The learnability of the Left Branch Condition

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1. Introduction

1.1. The data. In our corpus of two Dutch children, WH-type movements may shift only the WH-operator, leaving behind a nominal or adjectival projection.[1] This is illustrated in the examples (1)-(2) below. The construction is not found in the adult input.

(1) Stranding the nominal projection
    a [welke]$_i$ wil jij [t$_i$ liedje] zingen? (S. 3;7)
        [which]$_i$ want you [t$_i$ song] sing?
    b [welk]$_i$ wil jij [t$_i$ boekje]?
        [which]$_i$ want you [t$_i$ booklet]? (S. 3;9)

(2) Stranding the adjectival projection
    a {mag ik proeven} [hoe]$_i$ het [t$_i$ heet] is? (L. 4;3)
        {may I taste}   [how]$_i$ it   [t$_i$ hot] is?
    b [hoe]$_i$ is het [t$_i$ laat] (L. 6;5)
        [how]$_i$ is it   [t$_i$ late]?

Some major observations have to be added. First, Pied-Piping, i.e. movement of the entire WH-phrase, is a simultaneous option from the beginning. Second, although subextraction seems to appear less often than pied-piping the full constituent, it is nevertheless a very persistent phenomen: stranding data still have been found at the age of six. Third, there have been found in the corpora no examples of violations of the Constraint on Extraction Domains (Huang 1982).

1.2. The problem. The extractions in (1)-(2) violate the Left Branch Condition (Ross 1967), which accounts for their ungrammaticality in adult Dutch. Movement of the WH-element in the left branch position is possible, but only by pied-piping the entire phrase.

The Left Branch Condition is not a universal constraint. It does not apply in certain, highly inflected, adult languages such as Czech, Polish, Russian and Latin (Ross 1967:131). Consider example (3) from Polish given by Corver (1990:330).

(3)   jaki$_i$ wykręciłés   [t$_i$ numer]?
          which$_i$ (you) dialed   [t$_i$ number]?

These observations by Ross, reconsidered in Corver (1990), raise the question in (4) about the acquisition of Dutch, central question of this paper.

(4)   By which parameter setting does the initial grammar develop into a grammar with a Left Branch Condition?

2. *A fixed adjunct develops into a functional projection by a structural reanalysis (Hoekstra 1994).*

The language acquisition question has been raised in Jordens and Hoekstra (1991), Hoekstra, Koster and Roeper (1992), Hoekstra (1994). The examples provided by Jordens and Hoekstra (1991) mainly involve cases of topicalized and scrambled NP-subextractions.[2] The utterances of Jasmijn in (5) and (6) are from the Jordens corpus.

(5)   Topicalization of a left branch element
          [die]$_i$ heb   ik   niet   [t$_i$ sok]   aan   (J. 2;3)
          [that]$_i$ have   I   not   [t$_i$ sock]   on

(6)   Scrambling of a left branch element
          ik   vin   [Cynthia]$_i$ niet   [t$_i$ tekening] leuk   (J. 2;8)
   I   find   [Cynthia]$_i$ not   [t$_i$ drawing] nice

Jordens and Hoekstra propose that the acquisition device initially analyses a subset of the functional heads as adjuncts to the lexical projection. The Left

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[2] Jordens and Hoekstra provide only the following example of WH-subextraction:
          (i) Kijk eens   [hoe]$_i$ ik   [t$_i$ groot]   ben!
          Look   [how]$_i$ I   [t$_i$ big]   am!
This example does not appear in the Jordens corpus, but similar subextractions have been noted in English child language.

Branch Condition does not apply in adjunction constructions. The following structures are examples of base-adjunction for the subextracted elements in (1), (5), (6) (example 7a) and for the one in (2) (example 7b) before movement.

(7)   a   NP   b   AP

          NP   NP   MeasP   AP
   <+WH>   <+lex>   <+WH>   <+lex>
       <+N>   <+A>
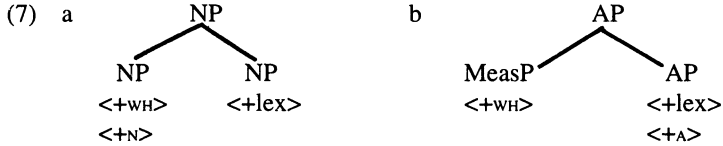
The NP- or WH-element is positioned outside the domain defined by the head <+N>/<+A> in the lefthand part of the construction.

