

Constraints on Wh-Movement: Language Acquisition and Universal Grammar

Jill de Villiers

1. Introduction

As part of the Symposium “Language Acquisition and Generative Grammar: The past 50 years”, I present my personal history of studying complex aspects of syntax in preschool children. I discuss the basic results, what has been called into question, and what is left unsettled.

Since the work of Ross (1967), constraints on syntax, or barriers to movement, constitute a central pillar of the argument for Universal Grammar, being the main focus of Chomsky’s *Barriers* (1986). Why are constraints central to Universal Grammar? They have been conceptualized as abstract configurational properties held to be universal, and this has clear implications for language acquisition. Constraints on movement are rare, even obscure phenomena, and most adult speakers are unaware that they obey them. They have no obvious learning path, and no apparent negative evidence. The natural but startling proposal is that children should not have to learn them, but obey them from the start, or at least the start of complex grammar.

Almost immediately following the publication of *Barriers*, Tom Roeper, Anne Vainikka and I embarked on research with preschool children on barriers to wh movement (1987-1990) (de Villiers et al., 1990). But how does one study what can’t be said? All the data at that time were based on adult intuitions, but we had significant doubts that three-year-olds could tell us if they found a sentence unacceptable. We did not expect three-year-old children to produce long-distance movement, and it seemed even less likely that they would produce enough for us to be able to tell if they avoided certain kinds. The solution was to test comprehension, as in the following story and question:

Sample story and question (with 3 picture cartoon)

Story: This little girl went shopping one afternoon, but she was late getting home. She decided to take a short way home across a wire fence, but she ripped her dress. That night when she was in bed, she told her mom, “I ripped my dress on a fence this afternoon.”

(1) When did she say she ripped her dress?

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Note the design features. There are two possible interpretations of the question, depending on where the *wh*-question *when* originated. Both of them are designed to be possible in the story. Is *when* connected as an adjunct to *say*, as in (1)a), or as an adjunct to *rip* as in (1)b)?

- (1)a. When_i did she say [trace_i] she ripped her dress? OR
 (1)b. When_i did she say she ripped her dress [trace_i]?

Now consider an alternative question, with a middle *wh* that introduces a barrier to movement, and causes the ambiguity to be lost for adults:

- (2) When did she say how she ripped her dress?
 [CP₁ Q] [trace_i]. [CP₂ indirect Q how]

We tested the contrast between (1) and (2) in preschool children, using what we later called the “stories before questions” technique (de Villiers & Roeper, 1996). We designed stories that contained potential answers to questions we might ask about times, places, manners, or instruments. That was followed by a question that either was ambiguous, like (1), or constrained, like (2). Different children would receive both types (1) or (2), but about different stories.

In the design, we tried to pit syntax against pragmatics. In other words, we tried to make the “wrong” answer alluring. If children resisted the allure, it must be because their grammar disallowed it. In this respect, we went against the tide of methodology, in which other researchers (Crain, 1980; O’Brien et al, 2006) tried to ensure that what the children were asked to do in an experiment was pragmatically appropriate, meeting all the felicity conditions. Indeed, wearing another hat, I was also following that advice in designing interventions for children with language delays. But there is a difference between testing and educating. This approach set us up for many arguments with researchers who believed in designing just the “right” pragmatic conditions for children to exhibit their grammatical knowledge. It depends on the question being asked, but this is a rich topic for discussion with beginning students.

We arranged for the study to have a counterbalanced design, in that two groups heard the same stories but different questions, so their different answers could not be an artifact of the story. A design feature that turns out to be significant in retrospect is that we presented no ungrammatical sentences. All the questions had a possible answer provided under at least one construal, so none of them were ungrammatical in themselves. Given the rarity of long-distance questions, this turns out to be a good thing, ethically, a point to which I will return.

Looking back, our sample (N=25) was insufficient for the conclusions we drew. The sample was small, and the children were above-average, as in many of the studies published in the 1970s and 1980s. But the data were really nice, and we learned some things (Table 1). First, it seems that some children as young as 3;6 years allowed long-distance interpretations of *wh*-questions. It was not just that they grabbed an answer from the story, because that very answer was resisted

when there was a medial wh-barrier in the question. The data were also compatible with a distinction in adult syntax made by Rizzi (1991) between adjuncts and arguments, in that argument questions blocked long-distance movement of adjuncts, but arguments moved freely over adjuncts.

