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Negative Islands in Language Acquisition

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1. Introduction

Modern linguistic research has two problems: 1) intuitional judgments are not always clear and do not always match the subtle predictions made by theory , and 2) the distinction between semantics and syntax becomes increasingly obscure. Acquisition data has traditionally been seen as undermined by "performance" factors, but the results of twenty years of research has revealed that acquisition data can be as subtle as intuitional data. Now the question arises: can acquisition data offer unique insights into linguistic ability. Two factors suggest that this is possible: 1) the time course of acquisition can reveal which factors belong together, and 2) the large amount of data, drawn from responses to contextually natural stories allows us to see effects that may be beyond any kind of sharp intuition.

In this paper, we reveal some acquisition data on the effect of negative islands on long distance WH movements. The experiment we developed was set to examine the theory of barriers on WH movement. In particular, the revised version of barriers as it is described in *Relativized Minimality* (Rizzi, 1990).

In *Relativized Minimality* , Rizzi (1990;1992) proposed that negatives and WH phrases are barriers to long distance movement of adjunct WH phrases. Under minimalism, each movement step has to satisfy locality condition for its WH type. Adjunct WH phrases must move through the specifiers (Spec) of all adjunct phrases. If negation is an adjunct phrase, then the WH phrase must move through its Spec. Therefore, we predict the ungrammaticality of the following sentences:

- (1) a. *Why don't you think [t' [we can help him]]?
 b. *How do you wonder [whether [we believe [(t') [we can help Bill t]]]]

If there is no trace in one of the intermediate Spec positions of the adjunct phrases, such as a WH phrase or NegP, in the sentence, then the trace at the end of the movement chain would be an improperly govern. This results in a violation of the Empty Category Principle (ECP), a condition on stranded traces in the sentence. In sentence (1a) (Rizzi's (22), 1990: p. 83), for example, the WH *why* cannot be moved from the lower clause (i.e. to construct Why-can help) because the chain between the trace of *why* and the antecedent *why* is interrupted by the NegP *n't* in *don't*. Similarly, in sentence (1b) (Rizzi's (45), 1990: p. 95), the WH island *whether* blocks linking the WH *how* to a lower trace in the embedded clause.

The theories of barriers raise natural questions about how those structures are learned by children. The acquisition data revealed that children are sensitive to WH barriers. In what follows, we review the results on the WH island study in child grammar before we present the negative island data.

2. WH island in child language

English acquisition data from de Villiers, Roeper, and Vainnika (1990) showed WH island effects. For the purposes of this paper, we focus on adjunct WH barriers. In Table 1, the results of the initial work on WH partial movement are presented. Long distance movement was clearly blocked in sentence (3&4) in contrast to sentence (2) where no medial WH phrase was present. Responses with short distance movements were more than responses with long distance movements. Partial WH movement was also observed. Partial movement involves answering the medial WH phrase. The mechanism via which a medial answer is obtained is by covertly moving the medial WH phrase to the matrix clause. In (5), an example from German, a WH partial movement language, the question is "with whom Jakob is talking" with the medial WH phrase having the wide scope.

Table 1. WH island effects on the movement of adjunct WH phrases (SD=short distance; LD=long distance; PM=partial WH movement) (N= 25; age: 3.7 to 6.8 year olds)

The Sentence	SD	LD	PM
2. <u>When</u> did the boy say he hurt himself? (Adjunct - 0)	50% (When-say)	44% (When-hurt)	NA
3. <u>How</u> did the girl ask <u>who</u> to paint? (Adjunct - argument)	23% (How-ask)	8% (How-paint)	68% (Who-paint)
4. <u>When</u> did the clown say <u>how</u> he caught the ball? (Adjunct - adjunct)	48% (When-say)	6% (When-caught)	40% (How-caught)

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- (5) Was_i glaubt [IP Hans [CP [mit wem]_i [IP Jakob jetzt t_i spricht]]]?
 WHAT does Hans believe with whom Jakob is now talking?