Hoekstra (1994) refers to Corver (1990), who also derives the absence of the Left Branch Condition in Polish and Czech from a phrase structural difference. Consider the NP-subextraction (8) in Czech.

(8)   její$_i$ čte   Petr   [t$_i$ knihu]!
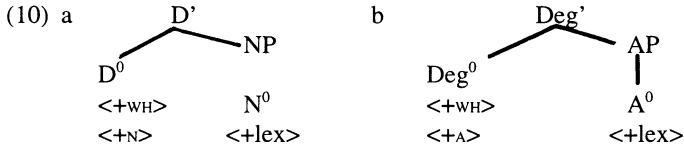   her$_i$ reads   Peter [t$_i$ book]!

Corver argues that in Polish and Czech possessives and demonstratives are not functional categories. Therefore, the characteristic configuration of the Left Branch Condition is not present. Possessives and demonstratives have declension endings similar to adjectives.[3] This leads Corver to interpret them as modifier phrases within the NP, as (9) shows.

(9)   NP
                    N'
          AP   N'
       <+WH>
       <+A>   N^0
                    <+lex>
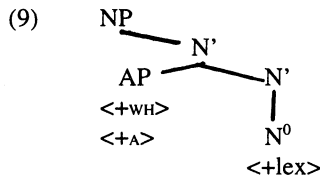
Hoekstra follows the same line of reasoning. In his view the child initially reads the WH-element as a lexical projection adjoined to a nominal or adjectival projection. Examples (1) and (2) would then involve movement of a lexical adjunct. The lexical elements are base-adjoined as long as they are not classified as functional categories by the 'lazy' language learner.

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[3] Corver (1990:333), in addition, bases his argumentation on the statement that demonstratives and possessives exhibit a rather free order and may appear on both sides of the noun. Note, however, that in postposition these elements receive focal stress (Maaike Schoorlemmer, p.c.).

If the extracted elements in child grammar are like adjuncts modifying noun phrases or adjectival phrases, subextractability is apparently no longer a problem. The movement of the single WH-element will constitute movement of a maximal projection that can adjoin to intervening maximal non-argument projections. As soon as the language learner establishes the functional category D or Deg, he will identify the WH-pronoun as a D^0/Deg^0 category. The adjunction-structure will then be reanalyzed as a functional head-complement structure, as in (10).

(10) a

$$D'$$
$$D^0 \qquad \text{—NP}$$
$$\text{<+WH>} \qquad N^0$$
$$\text{<+N>} \qquad \text{<+lex>}$$

b

$$Deg'$$
$$Deg^0 \qquad AP$$
$$\text{<+WH>} \qquad A^0$$
$$\text{<+A>} \qquad \text{<+lex>}$$

The functional WH-element is now in the domain of the lexical head N^0/A^0, that is, the WH-element is dominated by the extended projection of the lexical head (see for the notion 'extended projection' Grimshaw 1991). The Left Branch Condition becomes relevant and pied-piping of the full constituent is the only way to move the WH-element into the sentence-initial operator position.

In support of his account, Hoekstra (1994) observes that the only elements moved by apparent subextraction are elements that can be interpreted as independent NPs. Elements that could only be the head of a DP, such as articles, are not attested in cases of subextraction.

3. Objections against a structural reanalysis

Hoekstra assumes that the functional category D^0, as well as its specific form, which is <+D>/<+WH>, belongs to a universal set of categories accessible to the language learner a priori. Nevertheless, a learning procedure will be necessary to identify the universal categories in their language specific disguise. The phonological form, at least, is not given as a universal.

I do acknowledge Hoekstra's last point, but I doubt whether it sufficiently supports his view on the matter. I will provide some four arguments against a structural reanalysis for the WH-subextractions. This elaborate criticism in the present section means to re-establish the subextractions and the Left Branch Condition as a full fledged research problem. In section 4, I will sketch a completely different approach.[4]

First objection. Pied-piping of the full extended projection DP/NP, DegP/AP is

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[4] I give here only the argumentation for WH-subextractions. As for NP-subextractions, see my report in the OTS working papers 1994.

an   initial   option   in   child   language,   as   the   examples   in   (11)   show.

