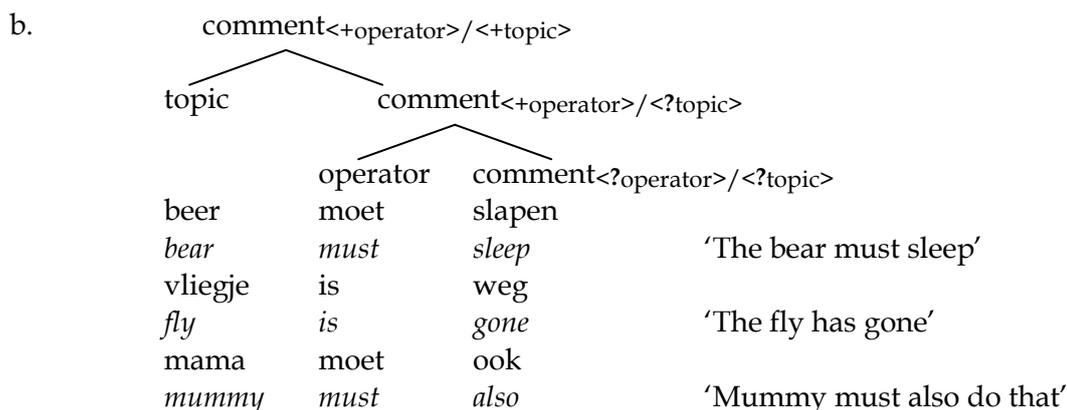


The comment label continues to be a denotational characterization of the situation when the grammar is extended to three-word combinations. A set of three member utterances that appear in early child Dutch can be seen as rearrangement of the label 'comment' as in (19). The examples are from Sarah before week 122. The structures (19a) and (19b) are semantically equivalent options.



⁹ Clitics and affixes are acquired due to a re-analysis that will take place only after the full-sized variants of the construction have been analyzed and acquired first (van Kampen 2001).

¹⁰ Thanks to Marcel den Dikken for pointing this out to me.



The binary structure from (14)/(18) is maintained in (19). Either an operator is added to a topic-comment structure as in (19a), or a topic is added to an operator-comment structure as in (19b). The sustained binarity for recursive stacking (‘asymmetric Merge’; Chomsky 1995) of comment structures need not be considered as a grammar-specific constraint, something given as a grammatical *a priori*. Binarity simply makes use of parts that were already known as analyzable. This ‘evolutionary’ economy continues to operate and establishes binarity as a general frame preferred for grammar. A triple non-stacking tree is less likely to survive in daily use as it is not supported by previous steps whereas stacking by binarity branching is.

For example, in the vein of Categorical Grammar, if *dog* is identified as <+N> (can be used as a topic-name) and if the article *the* is identified as ‘followed by <+N>’, then a later appearing [*angry dog*] must be <+N> in *the* [*angry dog*]_N where *angry* is <-N> (not a topic-name) and hence [*dog*]_N the head of the phrase *the* [[*angry*]_{-N} *dog*]_{+N}. The recursion in *the* [*angry* [*dark-haired dog*]] follows logically if the rule N → A+N is repeatedly applied Merge/residuation. The binarity of the system was first a practical start and developed from there into a dominating property of the system. As such it is not necessarily an innate property of grammar, but rather a self-reinforcing tendency of the naïve acquisition procedure. A learner may have acquired the small phrase [$\beta+\gamma$]. When confronted with larger constructs, say [$\alpha+\beta+\gamma$], there will be an immediate preference to hold on to the previous result [$\beta+\gamma$]. That favors the binary analysis [$\alpha+[\beta+\gamma]$]. The pressure of such a learnability preference may in the long run impose on grammars the binarity principle. In general, let grammatical structures have the option to be (i) binary branching as well as multiple branching, (ii) headed as well as non-headed, (iii) locally conditioned as well as non-locally (globally) conditioned. Then, in the long evolutionary run, the restricted system is likely to win the learnability competition.

I see no clear arguments to consider binarity, headedness and recursion as grammatical properties that could not emerge naturally. When a pre-grammatical language would consist of single word utterances, as in very early child language, the relation between such utterances must be a matter of pragmatic understanding. Under frequent use, that pragmatic understanding might standardize to a set of fixed relations that can be supported by a grammatical form of order, inflection or an additional functional word.

The re-combinations in (19) maintain the restrictions known from (14)/(18) that utterances allow a single operator and a single topic only. Later on this type of additions and local feature control will expand in respectively '(semi-) auxiliary cartographies' and multiple argument structures. Yet, at this moment in early Dutch child language the utterances are analyzable in as far as they restrict themselves to a single operator for 'is an illocutionary unit'. That single illocution operator is the later finite verb in first or second position.

2.3. *Wh-question Formation*

Here I come to my central point. Relevant is not the mere frequency of the *wh*-construction, but the way it fits into the current child grammar G_i . The operator context of early Dutch adds a general operator (the later finite verb) to all illocutional utterances, declaratives and questions alike. An additional $\langle +wh \rangle$ operator requires operator stacking and is not particularly welcome. The $\langle +wh \rangle$ element is systematically present in the adult input (99.5%), but systematically disregarded in the Dutch proto-grammar, see (20).¹¹

¹¹ Adult Dutch may drop the *wh*-pronoun, but does so only rarely. I counted in the speech of Dutch Sarah's mother (files 09-23; child's weeks 107-146) 10 examples out of 674 *wh*-questions, of which 6 were direct imitations of Sarah's *wh*-drop questions. The 4 remaining examples were of the type in (i). The huge percentage of *wh*-drop before the acquisition of V2 in the speech of Sarah (98/108 = 91%) is at odds with the rarity of *wh*-drop in the input (4/668 = 0.5%).

- (i) Ø ben je nou aan (he)t doen allemaal, Sarah? (file 13, Sarah week 122)
 are you now on the do all Sarah?
 'What are you doing 'then', Sarah?