Table 1: Sample Data from de Villiers, Roeper & Vainikka (1990)

<i>Question</i>	<i>Type</i>	<i>Barrier?</i>	<i>Percentage SD</i>	<i>Percentage LD</i>
<i>Who did the girl ask to call?</i>	Argument	None	68	32
<i>When did the boy say he hurt himself?</i>	Adjunct	None	50	44
<i>Who did the boy ask how to help?</i>	Argument	Wh- Adjunct (but not barrier to argument)	63	30
<i>How did the girl ask who to paint?</i>	Adjunct	Wh- argument	23	8
<i>Who did the man ask what to feed?</i>	Argument	Wh- argument	70	2

Working together with colleagues and students, the same materials were used to test children who spoke German and French, (Weissenborn et al, 1995) and Greek (Leftheris, 1991), with very similar results (de Villiers and Roeper, 1994). We also followed up the original work on long-distance movement with a longitudinal study over the course of one year with twenty-eight 3- to 4-year-olds tested four times (de Villiers & Pyers, 2002).

A few years later, we had the opportunity to redo the study on a massive scale in the process of creating the DELV assessment, whose main purpose was to create a dialect-fair test of English for African American children who spoke AAE (Seymour et al, 2005). The sample went from a few dozen to several thousand, and across a broader social class and different regions of the US, as well as variants such as African American English. However, in an assessment, counterbalancing is not possible: we had to commit to one question or another for each story. The DELV also expanded the range of barriers explored beyond wh-medial questions, to include relative clauses and empty operators (de Villiers et al, 2008). The results replicated those of the initial study, and expanded the sample to look at children who had language impairments or Developmental Language Disorder. Importantly, there were no differences in obedience to constraints for children with language impairments/delay. All children showed the same constraints. If the acquisition of constraints is a *learning* problem, this would not be expected.

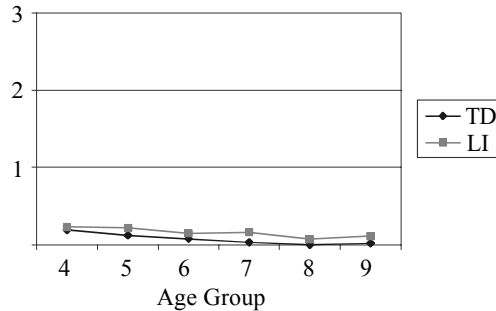


Figure 1: Number of wh-constraint violations (out of 3) by 1000 children (Typically Developing and Language Impaired) aged 4 to 9 years in the DELV assessment (de Villiers et al, 2008).

We demonstrated that:

- a) Children allow long-distance movement of wh-questions
- b) Children constrain that movement just where they should (e.g. medial wh is a barrier)

We had as an assumption:

- c) The types are sufficiently rare and abstract that learning is impossible/unlikely

And we drew the conclusion that:

- d) Therefore, children must have existing knowledge of the limitations on grammatical form.

But even in 1987 when I first presented our results to a workshop at U.Mass in Amherst, my sharp colleague Virginia Valian said to me: “Could it be an artifact?” Certainly, assumption c) can be held up to the light, and d) needs questioning as a conclusion if c) is in doubt.

What could call c) into question? Two alternative proposals suggest that these phenomena are not rooted in abstract syntax. A third retains the idea that the phenomena are syntactic, but offers a learning mechanism for the constraints.

2. Pragmatics as alternative explanation

Van Valin (1998; 2017) suggested that Role and Reference Grammar provided a pragmatic alternative to the phenomena of subadjacency and constraints put forward by Generative Grammar. One such pragmatic constraint is this:

“General restriction on question formation: The element questioned must be in a clause within the potential focus domain.” (Van Valin, 1984)

Van Valin (2017) gave as an example:

(3). Mulder believes that Scully hid the files.

He argued that since the embedded clause is a direct daughter of the matrix clause node, therefore the embedded clause is in the potential focus domain. As a result, (4) allows a long-distance question:

(4) What does Mulder believe that Scully hid?

Van Valin argued that by 5 or 6, children assume complements have this structure. But they “discover” that sentences with a *wh*-complement have a different structure. The explanation for this discovery requires a tangent about medial *wh*-questions.

