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On the Nature of Children's Left Branch Violations

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1. Introduction

A number of studies have reported that English- and Dutch-speaking children, even in the age-range of five to six years, exhibit Left Branch Constraint violations (LBVs) in *wh*-questions. The finding has held for studies of spontaneous speech (Kampen 1994, 1997), question answering (Hoekstra, Koster, & Roeper 1992), and elicited production of possessive questions (Thornton & Gavrusseva 1996). Kampen (1997) and Snyder (1995) have proposed parametric accounts, based on the observation that most Slavic languages, for example, have an adult grammar in which LBVs are permitted. The present study examines LBVs in English children (three to five years old), by eliciting questions of possession (*whose*) and quantity (*how many*). The results to date are problematic for a parametric account of LBVs, although at least one crucial condition (cf. Yamane, in progress) remains to be tested.

2. Left Branch Effects

The Left Branch Constraint (LBC) in (1) was first proposed by Ross (1967) to account for data such as (2,3) in English.

- (1) No NP which is the leftmost constituent of a larger NP can be reordered out of this NP by a transformational rule. (Ross 1967:114, 4.181)
- (2)
 - a. [Whose book] did John find __ ?
 - b. [How many books] did Mary read __ ?
 - c. [How old] is Fred __ ?
- (3)
 - a. * Whose did John find [__ book] ?
 - b. * How many did Mary read [__ books] ?
 - c. * How is Fred [__ old] ?

Thus, extraction of a *wh*-word from the left-periphery of an English NP is ungrammatical (3), and instead the entire NP must undergo *wh*-movement, as in (2). The LBC effect found in English is not universal, however. Most Slavic languages, for example, permit close counterparts to (3a,b), as illustrated by the Russian example in (4). (Counterparts to (3c) are also possible in the few Slavic languages, such as Serbo-Croatian, that permit degree modifiers with adjectives.)

- (4) Skol'ko pročtal Masha [__ knig]? (Russian)
 how-many read Mary __ books-GEN
 'How many books did Mary read?'
 (lit. 'How many did Mary read (of) books?')

A number of acquisitional studies have found that children learning English or Dutch violate the LBC. Dutch, like English, exhibits clear LBC effects in *wh*- and other movement operations. Hoekstra, Koster, & Roeper (1992) reported on a question-answering study involving questions that were unambiguous in adult English or Dutch, but that were predicted to be ambiguous for children whose grammar was not subject to the LBC. Among both the Dutch- and the English-speaking children (age-range: five to six years), there were subjects who gave at least one answer corresponding to the ungrammatical, LBC-violating interpretation of a question, as in (5).

- (5) Experimenter: How did John paint the cup yellow?
 Child: Dark yellow.

Studies of Dutch children's spontaneous speech by Kampen (1994, 1997), Hoekstra & Jordens (1991) similarly found left-branch violations (LBVs), as illustrated in (6), as well as adult-like forms.

- (6) a. Hoeveel denk je dat ik [__ geld] heb? (Kampen 1997: Laura 8;3)
 how-much think you that I [__ money] have
 (lit.) 'How much do you think that I money have?'
 b. Doe jij Laura's ook [__ haar]? (Kampen 1997: Sarah 6;3)
 do you Laura's too [__ hair]?
 (lit.) 'Are you doing Laura's too hair?'

Thornton & Gavrusseva (1996) reported that they obtained LBVs (as well as other non-adult forms) in an elicitation task for *whose*-questions with English-speaking children. In contrast, Snyder (1995:144-146) found only two potential instances of LBVs with *how*, *how much*, and *how many* questions in a computer search of the three English corpora from (Brown 1973).

3. Objectives

The present study seeks to answer the following questions: Why do children learning English or Dutch disobey the Left Branch Constraint? Are LBVs fully grammatical for the English- and Dutch-speaking children who produce them? Why are

LBVs more common in the spontaneous speech of Dutch children (cf. Kampen 1997) than of English-speaking children (cf. Snyder 1995)?

In particular, two predictions of Kampen's and Snyder's parametric accounts are tested in our study. The first is that LBVs should occur for a range of *wh*-expressions, including both *whose* and *how many*. The second prediction is that LBVs should occur in both long-distance and short-distance *wh*-questions.