This type of *wh*-question modulates the impact of the demand expressed by the question. The use of the sentence adverbial *nou* expresses the speaker emotional state (surprise, irritation, disbelief, etc.) vis-à-vis the interlocutor's behavior. It is the only context in which the *wh*-pronoun is sometimes dropped in adult Dutch.

A peculiarity of this type of question is the (almost obligatory) use of *nou*. There are parallels for this in the other Germanic V2 languages. Child Dutch also uses the sentence adverbial, but without the emotive intention which is beyond the child's pragmatic ('theory of mind') understanding. *Nou* is overused in child Dutch to make the predicate of questions when the $\langle +wh \rangle$ operator is blocked. It reduces to the adult norm when the *wh*-element is introduced. For the overuse and disappearance of *nou* in child Dutch, see van Kampen (1997: 78f.).

(20) *Dutch proto-grammar: General illocution operator*

comment<+operator>/<+topic>			
operator		comment<?operator>/<+topic>	
illocution	topic	comment<?operator>/<?topic>	
gaat	pappa	nou doen?	
goes	daddy	now do?	'What is daddy doing?'
zit	vogeltje	op?	
sits	birdie	on?	'What is the bird sitting on?'
ga	jj	nou toe?	
go	you	now to?	'Where are you going?'
moet	dat	nou in?	
must	that	now in?	'Where must that go?'
komt		daar nou aan?	
comes		there now on?	'Who is coming over there?'

Dutch proto-grammar disregards <+wh> operators because its standard utterance prefers a single sentence-typing operator, the later V2 finite verb. As we have seen in (15), 72% of the <+fin>/operator elements in early child Dutch declaratives are clause-initial.

The English proto-grammar is different. It does not introduce the general clause-initial illocution operator. For that reason, it allows the <+wh> illocution operator as a question-specific device, see (21).¹²

(21) *English proto-grammar: <+wh> operator*

comment<+operator>/<+topic>			
operator		comment<?operator>/<+topic>	
<+wh>	topic	comment<?operator>/<?topic>	
what	daddy	doing	
where	daddy?		
what		doing?	
where	you	going?	

English proto-grammar allows <+wh> elements as lexically restricted operators in stereotype questions (*where - go?*; *what - doing?*).¹³ English proto-

¹² The 'wanna' construction mentioned in (14) is a 'wanna' pattern, rather than a pattern for modals in general. Next to the modal illocution operator that develops into sentence-typing operator in V2 Dutch, there are other operators in early child language. One may think of deictic operators (*dit/is beer* 'this/is bear', see Evers & van Kampen 2008: 490) or operators for negation (van Kampen 2007). Thanks to an anonymous reviewer for pointing this out to me. The present article focuses on the property of the sentence-typing operator in V2 languages.

¹³ See also Radford (1990) for an analysis of early *wh*-questions in English as stereotypes. Note also that complex *wh*-phrases (*which N*, *what N*) do not occur until much later.

grammar allows the $\langle +wh \rangle$ operator because its standard utterance does not have a sentence-typing operator. The Auxes in English regularly mark the predicate that follow the topic/subject. Therefore, English proto-grammar cannot immediately fit in the residual V2 Auxes. Residual V2 left of the topic/subject is disregarded by the child as an anomalous case of inversion. This is reflected in the successive graphs in Figure 4. The first graph, graph C, depicts the rise of Auxes in declaratives (*I can see daddy*). The succeeding graph, graph B2, depicts the rise of inverted Auxes in yes-no questions (*Can you see daddy?*). It shows that the (non-inverted) Auxes in I^0 are identified before the (inverted) Auxes in C^0 . Aux-subject inversion is obviously harder to acquire. See Evers & van Kampen (2001) for a detailed account of the data selection.

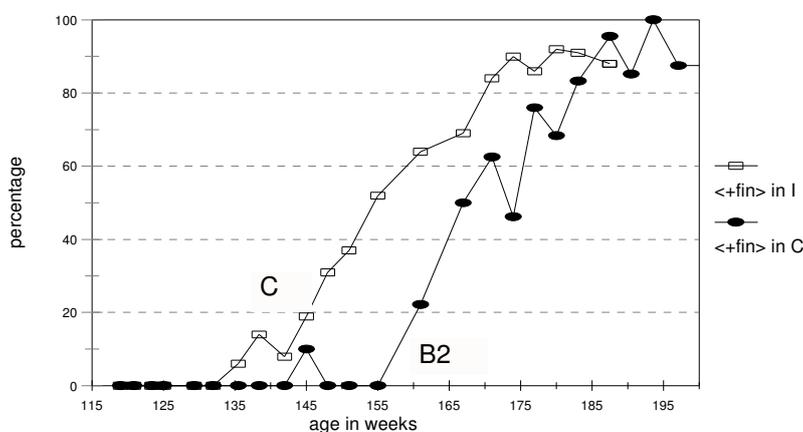


Figure 4: English Sarah: Graph C: $\langle +fin \rangle / \langle +aux \rangle$ in I^0 (declaratives)
Graph B2: $\langle +fin \rangle / \langle +aux \rangle$ in C^0 in *yes/no*-questions

Graph B2 represents residual V2 in *yes/no*-questions. The graph that establishes the residual V2 for American-English Sarah, graph B in Figure 1, generalizes over *wh*-questions and *yes/no* questions. Graph B in Figure 1 shows how it took American-English Sarah a full year to get the residual V2 in all questions. This extended period of hesitation must partly be due to the cliticized forms of copula, modal and auxiliary verbs in English *wh*-questions. In the speech of English Sarah's mother, two-third (77%) of the auxiliaries and modals were cliticized to the *wh*-pronoun.¹⁴ See some examples in (22).

- (22) a. What'd [: what did] he say ?
 b. What's your doggie's name ?
 c. Where's the little doggie ?
 d. Whyn't [: why don't] you go play with Bobo?
 e. What's the boy sitting on?
 f. Who's Daddy got ?

¹⁴ I counted the *wh*-questions in the files 1-17, Sarah's weeks 118-133, just before the rise of the $\langle +fin \rangle$ graph (graph B in Figure 1). In these 17 files, Sarah's mother used 493 *wh*-questions. Of these 493 *wh*-questions, 380 (77%) had an Aux cliticized on the *wh*-element.

