

Children's Sensitivity to Adjunct Islands in *There*-Sentences*

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1. Introduction

In the last two decades, how children acquire adjunct island constraints has been a focal topic of research in language development (e.g., Otsu 1981, Crain and Fodor 1984, Goodluck et al. 1992, de Villiers and Roeper 1995, Abdulkarim 2000; see Goodluck and Rochemont 1992 for a survey). Previous studies are mostly concerned with children's sensitivity to extraction from phonologically *overt* adjunct islands. For example, Otsu (1981) studied acquisition of tensed relative clauses with an overt relative marker (e.g., **What is Jim catching [a cat [that is climbing a tree with ___]]?*). On the other hand, Goodluck et al. (1991) investigated children's knowledge of the constraint that bans extraction from temporal adjunct clauses (e.g., **What did John read Dickens [before writing ___]?*).

The present study examines children's obedience of the Adjunct Island Constraint imposed on a phonologically *covert* syntactic environment, namely, existential (or *there*) sentences in English. Some *there*-sentences contain an island, which is formed by a participial *coda*, that is, the material following the post-copular NP. Hence material inside this island such as a manner adverbial cannot be *wh*-extracted, as shown in (1):¹

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¹ The syntactic structure of *there*-sentences is not so clear cut: Kim (2002a) argues that depending on their semantics, *there*-sentences with a participial coda can have either a small clause or a reduced relative clause structure. Kim's proposal predicts that *there*-sentences with a small clause structure will not exhibit the barrier effects shown in (1b).

- (1) a. There was a boy running *backwards*.
b. **How_i* was there a boy running *t_i*? (when asked about the manner of running)

Note that extraction of the same material from a corresponding non-*there* sentence is grammatical, as shown in (2):

- (2) a. A boy was running *backwards*.
b. *How_i* was a boy running *t_i*?

The challenge that (1b) poses for acquisition can be at least threefold: first, the child has to notice the difference between the copula in (1) and that in (2), the former being an existential verb and the latter being an auxiliary verb denoting progressive aspect. Second, the child has to analyze the string of words following the copula in (1) to contain an island. This can be a rather formidable task for her, because the target structure lacks an overt island marker such as a relative pronoun or a temporal adjunct. Third, the child must have an accurate knowledge of the Adjunct Island Condition in English and be able to apply it to (1b) in order to disallow the *wh*-extraction of the manner adverbial.

The experimental results show that children, as young as three, are remarkably sensitive to the non-overt islands inside *there*-sentences: they *never* allowed *wh*-extraction from inside them. Another interesting finding is that younger children tend to interpret *how* as *why* by giving a reason reading to *how* when it refers to manner of action (cf. de Villiers 1992). I claim that this curious behavior of children is due to the semantic overlap between *how* and *why* in certain environments. Hence it is expected that a clear differentiation between the two *wh*-operators may be delayed until a later stage of acquisition.

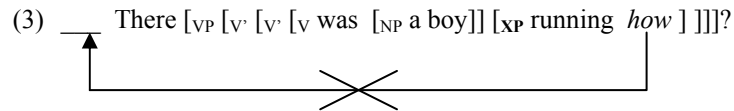
2. What Induces the Island Effect in *There*-Sentences?

In the literature, there is no consensus among theorists as to the syntactic structure of *there*-sentences.² Nonetheless, we can find at least two equally tenable accounts of the island effect exhibited by (1): McNally 1997 and Chomsky 1999.

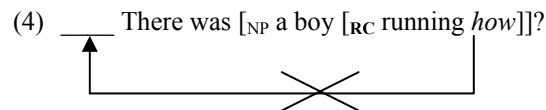
McNally proposes that the participle that follows the postcopular NP in a *there*-sentence is an adjunct secondary predicate. The ungrammaticality of (1b)

² In the literature, there are at least four competing syntactic theories of *there*-sentences: (i) a ternary branching structure theory (Milsark 1974, 1977), (ii) a small clause analysis (Stowell 1978, 1981), (iii) a bare NP theory (Williams 1984), and (iv) an adjunct predicate analysis (McNally 1997). These theories differ as to their assumptions about the status of the *coda*, which refers to the material that occurs following the postcopular NP in *there*-sentences. See Kim 2002a for a critique of these accounts with respect to the barrier effects under discussion.

naturally follows from her analysis: extraction of *how* is banned, because it crosses an adjunct island XP, in violation of an adjunct island constraint, as shown in (3):



Chomsky (1999), on the other hand, analyzes the participle in *there*-sentences as a reduced relative clause (RC).³ This analysis also readily accounts for the ungrammaticality of (1b): the extraction of *how* is prevented, because it would cross over a complex NP formed by the head noun and the RC, thereby violating the Complex Constraint. The derivation of (1b) is given in (4):



McNally's and Chomsky's accounts differ from each other in technical details and potentially in theoretical repercussions. For our present purposes, however, the two accounts are essentially the same, because both analyze the participial codas in *there*-sentences as some sort of adjunct islands, thus making the same predictions about the extractability of the material inside them.