Children answer the medial WH for arguments (e.g. *what* and *who*) and adjuncts (e.g. *how* and *when*) roughly 50% of the time. The amount of partial movement that children give varies among the questions for a variety of interesting reasons: the content of the WH phrase, the nature of the stories, and the semantics involved all contribute to children's choices. For instance, arguments are referential in that they refer to sets in contexts. Likewise, the non-central nature of adjuncts in the discourse may explain the presence of fewer adjunct-medial responses. Acquisition data demonstrated that both arguments and adjunct WH phrases create barriers for long distance movement.

Copying is a phenomenon that is similar to partial movement which is investigated in this study. In copying an identical WH phrase appears in two positions within the same sentence: the matrix Spec,CP and the embedded Spec, CP. Copying can be seen as another form of partial movement (e.g. Hohle, 1994, cited in Muller and Sternefeld, 1996) where the medial WH phrase is the spell-out of a trace during long distance movement (see Roeper, 1993, and Thornton, 1989). Such case is shown in (6). From our point of view, the crucial question is whether children will treat (6) as if *why*₂ undergoes movement to *why*₁.

- (6) Why₁ did John say why₂ he can played?

We include the copying condition to see if the copy and non-copy cases behave the same and hence a chain of move and copy in the medial Spec,CP underlies children's strategy of long distance WH movement. In production data, for example, children allow copying of the medial WH phrase as in (7) (e.g. Thornton, 1990). Copying movement to the matrix clause seems an overt version of what partial movement is as (8) shows.

- (7) What did she say what she wanted. (Roeper, pc.)
- (8) a. Was_i meint Hans [CP wen_i (da) sie wirklich t_i liebt?]
 [+Wh] think Hans who_{Acc} (that) she really loves?
 b. Wen_i meint Hans [CP wen_i (dass) sie wirklich t_i liebt?]
 Wh_{Acc} think Hans who_{Acc} (that) she really loves?

Now we are in a position to make new hypotheses. First, under the view that negatives are adjuncts, we argue that negative phrases are barriers to Long distance movement. Second, under the prediction that copying entails a movement at LF, we predict that negatives are barriers to copied WH phrases. Experimentally the following predictions arise:

- a. negatives will force short answers for long distance movement
- b. negatives will force short answers for partial movement or copying.

Prediction (b) follows precisely if we assume that there is covert or movement at the Logical Form (LF) involved in partial movement. This is the focus of our experiment. The predictions are the same for Standard English, African-American English, and Arabic.

3. The negative island experiment

3.1 Method

Participants. A total of 67 participated in the study. They ranged from 3.3 to 5 year old children of whom 27 speak Standard American English, 10 speak African American English and 9 speak Arabic. There were also 21 Standard American English speaking adults for a control group and for purposes of comparisons with the children's performance.

Materials. Twelve counterbalanced stories were used. Half of the stories were designed to provide felicitous answers to a negative question. The other half were followed by an affirmative question. Those were the control group. In the positive version (9), the short distance answer to the *why* question in (9 a&b) is "because his sister asked him how he got clean". Another reason is the long distance answer, "because he was dirty". In the negative version (10), a possible short distance answer for the negative question in (10 a&b) is "because his mother was sleeping" besides the long distance reason as in (9).