This stands in opposition to V2 Dutch. The Dutch modals and auxiliaries are explicitly present in the input as clause-initial operators. The copula/auxiliary *is* may be cliticized in Dutch, but most of the time the full form is used. A count of the copula and auxiliary *is* in CHILDES showed 70% cliticization in adult English (Brown corpus) versus 6% in adult Dutch (Groningen corpus and van Kampen corpus). See the table in (23).

(23) *Adult input of cliticized and full copula/auxiliary is*

	total <i>is</i> and 's	full <i>is</i>	clitic 's	
Dutch (all files Groningen + van Kampen corpus)	29,606	27,872	1,734	6%
American-English (all files Brown corpus)	16,263	4,926	11,337	70%

One may assume that cliticized forms, i.e. the auxiliaries in English, will not trigger anything until the non-cliticized forms have been acquired and the re-analysis of the cliticized forms becomes possible (cf. Radford 1990, van Kampen 2001). This becomes clear when one splits up graph B from Figure 1 in a graph B1 and B2, as in Figure 5. Graph B1 represents the residual V2 for *wh*-questions. Graph B2 repeats the residual V2 for yes-no questions in Figure 4.

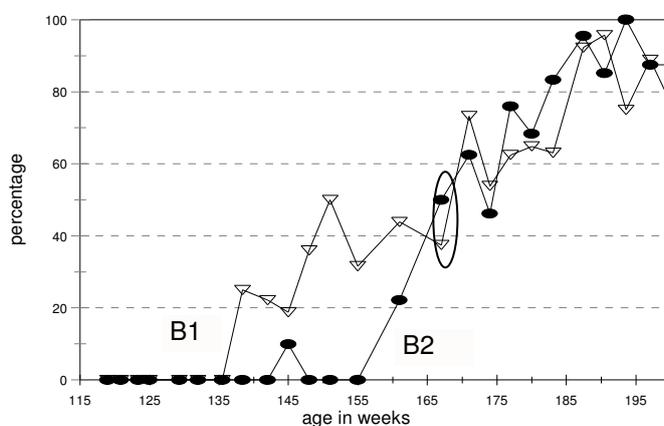


Figure 5: English Sarah: B1: <+fin>/<+aux> in C° in *wh*-questions

B2: <+fin>/<+aux> in C° in yes-no questions

The two graphs more or less coincide from the encircled point at week 167 on. Before that point graph B1 already has set in quite high. This might be due to the fact that the contracted form has not yet been identified as a cliticized 'Aux'. The contracted forms in the English *wh*-questions do not become analyzable before the auxiliary, copula and modal verbs have been acquired separately in *yes/no*-questions. The respective graphs then join at week 167 the general

development in B2 that might be characterized 'residual V2'. After week 167 the acquisition of <+fin> in C⁰ follows a uniform development.

In sum, although the *wh*-elements are clearly and explicitly present in the English and in the Dutch input alike, the 'single operator' restriction causes the disregard of the <+wh> operator in Dutch proto-grammar. The type of proto-grammar creates a selective environment for certain acquisition steps only. As long as <+wh> functions as a question operator, it can be added in child English proto-grammar, but not in child Dutch. English proto-grammar will not select <+fin> Auxes in *wh*-questions, because they are not generally present in the input as clause-initial operators as they are in V2 Dutch.

2.4. Real Grammar

The acquisition difference between the *wh*-elements in English and Dutch has been derived from a difference in their proto-grammar. There appeared a topic-oriented proto-grammar from the English SV_{fin}O input versus an operator-oriented proto-grammar from the Dutch V2 input. Proto-grammar is the first attempt of the acquisition procedure. Its parts (comment, operator, topic) have an immediate pragmatic function for the utterance as a whole. The first non-pragmatic categories that emerge in Dutch are V<+fin>/V<-fin>. In adult Dutch, one third of the <+fin> operator elements (input tokens in CHILDES corpus) are variants of denotational comment elements and two third of the <+fin> operator elements (input tokens in CHILDES corpus) have a non-denotational background (auxiliaries, copulas, aspectuals, modals). The graph in Figure 3, repeated here as Figure 6, shows how the operator-marking in child Dutch rises. The amount of operator types (copula, aspectual, modals) rises as well.

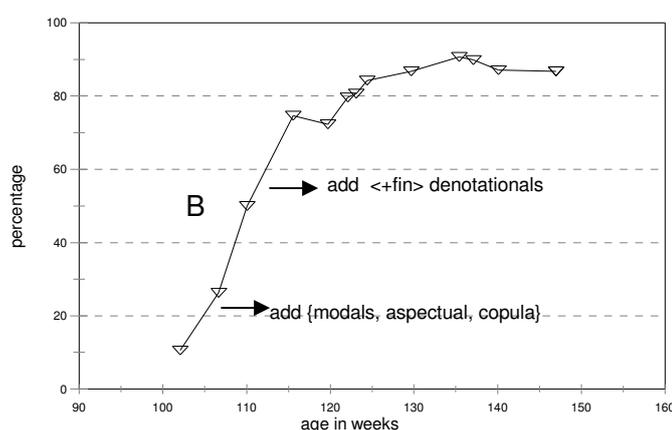


Figure 6: Dutch Sarah: Rise of <+fin> marked predicates

At a certain moment, indicated in the graph, the amount of operator types rises by the use of denotational forms with <+fin>-marking, that is, *beer slaapt ook* 'bear sleeps too', *ik heb snoepje* 'I have candy'. This allows a reinterpretation for the categorial status of lexical items that are involved. All elements that are