Among the findings of our studies on long-distance movement was the curious fact that children frequently took the medial question to be the actual question, and answered it instead. Inspired by the work of Dana McDaniel (1989) on *wh*-movement patterns in the world’s languages, we took the result to mean that children entertained a grammar in which this was a possible structure for English too. In some dialects of Romani, in Hindi and some dialects of German, the question can take the form of an initial *wh*-word that is a kind of empty scope marker, and a medial question has the content that is being questioned. Other languages allow “copying” in which the initial and medial questions are the same. Thornton (1992) demonstrated that children also produce such questions in an elicited question task. (The topic has too many spin-offs to do it justice here, but see Roeper & de Villiers, 2011; de Villiers et al, 2010; Lutken & Legendre, 2025; Kyuchukov et al, 2025).

Van Valin used these facts to argue that the child mistakenly thinks the lower clause with a medial *wh* is the “true focus domain”, thus explaining why children give medial *wh*-answers. But there are some important caveats. First, there is no obvious explanation offered in the pragmatics account for the findings of the argument/adjunct asymmetry. Second, according to Van Valin, children should consider the medial question part of the lower clause only. We arranged it in the stories so the two readings were distinct:

(5) How did the boy say what he bought?

where what he *bought* was distinct from what he *said he bought*. On the pragmatic claim, the medial question should *only* be answered with respect to the lower clause. However, we were unable to demonstrate this restriction in our data, nor did it vary tidily with age.

As a control for (5), I had added in sentences like:

(6) What did the boy say he bought?

And there went 30 years of my research life. We found that children frequently got the answer wrong by mentioning only what he bought. The exciting part was that performance on such questions turns out to be one of the best proximal predictors of false belief understanding in Theory of Mind development (de Villiers & Pyers, 2002; de Villiers, 2021; de Villiers & de Villiers, 2025)

It is not clear at all why R&R would predict that latter error on 6). We agree with Val Valin that children are drawn to answer the medial in the lower clause, though like McDaniel (1989), we put more emphasis on it as a syntactic option that some languages allow (Fanselow, 2005). To accommodate errors on both 5) and 6), we have argued, based on Minimalism, that the ideal grammar should complete interpretation one phase at a time, and that this is what children prefer (Roeper & de Villiers, 2011; de Villiers et al, 2010).

3. Parsing as an alternative

Central to our claim was proving that LD movement was easy for children. But in retrospect, is it? Philips & Ehrenhoffer (2015) and Omaki et al (2014) claim that the default is short-distance movement for adult and child parsing in English. If connecting the *wh*-question to the first available trace is the default, is it illusory that children obey constraints? Maybe they never get past the matrix clause!

But we had data that suggested long-distance readings were easily available to children. It is worth looking at the sentence differences across the studies. Omaki used the verb phrases *tell someone* and *say to someone* and those types as in (7) elicited primarily short-distance answers.

(7) Where did Mary say to someone that she was going to catch butterflies?

In contrast, we used bare verbs like *say*. The claim from Omaki (2014) and Phillips & Ehrenhoffer (2015) is that bare *say* is being treated more like an evidential, rather than a full clause matrix verb, and then children focus the question on the only other full verb, namely the one in the embedded clause.

Two objections can be raised about this analysis (see de Villiers, 2015). The first concerns the range of verbs used in our published and unpublished experiments. We also used the verbs *help*, *learn*, *ask*, *tell*, *decide* as well as *say*. It would be odd indeed to consider some of these verbs as evidentials.

The second objection is that nonfinite complements as well as tensed complements also attracted long-distance answers, often frequently (percentages in parentheses):

(8) Who did Big Bird ask to kiss? (25%)

(9) How did the fireman decide to get the cat down? (100%)

(10) Who did the nurse help to bandage? (100%)

How can the lower, tenseless clause be considered a full sentence under the evidential analysis?

It is intriguing that adding *(to)someone* (Omaki, et al, 2014) changes something about the relative weight of the matrix clause. Could *someone* be a possible intervenor? In the examples like (7), the *someone* has the semantic effect of a wh-question: one feels the need to establish the identity of the someone. There is an experiment here to be tried, contrasting the quantified indefinite *someone* with a referential noun. *Someone* may block LD wh-movement.