4. Method and Results

Both a comprehension task and an elicited production task were employed with English-speaking children between three-and-a-half and six years of age.

4. A. Comprehension Task

A Truth Value Judgement Task (Crain & McKee 1985) was developed in an effort to evaluate English-speaking children's acceptance of LBVs. Test items involved a *wh*-question embedded in a declarative sentence, and children were required to judge the combination of a sentence containing an embedded question plus a phrasal answer to the embedded question. Each test item was grammatical and unambiguous on the adult grammar, but grammatical and *ambiguous* on a grammar lacking the LBC. An example is provided in (7).

(7) Example of Truth Value Judgement Test Item.

Experimenter: This is a story about driving trucks on slippery snow. Grover is the boss of these guys who drive these trucks. He tells them things they are supposed to do. Today, these guys need to carry some stuff over a snowy mountain. They are waiting at Grover's house for Grover to tell them what to do. Grover comes out, but he is in such a hurry that he forgot to put on his coat and hat and mittens, so he's really cold.

Grover: Brr... I forgot my coat. I'm so cold! I have special instructions to tell these guys about driving on the snowy mountain, but I'm freezing. I guess I'll have to talk really fast! (to drivers, very fast) I want you to drive very slowly on the mountain because it's slippery. On the road after the mountain it's not slippery, so you can drive fast. (Grover runs inside.)

Truck guys: What did he say? He was talking very fast. I couldn't understand him! Let's call him and get him to come out again. GROVER!

Grover: (again forgets coat) It's too cold out here. I have to talk very fast. Drive very slowly on the mountain because the mountain very slippery! But on the road after the mountain you can drive fast. (runs back inside)

Truck guy: Grover talked very fast, but I think he said we should drive very slowly on the mountain. It's slippery. I'll go first. (Drives down the mountain and then drives fast on the road. Other guys do the same in turn.)

Puppet: ...

[Test Item]

I know how Grover said to drive down the hill slowly. Very Slowly!

Adult answer: No, he said it very fast.

LBV answer: Yes, he said to drive very slowly.

[Control Items]

I know where Grover said to drive slowly. On the mountain.

I know where Grover said to drive slowly. On the road after the mountain.

Subjects were 14 children at the University of Connecticut Child Development Laboratories, aged 4;4 - 5;11 (mean 5;1). (Three additional children were tested but excluded because they could not complete an initial set of practice items.) Each child first heard two practice stories and responded to a total of four practice items. Each child then heard four test stories, interleaved with filler stories. Each of the test stories was followed by a test item (adult answer=*no*), and then by a control item (adult answers balanced *yes/no*).

The results of the comprehension task were as follows. All the children gave an LBV answer to at least one of the four test items. Overall, children provided *adult* (non-LBV) answers to only 21.4 % of the test items, but provided adult answers to 91.1 % of the control items (paired $t(13) = 8.77, p < .0001$).

Unfortunately, certain methodological concerns emerged during testing. First, it was observed that the word *how* can sometimes function as a complementizer in colloquial American English (semantically comparable to *that*). Thus, it is difficult to be certain that the children were employing the intended, *wh*-word interpretation. Crucially, if *how* was interpreted as a complementizer, then the end of each test item was interpretable as part of a (grammatically well-formed) "repair strategy," rather than an LBV. Informal polling of adult informants suggests that the test items are at most mildly ungrammatical with the "LBV" truth conditions. True LBVs, in contrast, are severely ungrammatical in English.

4. B. Elicitation Task

A second approach involved elicited production, rather than comprehension. The elicitation study, modeled on that of (Thornton & Gavrusseva), included prompts designed

to elicit long-distance questions of possession, and both short- and long-distance questions of quantity. The child was first introduced to a puppet who liked to play guessing games, but didn't like to talk to grown-ups. For each test-item, the experimenter set up a situation and then prompted the child to ask the puppet a relevant question. Long-distance prompts were designed to bias the child strongly towards an LBV, if permitted by his/her grammar. The following (8a,b) are examples of short-distance (SD) and long-distance (LD) prompts:

(8) a. Short-distance Prompt

This must be somebody's necklace, but we don't know whose. Ask Dino whose! [Target: Whose necklace is this?]