marked as <+fin> are part of a morphological <+fin> (operator)/<-fin> (final comment element). The paradigm defines the category <+V>. The <+fin> defines the notion ‘illocution operator’ (see Evers & van Kampen 2008 for discussion). Now, sentence operators tend to get interpreted as <+V, +fin>. The <+fin>-marking turns the <+V> in V2 Dutch into a sentential operator. The <+V> elements can be combined with topics/subjects and complements (direct, indirect, prepositional objects). The same type of elements (topic names/nouns) can be used in all these positions. The name-like elements tend to be marked by the same functional element (article or article-like form), which, due to its frequency in the input, can be picked up by the child. At the moment that the V2 <+fin> graph in Figure 6 passes the acquisition point at week 125, the <+V> associated topic/subjects and complements (direct, indirect, prepositional objects) begin to be marked by the articles or article-like elements. In this way, the category <+V> gives rise to argument structure frames that are to be stored in the lexicon as well. The names used in the argument positions give rise to the article-like category <+D>. See the rise of articles in the speech of Sarah in Figure 7. The interesting point is that the graph for determiners D<-pro> (articles), and the graph for free anaphoric pronouns (3rd person pronouns) D<+pro> coincide with the graph for D<+wh> (*wh*-pronouns), graph A in Figure 2. For Dutch Sarah, these three graphs reach the acquisition point around the age of 2;9 (week 145). The diagram in Figure 7 compares the acquisition of question pronouns (graph A) with the acquisition of articles (graph D).

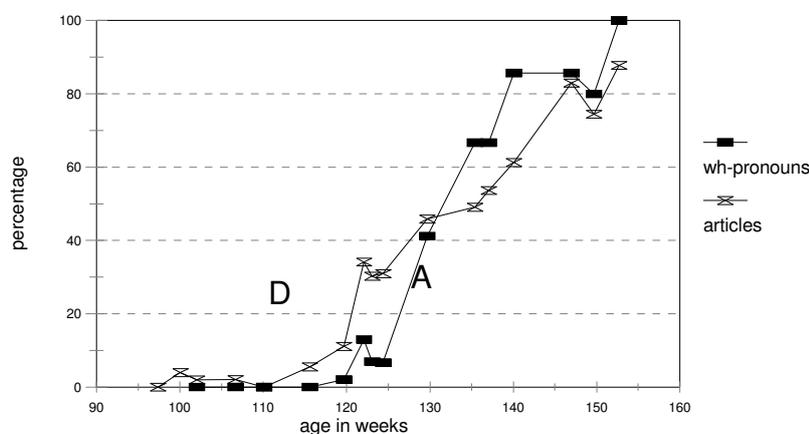


Figure 7: Dutch Sarah: Graph A: D<+pro, +wh> (question pronouns)
Graph D: D<-pro, -wh> (articles)

The diagram in Figure 8 compares the acquisition of question pronouns (graph A again) with the acquisition of 3rd person pronouns (graph C).

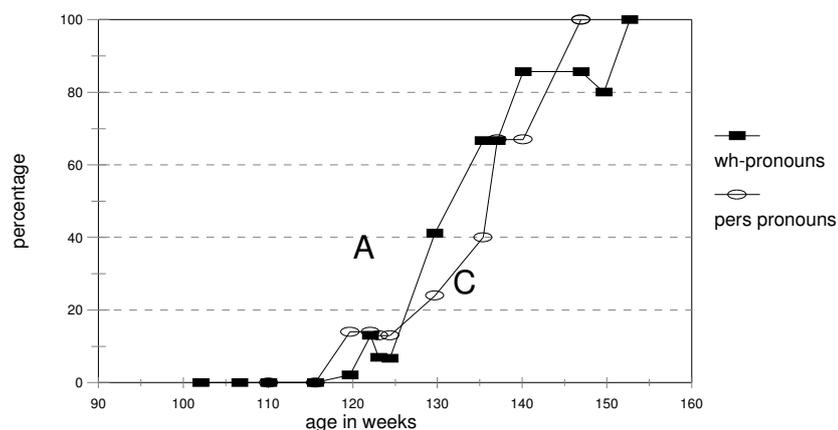


Figure 8: Dutch Sarah: Graph A: D<+pro, +wh> (question pronouns)
Graph C: D< +pro, -wh> (3rd person pronouns)

All these graphs for Dutch Sarah nearly coincide. They represent a more abstract phenomenon, the grammatical marking of discourse reference and clausal argument structure by the category <+D>. Just after the acquisition of V2 (at week 125), the use of the variant <+D> elements before names/nouns begins to rise. Argument structure gets established, once the predicate containing that structure has been shaped by a grammatical marking <+fin>. Predication (C⁰/I⁰) precedes reference (D⁰). It takes the period between 2;4–2;9 (week 120–145) for Dutch Sarah’s articles to reach the adult norm. The *wh*-element is a <+D> element too. The acquisition of Move <+wh> to [Spec,CP] takes place as soon as <+wh> is identified as a <+D> (determiner) in front of NPs. Reinterpreted as a D<+wh>, the <+wh> gets access to the clause-initial position. See some examples of <±wh> preposing in the speech of Sarah before and after the acquisition point at 2;9 (week 145).

- (24) <+wh> preposing (wh-movement) Dutch
- a. Wat doet de beer? (Sarah 2;5, week 127)
what does the bear
 ‘What is the bear doing?’
- b. Welke wil je boekje? (Sarah 2;9, week 144)
which want you booklet
 ‘Which booklet do you want?’
- c. Welk boekje hebben we allemaal? (Sarah 3;4, week 174)
which booklet have we all
 ‘Which booklet do we all have?’

- (25) <-wh> *preposing (topicalization)* *Dutch*
- a. Die bewaar ik ook. (Sarah 2;6, week 130)
that keep I too
 'I will keep that one too.'
- b. De prinses is hele groot. (Sarah 2;7, week 135)
the princess is very big
 'The princess is very big.'
- c. De klitten probeer ik eruit te halen. (Sarah 3;1, week 163)
the tangles try I out to get
 'I try to remove the tangles.'