(9) A positive version story

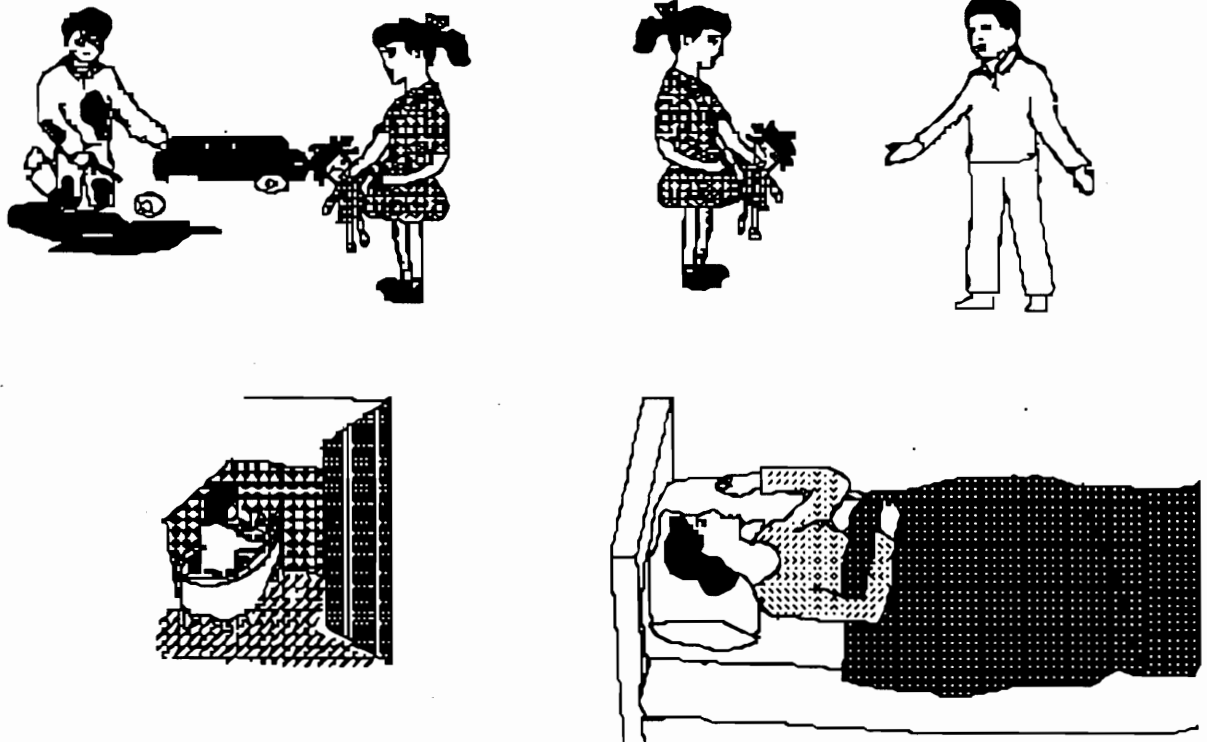
This little boy got covered with mud while playing outside with his sister. He took a bath because he was dirty and he had to get clean. His sister saw him afterwards and said: "You were so dirty. What happened?" He said: " I took a bath because I was dirty."

- a. Why did the boy say he took a bath?
- b. Why did the boy say why he took a bath? (Copy condition)

(10) A negative version story

This little boy got covered with mud while playing outside with his sister. He took a bath because he was dirty and he had to get clean. He didn't tell his Mom he took a bath because she was sleeping in her bedroom.

- a. Why did the boy not tell his Mom he took a bath? OR
- b. Why did the boy not tell his Mom why he took a bath? (Copy condition)



Half of the WH questions contained a medial WH copy as in (9 b & 10 b). Whereas most adults if they look closely at (9 b & 10 b) they would treat them as indirect questions, in actuality they treat them as long distance movement.

3.2 Results

Negation appeared as a barrier both in child and adult responses. In Table 2, all groups showed more short distance answers to the negative than the affirmative questions; within subjects effects were significantly different ($F=72$; $p=.000$). No main effect for age was found ($p=.43$). There was also no main effect for the adult and child group ($p=.28$).