4. Abstract but learnable

A final and most provocative idea is that constraints are indeed abstract and syntactic in nature, but nevertheless, learnable. We long ruled out the possibility that negative evidence could teach children that the constraints were operative on wh movement, given the fact that mistakes are not made either by parents or children. But neither did we imagine that constraints could be learned from positive input, as we argued that the instances of long-distance movement were themselves so rare. Yang & Legate (2024, cited with permission) demonstrate the rarity: long-distance questions occur at the rate of about one every other day in the input. However, they argue that positive evidence might suffice:

“Instead of identifying conditions that prohibit movement, this theory aims to characterize the conditions that allow movement, ...children’s task is to discover the regularities within, and the outcome is a finite list of inventory that specifies possible movements. As such, impossible movements such as strong islands are “learned” because children never encounter supporting evidence, thereby residing outside the inventory of possible.” (p. 3-4)

On this theory, the child records the local steps, which are defined across structures like vP, VP, CP, IP:

“the local steps, and therefore the grammatical possibilities of movement, can be exactly characterized as a finite state machine defined over transitions over syntactic projections.” (p.4)

They propose that by the slow accretion of possible wh-movements, the child eventually excludes the impossible. Thank goodness we never presented ungrammatical utterances, or a generation of small children would now be among us, violating constraints!

Figure 2 shows Yang & Legate’s (2024) finite state machine for the major movement patterns learnable from a child-directed English corpus. The square states are starting projections, solid arrows are productive steps, and dashed arrows are lexicalized steps annotated with the rote-learned lexical items.

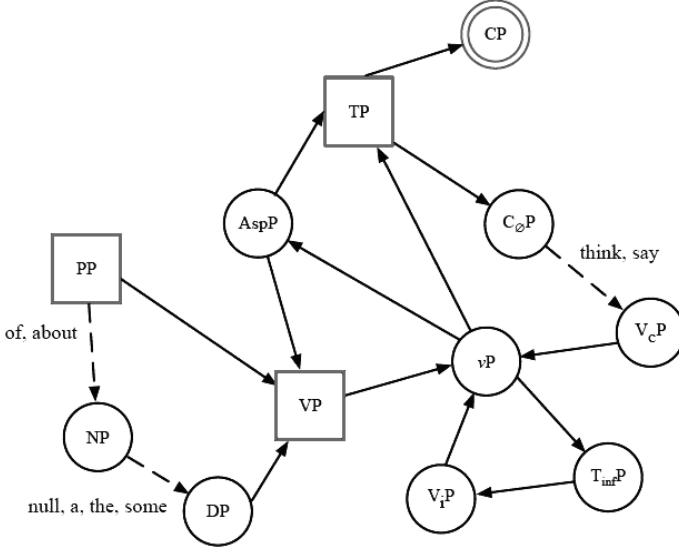


Figure 2: A finite state machine for the major movement patterns learnable from a child-directed English corpus.

There has to be some rote lexical learning for exceptional cases. For long-distance movement, the claim is that the bridge verbs must be learned individually, because there is some cross-linguistic variation. That is, each verb that permits long-distance wh-movement has to be learned individually. The problem with that argument is that children until about age 7 have been shown to permit long-distance movement over factive or semi-factive verbs like *know* (Phillip & de Villiers 1992; de Villiers et al, 1998; Schulz, 2003; Stoica, 2025), which (mostly) block those readings in the adult language. If this is an overgeneralization, how does a child retreat? Admittedly, the status of adult judgements with factive verbs is far from conclusive (Liu et al, 2022; Huang et al, 2025).

The account makes no argument/adjunct distinction, yet the child data suggest the distinction among the types of wh-movement is important, as Rizzi (1991) suggested. Yang & Legate contend that under their formulation, the model must treat them as the same. They propose that the distinction be handled elsewhere, perhaps by tracking the observed frequency of argument wh versus adjunct wh movement.

What kind of learning theory is this? Should the critics of Universal Grammar be raising a celebratory toast to Yang & Legate? Probably not. On their model, the child from an early age has to have a perfect syntactic analysis of configurations, including all the major syntactic nodes, and obviously knowledge of wh-movement and its landing site in e.g., spec CP. In addition, a child's mind needs to maintain statistical counts of observed data across each node type and

lexical items. Omissions must be considered constraints, after a certain (unspecified) quantity of evidence has been processed. Presumably, the system stays “open” for rare events that could alter the possibilities. Now I feel guilty about the grammars of my introductory syntax students to whom I have presented examples of sentences violating these constraints.

It is not clear yet that the learning model has an explanation for the two main errors that children make. One is the medial question error, and the other is the tendency to consider the fronted *wh* to be attached only to the embedded predicate. If the child has a mis-analysis of the embedded complement, how does the learning system recover? Could hearing recursion be the clue? (de Villiers, Kotfila & Roeper, 2017, but see Hollebrandse et al, 2019).