I expect a parallel development for the grammar of English. The category <+V> can be acquired due to the aspectual opposition <±-ing> and the associated use of auxiliaries and modals in I⁰, cf. the treelet in (10). Once the category <+V> has been established, argument structure can be acquired and get stored in the lexicon (as V⁰-DP frames and V⁰-PP frames). The <±wh> operators are subsequently reanalyzed as preposed DP arguments. English grammar still has to add the residual V2 for root questions thereafter, reanalyzing a bunch of cliticized 'Aux'-constructions. The most important point, though, is the acquisition of the English D⁰ articles. Probably, I can maintain my thesis that the acquisition of <+D> is a matter of acquiring argument structure after the acquisition of I⁰/V⁰.¹⁵

In sum, the Dutch/English difference in the acquisition of *wh*-questions is due to a difference in binary proto-grammar. Early child language turns into late child language by the three successive steps in (26).

¹⁵ The English <±definite> article opposition *the/a* can be construed as following the I⁰ graph, i.e. graph C in Figure 4. Yet, Sarah Brown, as well as other English acquisition children, shows a remarkable use of the element *my* well before the acquisition of I⁰, i.e. *my bear*, *my go*, *my nice*, etc.. The element *my* stands for a variety of functions in child English, first person possessor (D⁰) marking being one of them (e.g., *see my doggie*). One might argue that the use of *my* in early child language is situation-bound like the demonstrative *die* in Dutch proto-grammar. See van Kampen & Zondervan (2005) for an analysis of *my* by Adam (Brown corpus).

(26) *Successive acquisition steps*a. *Proto-grammar*

Dutch (V2)	English (SV _{fin} O-residual V2)
<ul style="list-style-type: none"> • fixed operator initials (modals) learned in declaratives • <+wh> operator blocked 	<ul style="list-style-type: none"> • fixed topic initials learned in declaratives • <+wh> operator possible

b. *Predicate marking*

Dutch (V2)	English (SV _{fin} O-residual V2)
<ul style="list-style-type: none"> • <+fin> marking in C⁰ • category <+V> 	<ul style="list-style-type: none"> • <+ -ing> marking in I⁰ • category <+V>

c. *Argument marking*

Dutch (V2)	English (SV _{fin} O-residual V2)
<ul style="list-style-type: none"> • argument structure <+D> marking • category <+N> • D<+wh> and move <i>wh</i> as argument reordering 	<ul style="list-style-type: none"> • argument structure <+D> marking • category <+N> • D<+wh> and move <i>wh</i> as argument reordering

In acquisition step (26c) both grammars prepose the <+wh> argument in the initial C⁰ projection. The Dutch/English difference in <+wh> acquisition is a short-lived phenomenon of early child language that does not survive. Nevertheless, it demonstrates how fairly universal categories and redistributions are acquired from reduced stages of the language type. The order of acquisition steps supports the (minimalist) ideas that the grammatical patterns follow from input and general cognitive abilities. Indications for a biological pre-wired program fall away when it turns out that prospective universals like <+V>, <+N> and “move to C⁰” are rather defined by and (non-biologically) derived from highly frequent language-specific hints in the input.¹⁶

Nobody will deny that languages are learned from parental input. Yet, the abstract nature of grammatical categories and their complex interaction in the

¹⁶ One reviewer remarks that Dutch children start their two-word phase with infinitival OV predicates and that these OV predicates mark the development of argument structure at an earlier stage than suggested here. Note, though, that the learnability issue is not helped with the assertion that all categorial distinctions are a given *a priori* (Pinker 1984). Within the present learnability context, no category has been acquired when there is no formal context yet. Early child utterances like *boekje lezen* (‘read booklet’) result from input reduction. The reduction patterns will satisfy the order in the input, but cannot be analyzed by the child with grammatical notions like object, verb and predicate before V2 has been acquired. All early ‘theta assignments’, like *boekje lezen*, are probably stereotype lexical associations, as already observed by Lebeaux (1988: 13). For a more detailed analysis of the OV problem, see Evers & van Kampen (2008).

adult language made it questionable that the system could be learned by toddlers. The present proposal nevertheless contends that the early learner reduces the input to small elementary constructions from which the various factors are identified and acquired. No reliance on biologically pre-wired forms of grammar needs to be assumed.

Proof that acquisition took place was based on the child's productions. Comprehension by children is undoubtedly more advanced, due to pragmatic orientation. Yet, grammatical competence is unambiguously present in production which for that reason is a better diagnostic for the system-inherent order of the acquisition steps. The point of interest here is not how early children may 'understand something', but how the order of acquisition steps is imposed by the grammatical system itself, given the child's acquisition strategy.

3. Biological Construct or Cultural Construct?¹⁷

3.1. *The Acquisition Model*

In a sense, the less one expects from an acquisition model of language, the more features of grammar one is likely to postulate as innate. Innate features need not be acquired. Somehow, they have already drifted in by neural evolution. By contrast, the present acquisition model sets a focus on the learnability of grammar. It needs no more than two elementary acquisition steps, one for a Merge pattern and one for a Move pattern. Highly abstract properties of grammar are subsequently derived from reduced input sentences. To the extent that this can be maintained, the acquisition model implies that the neural structures for grammar must have been acquired by learning, rather than being a pre-wired set of options that is innate due to the neural evolution of the species (van Kampen 2009). The main points of the acquisition model put forward in the article were the following:

Learning strategy

- (i) There is an initial reduction of the input, such that the acquisition device selects the major typological properties (major parameters) of the core grammar. The reduction is due to ignorance about functional structure and not due to *a priori* information.
- (ii) The input-reduction procedure directs the further development by selecting evidence frames that contain no more than one single functional category, i.e. grammatical feature, <F?>. Each acquisition step adds a grammatical feature F_i to the lexicon (or adds a grammatical feature F_i to elements already listed in the lexicon), together with the elementary context for F_i .

The context for F_i has appeared in the reduced input as a treelet (in the sense of Fodor 1998, 2001) and it has appeared as

¹⁷ The line of reasoning in this section owes much to work in progress with Arnold E. Evers (Evers & van Kampen, in progress).

well (systematically) in the child's productions. This is demonstrated by constructing the longitudinal acquisition graph of F_i .