It sounds like there are lots of marbles in the can, but we don't know how many. Ask Dino how many! [Target: How many marbles are in the can?]

b. Long-distance Prompt

This must be somebody's key, but we don't know whose. Ask Dino whose he thinks! [Target: Whose key do you think it is?]

This box has pencils in it, but we don't know how many. Ask Dino how many he thinks! [Target: How many pencils do you think are in there?]

Subjects were 11 children at the University of Connecticut Child Development Laboratories, aged 3;7 - 4;11 (mean 4;5). (Four additional children were tested but excluded from analyses because they systematically declined to ask the puppet a question, or were unable to complete the protocol.) Testing was divided into two sessions. The first session contained (2) LD *how many*, 2 LD *whose*, and (2) SD *how many* items. The second session contained (5) SD *whose* items. Responses were coded as *Adult*, *LBV*, or *Other*.

The main results of the elicitation study were as follows. Six of 11 children produced at least one LBV utterance. Yet, *no* child ever produced a short-distance LBV (0/77 opportunities). Furthermore, *no* child (0/11) produced LBV responses to all four long-distance prompts. The group data for the eleven children are provided in (9a,b).

(9) a. Long-distance Items:

	<u>LBV</u>	<u>Adult</u>	<u>Other</u>
Whose	6/22	2/22	14/22
How many	5/22	7/22	10/22
Totals	11/44	9/44	24/44
Percentages	25.0%	20.5%	54.5%

b. Short-distance Items:

	<u>LBV</u>	<u>Adult</u>	<u>Other</u>
Whose	0/55	40/55	15/55
How many	0/22	21/22	1/22
Totals	0/77	61/77	16/77
Percentages	0.0%	79.2%	20.8%

Overall, LBVs were significantly more frequent following LD prompts (25%) versus SD prompts (0%) (in repeated-measures 2x2 ANOVA with LBV/not as dependent variable, and Pearson's weighted-coefficient solution for unequal cells: $F(1,10)=9.05$, $p=.013$). The *whose* (8%) versus *how many* (11%) manipulation did not yield a significant difference in the frequency of LBV responses. Responses of the non-adult, non-LBV (*Other*) category were again more frequent with LD (55%) than SD (21%) prompts ($F(1,10)=46.9$, $p<.001$), and were also more frequent with *whose* (38%) than *how many* (25%) ($F(1,10)=8.92$, $p=.014$). Examples of the children's utterances are provided in (10-12).

(10) Utterances coded as (potential) LBVs (exhaustive list):

- a. How many do you think marbles are in there?
- b. How many do you think # pencils are in there?
- c. Who do you think whose dog this is?
- d. How many # do you think how many # marbles are there in there?
[Note: Subject-Aux inversion in embedded clause]
- e. How many # do you think marb # how much marbles is in there?
- f. How many do you think pe # how much pencils are in there?
- g. Who do you think this bottle 's is?
- h. Whose is thinks this is his # whose bottle?
- i. Whose you thinks # that # that -s bottle belongs to?
- j. Whose # whose # um bottle is this? Who do you think this bottle is?
- k. Who do you think this dog is # wh whose dog is this? Wh who do you think # this dog [-z] belongs to.

(11) Examples of Adult Utterances:

- a. Whose keys are these?
- b. Whose ribbon is this?
- c. How many postcards are in there?
- d. How many marbles do you think are in there?
- e. How many pencils do you think there is (?) in there?
- f. Whose bottle do you think this is?
- g. Whose are all these keys? [Note: Structure is grammatical, but slightly odd.]
- h. How many # pencils do you think that 're in there? [Note: *that*-trace violation]

- (12) Examples of Utterances coded as *Other*:
- a. Whose do you think he is? Who do you think he belongs to?
 - b. Uh, how many do you think?
 - c. Whose think? Whose bottle is this?
 - d. Whose # who do you think is his? Whose # do you think this is?
[Possible LBVs coded as *Other*.]
 - e. Who # do you think that book is?
 - f. Uh, whose, who do you think's?
 - g. How # h # what do you think how much um # pencils are in this box?