(11) a   [welk boek]$_i$ ga   jij   t$_i$ lezen?   (L. 3;6)
         [which book]$_i$ go   you   t$_i$ read
     b   [welke verhaaltje]$_i$ wil   jij   t$_i$ voorlezen?   (S. 3;9)
         [which story]$_i$ want   you   t$_i$ read?
     c   [hoe laat]$_i$ is   het   t$_i$?   (S. 3;1)
         [how late]$_i$ is   it   t$_i$?

The pied-piping mechanism relies on the assumption that the <+WH> feature is
projected up to the top of the constituent (Van Riemsdijk 1984; Emonds
1985:299,333; Grimshaw 1991:17), as in (12).

(12) a   DP<+WH>   b   DegP<+WH>

         D^0 NP   Deg^0 AP
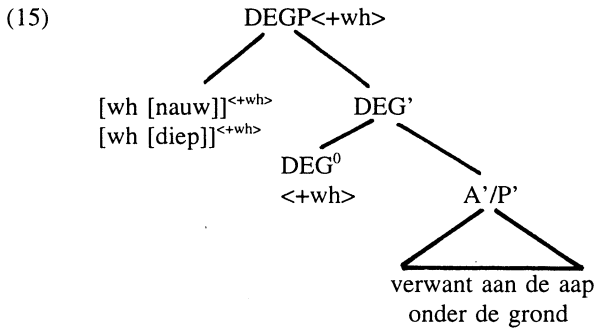   <+WH>   <+WH>

Since this projection of the <+WH> feature is a regular option, the constituent is
most probably conceived of as the projection of a <+WH> marked head and not
as a constituent provided with an adjunct that somehow carries a <+WH>
marking. Only functional heads can project WH-features, because only heads can
project features on the extended projection line. Adjuncts cannot project features
on the extended projection line.
    An anonymous reader has observed that this argument may not hold water.
Consider the examples (13)-(14), due to Corver (1990:261f,227f). It seems that in
these examples the left branch phrase of a PP or AP may or may not project its
<+WH> feature.

(13) a   [hoe diep]$_i$ ligt het lijk   [t$_i$ onder de grond]?
         [how deep]$_i$ lies the body   [t$_i$ under the ground]?
     b   [hoe diep onder de grond]$_i$ ligt het lijk   t$_i$?
         [how deep under the ground]$_i$ lies the body   t$_i$?

(14) a   [hoe nauw]$_i$ zijn   wij   [t$_i$ verwant aan de aap]?
         [how closely]$_i$ are   we   [t$_i$ related to the monkey?
     b   [hoe nauw verwant aan de aap]$_i$ zijn wij   t$_i$?
         [how closely related to the monkey]$_i$ are we   t$_i$?

If the WH-pronoun is interpreted as an adjoined phrase and a maximal projection
by the child, as in (7), the projection of the WH-feature may as well occur. The
optional pied-piping of the full projection in (1)-(2)/(11) is comparable to the
optional pied-piping in (13) and (14).

I do not agree. Not any adjoined phrase can pied pipe the constituent it has been adjoined to. Only phrases in the specifier position may pull that off. This must be related to an effect of specifier-head agreement. The specifier phrase can bring its <+WH> feature on the head by specifier-head agreement, as (15) shows. An adjoined phrase cannot do this.

(15)

$$DEGP<+wh>$$

[wh [nauw]]$^{<+wh>}$ DEG'
[wh [diep]]$^{<+wh>}$

DEG^0
<+wh>   A'/P'

verwant aan de aap
onder de grond

This arrangment relates pied-piping to the standard way of feature projection. The argument apparently given by the examples (13) and (14) could only support the adjunction approach by an ill-defined weakening of X-bar principles.

Second objection. The period of the WH-subextractions in Dutch child language extends far into the period in which the obligatory use of articles, demonstratives, interrogatives, and genitive marking is well-established in the childs grammar. Consider, for instance, the examples in (16), which are only a few among many.

(16) a *waarom* wil   jij   dat   in *de* auto zetten? (L. 3;5)
        why   want   you   that   in the car   put?

     b ik   mag wel op *mijn*   kont   zitten   (S. 3;0)
        I   may   on my<+gen>   bum   sit

     c *mijn*   jurk is nat van *dit* water   (S. 3;1)
        my<+gen>   dress is wet from this   water

     d *de* volgende keer ga ik *mijn*   brood   opeten (S. 3;5)
        the next time   go I   my<+gen> bread   eat

At this stage, the children must have recognized that articles, demonstratives and genitive marking are functional D-heads, because they use them as in adult grammar. This casts doubt on an analysis that relies on movement of an adjoined projection.