3. The Experiment

A cross-sectional study was conducted to investigate how the child grammar behaves with respect to the adjunct islands inside *there*-sentences which are formed by participial codas.

3.1. Participants

The subjects were fourteen normally developing monolingual English-speaking children whose ages varied from three to six. They were living in Western Massachusetts, USA, at the time of the study. In addition, for control purposes, twenty-four native speakers of Standard American English were tested as well. They were attending college in Massachusetts at the time of the study.

3.2. Procedure

The subjects were presented with a story accompanied by illustrations describing the content of the story in a chronological order. Each story was

³ Chomsky's account is in fact quite reminiscent of Jenkins' (1975) and Williams' (1984) proposals.

followed by one test question. Every subject participated in two sessions with the contents of the stimuli varying and counterbalanced. The responses were cassette-tape-recorded to check against the on-site transcription at a later time.

3.3. Stimuli

3.3.1. Variables and hypotheses

The stimuli contained two kinds of variables: (i) *wh*-type and (ii) the presence of *there* in the embedded clause. The test questions were potentially ambiguous: depending on the construal of the *wh*-element, either an upstairs construal or downstairs construal was available.

It was hypothesized that if the child has knowledge of the Adjunct Island Constraint, she would not allow downstairs construals for *how* in *there*-questions, while allowing them in non-*there* questions. In the case of *why*-questions, however, the child would allow a downstairs construal for *why*, regardless of the presence or absence of *there* in the test question.

The variables and hypotheses of the study are summarized in Table 1:

Table 1. Question-types and expected construals for WH

Q-type	How	Why
There	How did Johnny say to Mom that there was an old dog running in the race? ✓How-say; *How-running.	Why did Johnny say to Dad that there was construction going on? ✓Why-say; ✓Why-construction going on.
Non- there	How did Johnny say to Mom that an old dog was running in the race? ✓How-say; ✓How-running.	Why did Johnny say to Dad that construction was going on today? ✓Why-say; ✓Why-construction going on.

3.3.2. Sample Stimuli (italicized areas were read emphatically):⁴

Condition 1: Extraction of *how* referring to a manner adverbial

Story: Recently Johnny got a telescope. It's such a cool telescope that he can see things that are really far away. Today Johnny was looking outside through the telescope and he found something very interesting. There was a bunch of guys walking *shoulder to shoulder* on the street! Johnny wanted Mom to see it. But she was a bit far away in the kitchen. So he said *really loudly*, "Mom, come here and look at this! There's a bunch of guys walking *shoulder to shoulder*!"

⁴ See Kim 2002b for the entire set of the stimuli.

After the story, the child was asked one of the following questions (the grammaticality judgments reflect the adult grammar's viewpoint):

Table 2. Sample *how*-questions

Question & answer	How did Johnny say to Mom that there was a bunch of guys walking on the street?	How did Johnny say to Mom that a bunch of guys was walking on the street?
UC reading	✓Loudly	✓Loudly
DC reading	*Shoulder to shoulder	✓Shoulder to shoulder

Condition 2: extraction of *why* referring to a *because*-clause:

Story: Today there's going to be a parade in Johnny's town, *because the President of the United States is visiting*. Johnny heard that the President is going to pass by his house. He got really excited about it. So he got up early and went outside to see whether everything in front of his house looks nice and clean. But Johnny found that Dad's car was parked on the street. The car would block the parade! So Johnny went to Dad to ask him to move the car. Johnny said, "Dad, there's going to be a parade today, *because the President is coming*. He's going to pass by our house but your car is going to be in the way. Could you please move the car?"

After the story, the child was asked one of the following questions (again, the grammaticality judgments reflect the adult grammar's viewpoint):

Table 3. Sample *why*-questions

Question & answer	Why did Johnny say to Dad that there was a parade taking place today?	Why did Johnny say to Dad that a parade was taking place today?
UC reading	✓Because he wanted him to move his car.	✓Because he wanted him to move his car.
DC reading	✓Because the President was coming to town.	✓Because the President was coming to town.

3.4. Results

3.4.1. Results from the Children

There are three notable findings from the data from the children. First, the data show that in the case of *how*-questions, the presence or absence of *there* in the embedded clause influenced the ratio of long-distance (LD) answers or the downstairs construal of the *wh*-element. As shown in Table 4, the children

allowed for LD extraction of *how* from non-*there*-sentences but *never* from *there*-sentences. When it comes to *why*-questions, however, the expletive *there* did not have any effect on the ratio of LD answers.

Table 4. Children’s ratio for LD answers

Q-type	There	Non-there
How (n = 28)	0%	25 %
Why (n = 28)	64.3%	53.5%

Second, some children gave “I don’t know” answers to *how*-questions and the rate was considerably higher in response to questions containing *there* in the embedded clause than to questions without *there*. By contrast, the children *never* gave “I don’t know” answers to *why*-questions, regardless of the presence of *there* in the test question. The results are summarized in Table 5:

Table 5. Children’s ratio for “I don’t know” answers

Q-type	There	Non-there
How (n = 28)	28.6%	3.6 %
Why (n = 28)	0%	0%

Third, quite a number of children answered *how*-questions with *because*-clauses as if they interpreted *how* as *why*. Notably, the rate for this interpretation was higher when the expletive *there* was not present in the question, as shown in Table 6.