Table 2. Results on the negative barrier for children and adults (LD=long distance movement; SD=short distance movement)

Age	Why (9a)		Why Copying (9b)		Why Neg (10a)		Why Neg Copying (10b)	
	LD	SD	LD	SD	LD	SD	LD	SD
3 (N=6)	69.4%	30.5%	88.9%	11.1%	38.9%	61%	5.6%	94.4%
4 (N=9)	92.6%	7.4%	96.3%	3.7%	14.8%	85.2%	14.8%	85.2%
5(N=17)	96%	3.9%	95%	4.9%	7.8%	92%	15.7%	84.3%

Adults (N=21)	88.9%	11%	73%	27%	0%	100%	0%	100%
Arabic								
4 (N=3)	88.9%	11%	100%	0%	11%	88.9%	38.9%	61%
5 (N=6)	88.9%	11%	83.3%	16.7%	11%	88.9%	25%	75%

Negative barriers showed similar crosslinguistic effects. There was no main effect for the Standard or African American English dialect among the 5 year olds ($p=.39$); hence data was joined. There was also no main language effect for the English and Arabic 4 and 5 year olds ($p=.14$). There was, however, significant interaction effect between the WH conditions and language in the English/Arabic case ($F=2.26$; $p=.03$) which became not significant when corrected by Greenhouse-Geisser Epsilon ($p=.08$). The means of the SD answers to the negative questions were higher for English than Arabic. In general the data provides further evidence that children obey syntactic constraints on LD movement.

In the data, there were no significant differences between the copy and non-copy affirmative questions. No significant differences were also found for the negative copy and non-copy questions indicating that a medial *why* behaves like a trace in LD questions (i.e. 9 a&b are syntactically identical). The copy and non-copy sentences behave the same: both have LD movement without negatives and both are blocked by negatives. Children seem to use the WH copy as a LD strategy. The fact that adults also get LD on copy-sentences may reflect an option in UG which is available to the child in the initial stages and the adult in substandard speech (see Roeper (1993), and de Villiers, Roeper & Vainikka, 1990). The data, however, is open to some more refined analysis.