Third objection. The identification of the WH-pronoun (*hoe/welke/wie/wat*) as a functional category D^0 has to be fairly straightforward in child language. WH-questions first appear as constructions with an argument gap only (Van

Kampen 1989). When the WH-element appears shortly afterwards, it is invariably in sentence initial scope-position (i.e. is <+WH>) and contains, in addition, no further information than the typical phi-features allow (cf. Lebeaux (1988:444). It is hard to imagine what lexical category would be compatible with such properties. They are as functional as any category could be. I follow here Emonds' (1985:191) characterization of grammaticalized (functional) categories, paraphrazed in (17):

(17) a They are closed class elements and belong to a class that contains a small set of words which can't be added on to (no conscious coining).
    b They differ only by syntactic features and cannot be differentiated from each other solely by purely semantic features.

The distinction open/closed class and the relation head/complement occur in child language as early as in the two-word stage (Braine 1963, Bloom 1970, Lebeaux 1988:9f). We can regard these patterns as an indication that children fix the position of the functional head in the structure at a very early period. For instance, two-word nominal constructions of the type in (18) in early Dutch show a closed class element to the left of the open class noun.

(18)   (Laura 2;0-2;1)
    a   mij(n) N   (my N)
    b   beertjes stoel   (bear's chair)
    c   pappa's schoenen   (daddy's shoes)
    d   een boontje   (a bean)
    e   de ander pen   (the other pen)
    f   het boek   (the book)

WH-elements, articles and demonstratives are mutually exclusive and this restriction is respected in child language.
    The last argument against the Hoekstra/Corver analysis is based on the absence of certain subextractions. The argument runs as follows. WH-subextractions in Dutch child grammar involve only direct object DP's and predicated DegP's. Utterances like those in (19) and (20) do not occur in child language:

(19)   Extraction out of a subject
        *welk$_i$ leest   [$_{DP}$ t$_i$ kind]   een boekje?
        which$_i$ reads   [$_{DP}$ t$_i$ child]   a booklet?

(20)   Extraction out of an adjunct
        *hoe$_i$ heeft   de kat   [$_{DegP}$ t$_i$ hoog]   gesprongen?
        how$_i$ has   the cat [$_{DegP}$ t$_i$ high]   jumped?

This is reminiscent of the CED effects (Constraint on Extraction Domains, Huang 1982) of adult grammars. Adverbial phrases and subject NP's constitute islands for extraction, since they are not L-marked. The adjunction structure in (7) cannot handle the presence of CED effects. The adjoined NP/DegP is not included in all segments of the subject or adverb phrase (cf. Chomsky 1986:9). As a consequence, these phrases will not function as barriers and the explanation of the CED effects is lost.

To sum up: Four arguments have been presented to support the point of view that subextracted elements are based on a <+WH> feature of the functional head D^0 from the very beginning on. There are, in addition, no examples of other functional heads that show the delayed acquisition in the way assumed by Hoekstra for the <+WH> feature.

4. Towards an analysis of functional head movement

The proposal by Corver/Hoekstra implies that D^0 subextraction is apparent only. The <+WH> D^0 element is interpreted as a maximal projection NP adjoined to the object argument. This proposal gives the NP segmented structure [NP [NP]], which allows subextraction of the NP under the provisions of the Barriers theory, but it leads to the problems mentioned in section 3.

I venture a completely different approach.[5] Let me take the subextractions simply for what they seem to be, subextraction of the D^0 head. This will lead us to the questions in (21).

(21) a   Why is there no subextraction out of CED domains?
     b   What is the landing site of the <+WH> D^0 head?
     c   How can we devise a suitable path for A/bar head movement?
   d   Why is the acquisition of the LBC language specific and slow?

A more or less elaborated answer will ask more space than I have here to spend. The interested reader may look into Van Kampen (1994). Nevertheless, the direction of the answers can be indicated briefly.

The answer to (21a) is that subextraction of the D^0 element is possible in principle if the DP projection line is L-marked (Chomsky 1986). This requirement for the D^0 movement path explains the CED effects.