5. Discussion

The results of the comprehension task were equivocal, for reasons already indicated, and will not be discussed further. The results of the elicitation study speak *against* a simple parametric account, in which English-speaking children's LBVs are analogous to those in adult Slavic. The Slavic languages (e.g. Russian, Serbo-Croatian) that allow LBVs use them with considerable frequency in SD contexts (Zeljko Boskovic, personal communication), but none of the children in our elicited-production study produced *any* LBVs in SD contexts. Furthermore, our results indicate that LBVs are not a fully grammatical option for any of the English-speaking children in our study. The long-distance prompts we employed should have yielded a strong bias towards an LBV response in any child for whom such a response was grammatical. Yet, *no* child in our study consistently used LBVs in response to the LD prompts. Instead, the LD prompts yielded large numbers of non-LBV, *Other* responses that diverged substantially from the adult target, suggesting that children who began with a modified version of the prompt (i.e., 'Whose/How many do you think ...') could not find *any* fully grammatical continuation.

Nonetheless, our results suggest that the source of children's LBVs (and perhaps of certain other, non-adult forms) is sensitive to syntactic structure. Of the 5 LBVs produced with *how many*, all placed the stranded material in a medial complementizer (SPEC, CP) position (10d) or in a position ambiguous between medial Comp and surface subject position (10a,b,e,f). Of the 6 LBVs with *whose*, one (10c) placed the stranded material in medial Comp, and at least 4 others (10g,h,i,k) placed the stranded possessee, together with some form of adjacent possessive marking, in what is plausibly a pre-*wh*-movement position.

The LBVs obtained in our elicited-production task might be similar in origin to the resumptive pronouns used by certain adult English-speakers. The resumptive pronouns in question are at least moderately ungrammatical in their own right, but allow the speaker to avoid a more severe grammatical violation without stopping and completely recasting the utterance. Note that this phenomenon is to be distinguished from so-called "Last Resort" mechanisms, such as English *do*-support, which yield a fully grammatical sentence. In the case of the LBVs we elicited, the children presumably attempted to begin their question with approximately the same words that were used by the experimenter. Where the experimenter said, "Ask Dino whose/how many he thinks," the child might reasonably be expected to echo this structure, and begin, "Whose/How many do you

think" Even if the LBC is operative, the child's "best" option, short of backtracking and recasting the first clause, may be to pronounce some of the material missing from the matrix SPEC, CP in some structurally lower position. In terms of Chomsky's (1993) copy-theory of traces, the child may be spelling out part of a lower trace (either in the intermediate SPEC, CP or in the thematic position) under conditions analogous to those associated with resumptives.

The presence of LBVs in the spontaneous speech of Dutch-speaking children, but not English-speaking children, may be related to the existence of focus-related scrambling in Dutch. Kampen (1997:134) observes that Dutch LBVs frequently contain an overt focus particle (*wel, niet, nog, ook, nou*) adjacent to the stranded material, and/or involve focal stress on the moved left-branch material. Moreover, Kampen argues that focus-related scrambling is the source of the non-wh LBVs in her data. Dutch children may have a grammar in which focus-marking triggers scrambling (as is perhaps true for adult Dutch), but in which focus-marking cannot spread beyond semantically focused material. In this case Dutch children might be faced with the choice of disobeying grammatical constraints on the syntactic representation of focus, or violating the LBC. LBVs with *wh*-words in Dutch perhaps result from a combination of focus- and *wh*-features. Without overt, focus-triggered movement, English-speaking children would then produce LBVs only rarely in spontaneous speech.

The interpretation of the present elicitation study must remain tentative, because at least one major factor remains to be examined. As pointed out to us by Sandra Stjepanovic and Kazumi Matsuoka (p.c.), the structures that we sought to elicit were generally violations of both the LBC and Huang's (1982) Condition on Extraction Domains (CED), as the intended extraction site was typically within a subject or a predicate nominal. A follow-up study (Yamane, in preparation), explicitly testing for an effect of subject versus direct-object extraction site, is currently underway.

Note

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