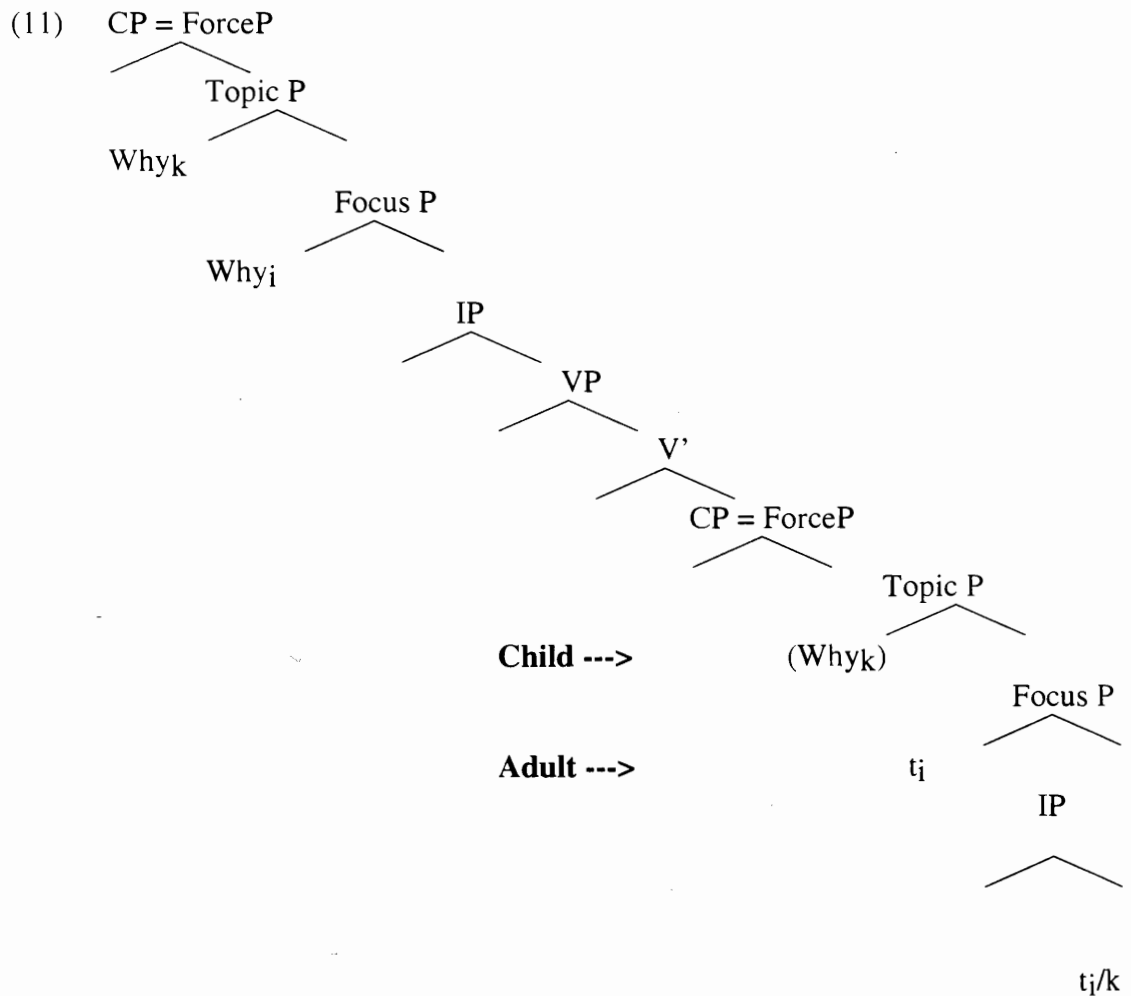
While the negative barrier in the non-copy WH questions (7a) was predicted from age ($b=14$; $p=.03$) for the English speaking children, there is a linear decline of LD answers. An age effect was also found for the non-copy affirmative questions ($b=14$; $p=.01$). LD answers are linearly increasing. One possible reason is that the lack of the copy makes it harder for the younger children to process the long distance chain (Dickey, pc.).

According to Rizzi (1990, 1992), WH and negative islands receive a unified syntactic account. We have demonstrated that the behavior of WH islands showed island effects similar to the negative island. Why do, then, younger children seem to block less? One possibility is that they group all WH phrases together at first with some default constraints once the movement concept is triggered, let say constraints that apply on the argument WH phrases. As they internalize more data input, WH phrases become identified with more syntactico-semantic features, and hence more WH or feature-specific constraints are triggered. Another possibility is that the negative phrase might start as an adjunct in child grammar, and once it is analyzed as a fully projected negative phrase headed by *not*, children become sensitive to negative islands. (See Lebeaux, 1988; Roeper, 1996).

It is always valuable to project the final stage of acquisition. Here, of course, one is making a logical projection and not a data-driven analysis. One question which has never received a satisfactory answer is this:

How does the English speaking child eliminate partial and LD movements?

We will address the question from the new perspective offered by Rizzi's theory of Split complementizer phrase. Rizzi (1996) proposed that there is a series of split-CP positions, which exhibit some language variations. In (11), there are different positions in CP for different syntactic elements. In the tree diagram, it is shown how a child would construe a WH chain in comparison to an adult chain. Each position has different properties. Crucially one difference stands out: Topic phrase is not quantificational; Focus phrase is quantificational. A chain for a child and an adult would look like the chain in (13). The *only* phrase introduces a contrast set.



- (12) **Child** ==> Wh_k ----- Wh_k ---- t_k
Adult ==> Wh_i ----- t_i ---- t_i
- (13) John said that only milk would he drink.