The answer to (21b) is that the landing site of the <+WH> D^0 element must be the C^0 position. Diagram (22) postulates two C-head positions in Dutch, one verbal for the finite verb, one non-verbal for the spell-out of the Q-operator. The Split-C hypothesis has been suggested in different contexts by various authors. It

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[5] The present version is due to extensive discussions with Arnold Evers.

fits a framework in which each functional category is represented by a projection. The C-projection harbors several functional categories, operator functions, subordination and mood. It is crucially assumed here in order to allow A/bar head movement in V-2nd constructions. In those constructions one needs a C^0 position for the finite verb as well as for the WH-head.[6]

(22)
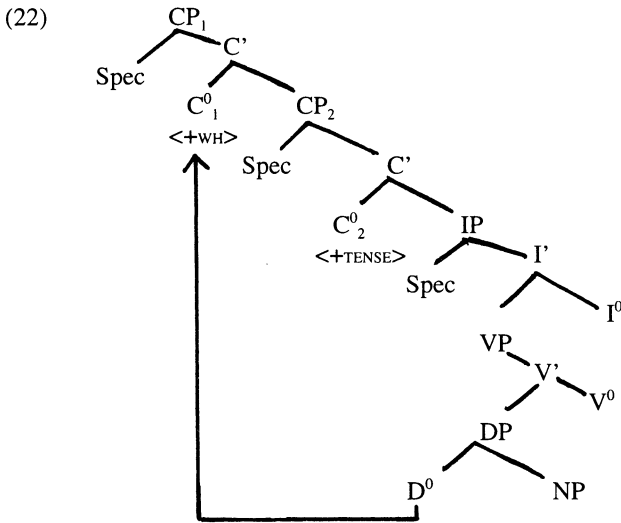
The answer to (21c), a suitable path for an A/bar head movement, is of some complexity. We have to consider the crossing of maximality and minimality barriers. Suppose we move the D^0 <+WH> as indicated in diagram (22). The WH-element crosses the potential maximality barriers DP, VP, IP, and CP_2. It also crosses the minimality governors V^0, I^0, and $C_2^{\,0}$.

A short look at the present possibilities for WH-movement may be useful. The original proposal for WH-movement in Chomsky (1986) considered maximal WH-phrases only. The WH-constituent would escape the VP maximality barrier by an in between adjunction to the VP. The IP projection was declared to be a non-barrier by brute stipulation and clearly the CP_2 just proposed above, did not belong to the phrase structure assumptions of Chomsky (1986). This story will not work for WH-head movement anyway. A head can not be adjoined to VP for reasons of phrase structure. It can only be adjoined to the head V^0, but that

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[6] A problem in the present split-C analysis is that the verb second placement in Dutch is well-established in the child grammar early on. I leave this problem for further research. It stands to reason that a maximal projection can only reach the specifier C_1 by first moving into the specifier C_2, if we assume relativized minimality as is done here, thus preventing the subject to move into the Specifier C_2 position.

adjunction will keep the WH-head within all segments of the VP and therefor not relieve the VP barrier. This looks pretty bad for the WH-head movement. However, we might make 'bonne mine à mauvais jeu' and consider whether the VP-adjunction was such a good idea after all.

The VP barrier escape for A/bar movements can not be generalized to a VP barrier escape for A movements. The A movements escape the VP barrier by another construction specific stipulation, the 'extended chain' (Chomsky 1986:75). It has been suggested by Drijkoningen (1987:119f) to stretch the extended chain proposal in such a way that A and A/bar movements may overcome the VP barrier in a parallel fashion. This seems a step in the right direction, although we may remark that the intended notion of extended chain does not fit the spirit of barriers either. The fundamental idea must have been to derive binding and bounding islands from phrase structure configurations in such a way that construction or category specific assertions were avoided. I suggest to exchange the notion of 'extended chain' for Grimshaw's (1991) notion of 'extended projection' as in (23)

(23)   The true Maximality Barriers are Grimshaw's Extended Projections rather than Chomsky's Maximal Projections.

The extended projection is a general phrase structure notion, which fits the spirit of the Barriers proposal better than the VP/IP and extended chain proposals.