On a final note, I have to be pleased if more input is the solution, given that we have strong evidence that increased, specific, exposure can make a difference to both complements and false belief reasoning (Durrleman et al, 2019; de Villiers & Durrleman, 2026).¹

5. Summation

To sum up the different accounts that extend the original claims about constraints on *wh*-movement:

R&R and Pragmatics (Van Valin):

- Explains the legitimacy of long-distance readings
- Explains the child’s attraction to medial *wh* questions
- Offers no account of their confusion with false complements

Parsing (Omaki et al)

- Argues that short distance movement is the default option, so constraints are trivially true
- Gives no account of why a variety of verbs are treated as “evidential”
- Offers no account of how a nonfinite complement can be considered a main clause under a verb treated as a mere “evidential”

Learning Positive evidence (Yang & Legate)

- Accounts for the exceptionality of bridge verbs and their non-universality
- Fails to account for extraction with factive verbs
- Does not explain why children misanalyze false complements.

No account offers anything to explain the adjunct-argument asymmetry (Rizzi 1991). But there is so much more to explore! I offer this bibliography concerning some further constraints that other colleagues and I have studied in acquisition, all of which need further expansion and replication. It would be a mistake to believe that the acquisition work is complete, or even coherent. For example, not all constraints fall so clearly under the syntactic umbrella, notably

¹ I have even staked my claim with a series of children’s books on this very premise, see <https://www.ventriclelearning.com/mind-the-book/>

wh-movement constraints on sentences containing quantificational adverbs (Philips & de Villiers, 1992) and negation (AbdulKarim, 2001), and constraints on “covert movement” of quantifiers (Coles-White et al, 2004). It is a rich domain that I recommend as a field for new researchers.

6. Other examples of barriers we have explored in child language

Factivity

Roeper, Thomas. & de Villiers, Jill G. (1994) Lexical links in the Wh-chain. In Barbara Lust, Gabriella Hermon & Jaklin Kornfilt (eds) *Syntactic Theory and First Language Acquisition: Cross Linguistic Perspectives Volume II: Binding, dependencies and learnability*. Lawrence Erlbaum.

Negation

Abdulkarim, Lanya (2001). *Complex Wh-questions and universal grammars: New evidence from the acquisition of negative barriers*. Ph.D. dissertation. University of Massachusetts, Amherst.

Abdulkarim, Lanya, Roeper, Thomas. & de Villiers, Jill. G. (1999) Negative islands in language acquisition. In Bart. Hollebrandse (ed) *New perspectives on language acquisition*, University of Massachusetts Occasional Papers.

Coles-White, D’Jaris, de Villiers, Jill & Roeper, Thomas. (2004) The emergence of barriers to wh-movement, negative concord and quantification. In Alejna Brugos, Linnea Micciulla, & Christine Smith (eds), *Proceedings of the 28th Annual Boston University conference on Language Development*, Cascadilla press, Volume 1, pp.98-107.

Quantificational adverbs

Philip, William. & de Villiers, Jill G. (1992) Monotonicity and the acquisition of weak islands. In Eve Clark (ed), *Proceedings of the twenty-fourth Stanford Child Language Conference*, Stanford University CSLI.

Empty operators

Vainikka, Anne., & Roeper, Thomas (1995). Abstract operators in early acquisition. *Linguistic Review*, 12, 275–310.

Epistemic modals

Kotfila, Jessica. & de Villiers, Jill G. (2019) When must children acquire long distance wh questions? In Megan Brown & Alexandra Kohut (eds) *Proceedings of Boston University Conference on Language Development*, 44, Cascadilla press.

Relative clauses

de Villiers, Jill G. & Roeper, Thomas (1995) Relative clauses are barriers to Wh-movement for young children. *Journal of Child Language*, 22, 389-404.

DPs

de Villiers, Jill G. & Roeper, Thomas (1995) Barriers, binding and acquisition of the DP/NP distinction. *Language Acquisition* 4, 73-104.

Quotation

Hollebrandse, Bart. (2007) A special case of wh-extraction in child language. *Lingua* 117, 1897-1906.

Roeper, Thomas & de Villiers, Jill G. (2011) The acquisition path for wh-questions. In de Villiers, Jill G. & Roeper, Thomas (eds) *Handbook of Generative Approaches to Language Acquisition*. Springer.

Recursive complements

de Villiers, Jill G., Kotfila, Jessica, & Roeper, Thomas (2020). When is recursion easier for children? In *New Trends in Language Acquisition Within the Generative Perspective* (pp. 239-256). Springer, Dordrecht.

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