Learnability hierarchy

- (iii) There is a natural order of acquisition steps, since some grammatical features need others in their minimal frame. This phenomenon explains the temporal order between the acquisition graphs.
- (iv) The probably universal lexical categories V^0 and N^0 are not postulated but derived and acquired from their more language-specific functional environment, respectively the identified illocutionary value of C^0/I^0 and D^0 . See also van Kampen (2005), Evers & van Kampen (2008: 504f.).

Outcome: The lexicon

- (v) Although each grammatical feature is first captured within a minimal treelet, the initial grammar is not seen as a bunch of constructions as in Tomasello (2003). The acquisition model is aimed at building up a categorial lexicon that specifies the local combinatorial properties of its items (*contra* Construction Grammar).

I demonstrated that the present acquisition model is able to set several categories and their parameters from input, such as the V2 parameter and the $\langle +wh \rangle$ parameter. The same model was effective in setting the OV parameter and the major lexical categories in van Kampen & Evers (2004), van Kampen (2005), Evers & van Kampen (2008). When the model derives some fundamental and typological properties from reduced input and does so in the same order as in actual child language, it becomes more plausible that all grammatical properties will be acquired in that manner. Notice that it is not assumed that these categories and parameters are used as *a priori* by the learner. They are rather imposed upon the learner by the treelets of the reduced input.

The simplified and repetitive structures produced by systematic input reduction are not postulated. They are manifest in actual child language. There, they allow that grammatical features are at first learned in a maximally simplified environment. Later on, the same features continue to function in more complicated environments as abstract and interacting factors. It must be an important formal property of natural grammars to have this build-in hierarchic learnability for the grammatical distinctions.

Dresher (1999) has made a simple, but now debatable, objection against UG features and their parametric form. He argued that the UG properties were too abstract and interacting to offer a reliable guidance to an acquisition procedure. In a sense his objection was a rephrasing of Chomsky's argument about the poverty of the stimulus. Yet, such objections, including the argument from the poverty of the stimulus, need no longer hold. The acquisition model proposed above made no direct use of UG features as such. It worked the other way

around. The input patterns simplified by reduction impose such features on the learner. Once acquired, these features are stored in the lexical memory. That is, they are added to the various lexical items as context features. Fortunately, this property of grammatical context is already known as Chomsky's (1995) Inclusiveness Principle. Each time the lexicon is consulted, the (invariably) local context properties are bound to get deployed. The natural consequence is that early acquisition steps must have typological significance. They have established themselves in the lexicon and from there they control further properties. This was clearly seen by Jakobson (1942). He predicted typological significance and a more stable status for features acquired early, whereas features acquired later on were expected to show less stability in history and dialects. Jakobson's view translates easily in an acquisition difference between major parameters and micro-parameters. The actual discovery of such acquisition differences and their derivation from evidence frames is still to be made, but to my mind we know now where to look. Let me finally turn to the question whether a construct so much designed for diversity and learnability as grammar, must nevertheless be based on innate biologically given frames. As you may expect, I will answer this question in the negative.

3.2. *The Perfect Language*

Chomsky (2005) assumes three sets of determinants for the acquisition of grammar: (A) general cognitive abilities, (B) innate UG distinctions, and (C) input sentences. He considers the possibility that the determinants in (B) can be minimalized. Minimal assumptions one must make about any combinatorial system would suffice to derive a grammar by means of (A) from input (C). A language controlled by such a grammar is called 'perfect'. It will not need the evolution of pre-wired task-specific neurology. He introduces a distinction, though, between a language faculty in the broad sense (FLB) and a language faculty in the narrow sense (FLN; Hauser, Chomsky & Fitch 2002). I interpret this in the following way. The language faculty in the narrow sense may in principle contain all pieces of grammatical furniture recommended as useful devices in generative grammars, {the system of categories, grammatical relations, binary parameters, projection of labels, locality, binarity, recursion, selectional hierarchies of adverbs and auxiliaries, case systems, chains, movements and their triggers, phi-features, agreement, pronouns, islands, binding principles}.

If elementary acquisition principles were to derive all these distinctions from input properties only, set (B) gets empty and grammar becomes 'perfect' in the sense of the minimalist program (Chomsky 2005), as advanced in section 2 above or in Evers & van Kampen (2008) and van Kampen (2009). It is revealed as a learnable cultural construct and having no biological determinant (cf. Koster 2009). If by contrast, it turns out that grammar is not perfect in the above (minimalist) sense, then it will require pre-wired innate task-specific neural constructs to acquire language. Then language is unlike the traffic system, a ballet choreography, or the stock market. Then, it is indeed the quirky offshoot from an autonomous innate neural construct and the biolinguistic program is in business. This is not to deny that the combinatorial use of words is a novelty

called 'grammar'. The novelty may emerge from a special neural organ, but it is not necessary to make such a drastic assumption. As a matter of fact, pragmatic and associative relations between content words are present in early pre-grammatical child language, when each content word is used as a separate utterance. These relations between single-word utterances may give way to a set of relations (argument structure, event structure, illocutional structure) applied in a standard way. It seems not unlikely that such standardization of word-word relations may be a natural outcome.

The acquisition analysis above suggests that the acquisition model can be aimed at analyzing language as perfect in the sense of it being a cultural (socially transmitted and evolved) learnable construct, rather than a biological (genetically given) frame. There is no denial of a neural faculty of language in the broad sense (FLB). My skepticism against biolinguistics is only directed at the faculty of language in the narrow sense (FLN). This is not yet a common stance among generative grammarians. Some of them consider it even the hallmark of the generative enterprise that the study of grammar should postulate an innate task-specific neural complex. None of the usual arguments seem to me convincing or even relevant. I will shortly review them as recently brought up in Piattelli-Palmarini (2008). Thereafter I will turn to the nature of the faculty of language in the broad sense.