Suppose that, in the child grammar, unlike adult grammar, a WH phrase occupies a Topic phrase. In addition, initially, the wh-phrase may lack quantificational force. This speculation is compatible with partial movement. The WH phrase is linked to a Topic phrase and then co-indexed with a matrix scope-marker. If the child initially moves a WH phrase to a position not directly head-governed by the higher verb, such as to the Topic phrase, then copying without deletion may occur at PF (under the copy and delete approach to transformations (Chomsky, 1993). After copying, binding can be achieved by coindexation. This makes partial movement like resumptive pronouns. This resumptive pronoun strategy has also been suggested by Perez (1993) and Penner (1996) in embedded clauses until age 4 where a WH phrase is linked to a base-generated null resumptive pronoun.

Then at some point a new factor enters the grammar: Quantification and quantificational operators are triggered. This process may play a crucial role in WH acquisition, but involve a totally different range of quantificational data. We shall not review how quantification emerges. There are many intriguing possibilities. Here we just assume its effect. When quantification appears, we predict that WH copying disappears before partial movement (Thornton, 1990) due to the fact that a WH phrase moves to a quantificational position in the matrix clause and hence can bind a variable, which makes copying unnecessary.

With quantification, the Focus phrase appears in the embedded clause as in the adult grammar. Focus phrases are linked to specific verbs and therefore entail subcategorization. When verb subcategorization is acquired (Weissenborn, Roeper & de Villiers, 1991), movement of the type copy and delete is triggered. Then the WH phrase can appear in the Focus phrase under subcategorization. Subcategorization allows Proper Government by the higher verb, which now makes the ECP (Proper Government) active. The child deletes the WH copy when verb-subcategorization is acquired. It is predicted, then, children show a decrease in partial movement for verbs like wonder [+WH] (Weissenborn, Roeper & de Villiers, 1991). Under Minimalism, where government is no longer a fundamental principle, the relation can be restated configurationally as a sister relation with, possibly, a Feature on the verb that selects the Focus Phrase.

3.3 The parallel between partial movement and copying

A further claim is natural and leads to work currently underway. Covert or LF-

movement is present for copying; therefore, it should be present for partial movement. We need to test the interaction between negation and the presence of a different medial WH word. This will establish whether children carry out invisible LF-movement with any WH phrase. Negation should block movement of medial *how* and *why*. There are at least three possible readings for the sentence. A short distance for “when she didn’t tell? In the evening”, in contrast to the partial movement for “how broke? By smashing into a big rock.” The long distance reading is “when broke? In the afternoon.” The last two readings, however, are not grammatical for the negative question in (14a). The ungrammaticality is induced by the negative *not*. For example, in sentence (14a), to answer *how*, one needs to move over negation.

- (14) a. When did the girl not tell her Mom how she broke her bike?
b. When did the girl tell her Mom how she broke her bike?

This effect in the partial movement construction is observed in the WH copy examples reported in this study. In other words, is copying just one instance of LF-movement for WH phrases? If so, then any WH phrase will show the same property (Horvath, 1996; Muller and Sternefeld, 1996). That is, the medial WH phrase moves covertly to the position of the matrix scope marker at LF where every syntactic element receives interpretation.¹

4. Conclusion

Selective islands have been the core of research on the acquisition of the CP system for the last decade. WH islands have already been demonstrated in child grammar. Is negation the same? Rizzi (1990) utilizing subtle and controversial data argued that adjuncts block in principle in the same manner as arguments. We have used acquisition data (1) to support his account, and (2) to demonstrate that copying, and by extension partial movement, involve invisible movement and Relativized Minimality at the level of Logical Form. The fact that Logical Form effects are present among young children is itself a demonstration of the idea that children's grammars possess the full abstract character of adult grammars.

¹ See R. Frank (1997) for an extension of the partial movement concept to include other kinds of apparently long distance movement. In general, he argues that there is no long distance movement at early stages. Instead an invisible Operator functions in the same manner as a medial WH phrase. His account makes all early WH movement consistent, but leaves open the question of why and how the child moves to an adult grammar because nothing would prevent the child from remaining with this grammar.

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