Let me return to the WH-movement in (22). As far as the maximality barriers are concerned, we have to deal only with the DP and the CP_2. The DP and its head D^0 are theta-governed (Chomsky 1986:19).[7] This should relieve the DP barrierhood. The CP_2, the only relevant barrier in (22), will not cause a subjacency offence when crossed.
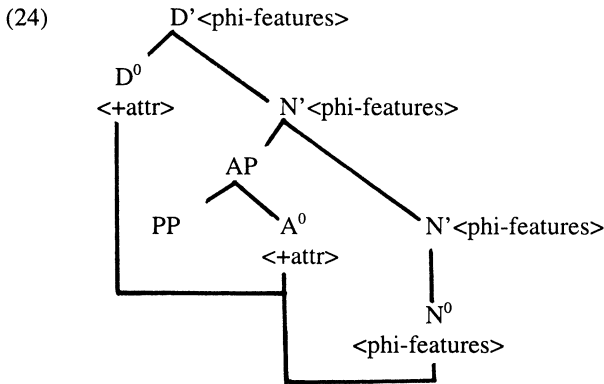
It will not cause a binding offence either on the assumption that the landing position C^0_1 is the first c-commanding A/bar head that yields a potential antecedent position for D^0.[8] The minimality barriers in (22), V^0, I^0 and C^0_2 may allow the movement of WH-elements if they are relativized with relation to the feature <+/-N>. The minimality governors themselves are <+V,-N>, whereas the WH-elements must be <+N> for D^0 and Deg^0. All of this construes a WH-movement path. Crucial assumptions have been (23) and Rizzi's Relativized Minimality.

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[7] Chomsky (1986:71) retracts this position, but for reasons that seem irrelevant in the present alternative.

[8] Consider also Rivero (1991) and Roberts (1994) for long head movement, but within the verbal projection. Roberts derives clitic climbing in Italian by using the distinction L-related/non L-related. In a non L-related chain the clitic can skip L-related (verbal) heads, and subsequently adjoin to, a higher, Agr. Note that clitic movement to C^0 in Slavic languages constitute a close parallel to the WH-head movement and, as far as I know, an equally unsolved problem.

The answer to (21d), and to the initial question of parametrization in (4), is that the Left Branch Condition is not a matter of insufficient binding of an empty category at all. It is a PF requirement on attributive morphology.

Suppose that in an extended projection all heads at left branches m-governed by the lexical head of the extended projection are marked by a morphological feature <+attributive>. Furthermore, suppose that there is a language specific spell-out of the <+attr> marking. In poorly inflected languages the <+attr> marking can only be deleted or spelled out under adjacency at PF, as (24) shows.

(24)

D'<phi-features>

D⁰
<+attr>

N'<phi-features>

AP

PP   A⁰
          <+attr>   N'<phi-features>

                         N⁰
                         <phi-features>

checking of <+attr> and phi-features at PF,
under string-adjacency of <+attr> and N'

The identification of <+attr> at PF requires the original N' adjacency to be preserved. The underlying idea is that structural information is available at PF, but only under conditions of string adjacency. Therefore, if adjacency has been destroyed by previous WH-subextraction, the feature <+attr> cannot be spelled out. The resulting structure will be ruled out at PF.

In highly inflected languages the morphological feature can be spelled out context free by means of the phi-features of the extended projection (number, gender, case, definiteness, animacy, etc.).[9]

The restrictive conditions of poor morphology are acquired slowly. The spell-out of <+attr> will often be a zero morpheme. Let's suppose that, at least in child language, there is no <+attr> spell-out at all. This would allow the child to ignore the Left Branch Condition.

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[9] The reference to 'rich morphology' is admittedly vague, but not necessarily illegitimate. Consider for instance the parallel problem for verbal inflection and pro-drop.

5. Conclusion

WH-operators may be extracted from extended [+N]-projections if they are L-marked. Children obey the Barriers-type of locality in that they do not subextract out of subjects and adjuncts. This is consistent with the universal nature of locality principles that can be derived from the Barriers theory. The fact that children do not comply with the language-specific Left Branch Condition must be a matter of parametric variation.

I have defined a suitable path for the A/bar head movement, assuming extended projections and a modified version of Relativized Minimality. The verbal heads that build up a path will not block a non-verbal WH-head from moving over the verbal extended projection.

I have accounted for the parametric variation on left branch extractions in terms of a checking of the feature <+attr> under conditions of strict adjacency.

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