Piattelli-Palmarini (2008) protests against the idea that grammar might be a cultural construct that caused as a secondary effect the evolutionary enlargement of the human brain, a view developed in Deacon (1997). Linguistic inquiry, Piattelli-Palmarini argues, has shown all kind of unexpected consequences and curious restrictions in grammar. This suggests, he feels, a biological source for grammatical distinctions. I do not see that point. Unexpected consequences and curious restrictions hold for any complex system, whether biological or cultural. As far as cultural constructs are concerned, one may think of the riddles in number theory. Piattelli-Palmarini (2008) is also in favor of a biological origin for grammatical distinctions because children are said to acquire language 'easily'. I doubt that as an argument for the biological status of the construct. It rather seems that young children are unbelievably vigorous learners in all kind of physical, social or cultural competences. Within months six year olds get the basic competences for reading, writing, drawing, counting, biking, playing the piano, swimming, knitting, tying ones shoes, and a variety of social games. Acquiring a language is but a bit different. It is an extensive device. Learning must begin earlier and will take longer, but the same prolific flexibility for learning is in action. Children start small and often one sees their short but considerable concentration. As for language acquisition, they remain engaged for years in a round-the-clock training with strong and immediate rewards. Relative ease in language acquisition may be no more than the impression of a somewhat distracted father. Another point that Piattelli-Palmarini brings up refers to the spontaneity of grammatical reactions. I do not get that point either. Reactions by trained participants in chess, soccer or music have to be immediate and spontaneous as well. That is the fun they yield. On the other hand, carefully wording a letter is the opposite of rambling off. It is true that verbal reactions from the top of one's head still fit the rules of grammar, but that holds no less for

whatever rule-governed behavior. In general, conscious training in cultural constructs would not take place if it did not have such clear and selectional consequences. Grammatically governed achievements are no exception as is daily demonstrated in the school system and in society at large. And if this holds for the finer points of lexicon and grammar, why not for all points? And if this holds in history, why not in pre-history?

When grammatical systems seem designed for learnability and UG distinctions seem learnable by a few elementary steps that have a minimalist orientation, as advanced in section 2, one need not postulate a task-specific and innately pre-wired neural system to offer the learner possible frames for grammar. The fully learnable grammar as a cultural construct is on a par with other constructs and inventions that human beings employ in order to survive, such as ways of gathering food, weapons and shelter, constructing tools to get tools, and preserving fire. When clans or tribes in completely different parts of the world show far reaching parallels between their cultural devices, from fishing gear to grammatical devices, this proves that these devices are parallel solutions to parallel problems irrespective of postulations about innateness.

The emergence of grammar must be dependent upon an environment that invites the frequent use of content words and the inventive flexibility of a young brain. Both factors are relevant anyway. One may of course postulate additional factors, such as genetically innate parameters of grammar, but these must remain speculation. The major conclusion appears less speculative and more promising for advanced research in child language: Grammar is to be analyzed as fully learnable. Its intricacies should in the first place be explained by paying more attention to the stepwise procedure that is present in child language itself.

References

- Berwick, Robert C. 1985. *The Acquisition of Syntactic Knowledge*. Cambridge, MA: MIT Press.
- Berwick, Robert C. & Amy S. Weinberg. 1984. *The Grammatical Basis of Linguistic Performance*. Cambridge, MA: MIT Press.
- Brown, Roger. 1973. *A First Language: the Early Stages*. Cambridge, MA: Harvard University Press.
- Chomsky, Noam. 1975. *Reflections on Language*. New York: Pantheon.
- Chomsky, Noam. 1986. *Barriers*. Cambridge, MA: The MIT Press.
- Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA: The MIT Press.
- Chomsky, Noam. 2005. Three factors in language design. *Linguistic Inquiry* 36, 1-22.
- Clark, Robert. 1992. The selection of syntactic knowledge. *Language Acquisition* 2, 83-149.
- Deacon, Terrence. 1997. *The Symbolic Species: The Co-Evolution of Language and the Brain*. New York, NY: W.W. Norton & Co.
- Dresher, Elan B. 1999. Charting the learning path: Cues to parameter setting. *Linguistic Inquiry* 30, 27-67.

- Evers, Arnold E. & Jacqueline van Kampen. 2001. E-language, I-language and the order of parameter setting. *UiL OTS Working Papers* 00105-S-S. [<http://www-uilots.let.uu.nl/research/Publications/Publications.htm>.]
- Evers, Arnold E. & Jacqueline van Kampen. 2008. Parameter setting and input reduction. In Theresa Biberauer (ed.), *The Limits of Syntactic Variation*, 483–517. Amsterdam: John Benjamins.
- Evers, Arnold E. & Jacqueline van Kampen. In progress. Hierarchies of learning steps in first language acquisition. Ms., UiL OTS, Utrecht.
- Fodor, Janet D. 1998. Unambiguous triggers. *Linguistic Inquiry* 29, 1–36.
- Fodor, Janet D. 2001. Setting syntactic parameters. In Mark Baltin & Chris Collins (eds.), *Handbook of Contemporary Syntactic Theory*, 730–767. Oxford: Blackwell.
- Gerritsen, Marinel. 1984. Divergent word order developments in Germanic languages: A description and a tentative explanation. In Jacek Fisiak (ed.), *Historical Syntax*, 107–135. Amsterdam: Mouton.
- Gibson, Edward & Ken Wexler. 1994. Triggers. *Linguistic Inquiry* 25, 407–454.
- Haan, Ger de. 1987. A theory-bound approach to the acquisition of verb placement in Dutch. In Ger J. de Haan & Wim Zonneveld (eds.), *Formal Parameters of Generative Grammar III*, 15–30. Dordrecht: ICG Printing.
- Hart, Betty & Todd Risley. 1995. *Meaningful Differences in the Everyday Experience of Young American Children*. Baltimore, MD: Paul H. Brookes.
- Hauser, Marc D., Noam Chomsky & Tecumseh W. Fitch. 2002. The faculty of language: What is it, who has it, and how did it evolve? *Science* 198, 1569–1579.
- Jakobson, Ramon. 1942. *Kindersprache, Aphasie und Allgemeine Lautgesetze*. Uppsala: Uppsala Universitets Årsskrift.
- Jansen, Frank. 1978. Sentence initial elements in spoken Dutch. In Wim Zonneveld (ed.) *Linguistics in the Netherlands 1974–1976*, 102–108. Lisse: Peter de Ridder.
- Jansen, Frank. 1981. *Syntactische Konstrukties in Gesproken Taal*. Amsterdam: Huis aan de drie grachten.
- van Kampen, Jacqueline. 1997. *First Steps in Wh-Movement*. Delft: Eburon.
- van Kampen, Jacqueline. 2001. Review article of Becker, *The Development of the Copula in Child English*. *GLOT International* 7.
- van Kampen, Jacqueline. 2005. Language-specific bootstraps for UG categories. *International Journal of Bilingualism* 9, 253–277.
- van Kampen, Jacqueline. 2006a. Early operators and late topic-drop/*pro*-drop. In Vincent Torrens & Linda Escobar (eds.), *The Acquisition of Romance Languages*, 203–227. Amsterdam: John Benjamins.
- van Kampen, Jacqueline. 2006b. The acquisition of the standard EPP in Dutch and French. In João Costa & Maria Cristina Figueiredo Silva (eds.), *Studies on Agreement*, 99–119. Amsterdam: John Benjamins.
- van Kampen, Jacqueline. 2007. A perspective on doubling constructions in child Dutch. *Nordlyd* 34(3), 131–152.
- van Kampen, Jacqueline. 2009. The learnability of A-bar chains. In Martin Everaert, Tom Lentz, Hannah de Mulder, Øystein Nilsen & Arjen Zondervan (eds.), *Theoretical Validity and Psychological Reality* Amsterdam: John Benjamins.

- van Kampen, Jacqueline. In press. Typological guidance in the acquisition of V2 Dutch. *Lingua*. [[doi:10.1016/j.lingua.2008.07.005](https://doi.org/10.1016/j.lingua.2008.07.005).]
- van Kampen, Jacqueline & Arnold E. Evers. 2004. Locality constraints imposed by acquisition frames. In Olivier Crouzet, Hamida Damirdache & Sophie Wauquier-Gravelines (eds.), *Proceedings of JEL (Journées d'Etudes Linguistiques) 'Domaines'*, 35–41. Nantes: UFR Lettres et Langues.
- van Kampen, Jacqueline & Arnold E. Evers. 2006. Single value steps in first language acquisition. In Adriana Belletti, Elisa Bennati, Cristiano Chesi, Elisa di Domenico & Ida Ferrari (eds.), *Language Acquisition and Development: Proceedings of GALA2005*, 304–318. Cambridge: Cambridge Scholars Press.
- van Kampen, Jacqueline & Arjen Zondervan. 2005. The possessor construction in early child languages. Paper presented at the 10th International Congress for the Study of Child Language, Berlin. [Freie Universität, 25–29 July 2005.]
- Klima, Edward & Ursula Bellugi. 1966. Syntactic regularities in the speech of children. In John Lyons & Roger Wales (eds.), *Psycholinguistic Papers*, 183–219. Edinburgh: University of Edinburgh Press.
- Koster, Jan. 2009. Ceaseless, unpredictable creativity: Language as technology. *Biolinguistics* 3, 61–92.
- Krifka, Manfred. 2007. Functional similarities between bimanual coordination and topic/comment structure. In Shinishiro Ishihara, Michaela Schmitz & Anne Schwartz (eds.), *Working Papers Interdisciplinary Studies in Information Structure (ISIS)* 8, 39–59. Potsdam: Universitätsverlag Potsdam.
- Lebeaux, David. 1988. Language acquisition and the form of grammar. Amherst, MA: University of Massachusetts dissertation.
- Lightfoot, David. 1995. Why UG needs a learning theory. In Adrian Battye & Ian Roberts (eds.), *Clause Structure and Language Change*, 31–52. Oxford: Oxford University Press.
- Lightfoot, David. 1999. *The Development of Language: Acquisition, Change and Evolution*. Malden, MA: Blackwell.
- Piattelli-Palmarini, Massimo. 2008. Novel tools at the service of old ideas. *Biolinguistics* 2, 237–246.
- Pinker, Stephen. 1984. *Language Learnability and Language Development*. Cambridge, MA: Harvard University Press.
- Pullum, Geoffrey K. 1997. Learnability, hyperlearning, and the poverty of the stimulus. *BLS 22: Parasession on Learnability*, 498–513.
- Radford, Andrew. 1990. *Syntactic Theory and the Acquisition of English Syntax: The Nature of Early Child Grammars of English*. Oxford: Blackwell.
- Rizzi, Luigi. 1990. Speculations on verb second. In Joan Mascaró & Marina Nespors (eds.), *Grammar in Progress*, 375–386. Dordrecht: Foris.
- Roberts, Ian. 2001. Language change and learnability. In Stephano Bertolo (ed.), *Language Acquisition and Learnability*, 81–126. Cambridge: Cambridge University Press.
- Sakas, William G. & Janet D. Fodor. 2001. The structural triggers learner. In Stephano Bertolo (ed.), *Language Acquisition and Learnability*, 172–233. Cambridge: Cambridge University Press.
- Santelmann, Lynn M. 1995. The acquisition of verb second grammar in child Swedish: Continuity of Universal Grammar in *wh*-questions, topicalization

- and verb raising. Ithaca, NY: Cornell University dissertation.
- Tomasello, Michael. 2003. *Constructing a Language: A Usage-Based Theory of Language Acquisition*. Cambridge, MA: Harvard University Press.
- Tracy, Rosemary. 1994. Raising questions: Formal and functional aspects of the acquisition of wh-questions in German. In Elsa Lattey & Rosemary Tracy (eds.), *How Tolerant is Universal Grammar?*, 1-34. Tübingen: Niemeyer.
- Tracy, Rosemary. 2002. Growing (clausal) roots: All children start out (and may remain) multilingual. *Linguistics* 40, 653-686.
- Yang, Charles D. 2002. *Knowledge and Learning in Natural Language* Oxford: Oxford University Press.

Jacqueline van Kampen
Utrecht University
UiL OTS
Janskerkhof 13
3512 BL Utrecht
The Netherlands
N.J.vanKampen@uu.nl