Table 6. Children’s ratio for “because” answers to *how*-questions

Q-type	There	Non-there
How (n = 28)	17.8%	39.2%

3.4.2. Statistical Significance of the Results

A 2x2 repeated measures ANOVA was conducted to test the effects of *there* and *wh*-type on the probability of a LD answer. Although the main effect of the variable *there* was not significant, the main effect of *wh*-type was highly significant ($F(2,26) = 13.65, p < .0001$). The means reveal that the major differences lie in the relatively few long distance responses to *how*-questions. In addition, there is a significant interaction between the presence of *there* and the type of *wh*-question on the likelihood of a LD answer ($F(2,26) = 3.37, p < .05$).

The means reveal that the interaction is caused by the preference for LD extraction over *there* in the *why*-questions, but never in the *how*-questions.

Two further ANOVA's were conducted to test the effects of the presence of *there* on the likelihood of "I don't know" and "because" answers. The first ANOVA showed no main effect of *there* on the likelihood of a "because" answer but the trend is in the right direction. The second ANOVA showed a main effect of *there* on the likelihood of a "I don't know" response ($F(1,13) = 8.27, p < .015$).

3.4.3. Results from the Adult Control Group⁵

In answer to *how*-questions containing *there* in the embedded clause, the adults preferred the UC reading as much as 98% of the time, allowing DC readings only 2% of the time. On the other hand, in answering *how*-questions without the expletive *there* inside, their answers were evenly split between UC and DC readings. As was the case with the children, the presence of *there* in the test question had no impact on the adults' responses to *why*-questions. These results are summarized in Table 7.

Table 7. The adults' ratio for LD (or DC) answers

Q-type	There	Non-there
How (n = 48)	2%	52.1%
Why (n = 48)	43.7%	33.4%

3.5. Discussion

The obtained results have at least four important implications. First, the fact that the children *never* allowed a DC construal for *how* in *there*-questions and the adults allowed it only 2% of the time strongly suggests that in both groups' grammars, the participial codas in *there*-sentences constitute some sort of islands. This lends support to syntactic theories that analyze participial codas as adjunct islands such as McNally 1997 and Chomsky 1999.

Second, given the rather complex syntactic structures proposed by these theories and the absence of an overt indicator for a barrier in the surface structure, one can conclude that young children have a remarkably sophisticated knowledge of the syntactic structure of *there*-sentences containing a participial coda.

Third, the data from the children strongly suggest that the island constraint that prevents the extraction of *how* over the expletive *there* is quite robust;

⁵ Unlike the children, the adults did not give "I don't know" or "because" answers in response to *how*-questions.

otherwise, one would not be able to explain the fact that no children, including three year olds, allowed LD extraction of *how* from *there*-sentences.

Fourth, children's high percentage of "I don't know" answers to *how*-questions containing *there* seems highly suggestive of their knowledge of the Adjunct Island Constraint; it seems to suggest that when there is a barrier in the sentence, children are able to detect the complexity of the structure. The argument for this analysis comes from some previous research of *wh*-extraction. Several authors (e.g., Goodluck et al. 1992, de Villiers et al. 1990, Roeper and de Villiers 1994) report that younger children have a strong preference for LD extraction. Suppose my subjects also had this tendency. Then it seems that the reason for them to give "I don't know" answers to *how*-questions containing a barrier is precisely because they noticed something ungrammatical with the downstairs construal of *how* across the barrier. With the DC reading unavailable to them, the children were, in a sense, forced to say, "I don't know" instead. In other words, for them, "I don't know" was an assertion that the given question is not computable in their grammar, which only sees extraction from the embedded clause.

4. Some Thoughts on *How* and *Why*

The most puzzling and interesting finding of the present study is that the younger children tend to answer *how*-questions with *because*-clauses, as illustrated in (5-6).

- (5) a. **How** did Johnny say to Mom that there was a bunch of guys walking on the street?
Because they were walking with their arms around (3;08).
- b. **How** did Johnny say to Mom that a bunch of guys was walking on the street?
Because he yelled (3;10).
Because he wanted his mom to see it, because it was so cool (4;03).
Because they were wearing the same suits on their body (4;07).
- (6) a. **How** did Johnny say to Mom that there was an old dog running in the race?
I think **because** he wanted his mom to see the dog (4;03).
Because he was behind all the dog (4;09).
- b. **How** did Johnny say to Mom that an old dog was running in the race?
Because he was there (3;10).
Because the dog was slow (5;00).

This phenomenon was first noted by de Villiers (1992) in her study of *why* questions. As shown in (7), de Villiers discovered that young children tend to

give inappropriate answers to *how*-questions by misinterpreting the *wh*-word as *why*:

- (7) a. **How** did the dog run? (de Villiers' Table 2)
Because black dogs are fast.
Because he had so much might.
Because he was using his paws.
- b. **How** did the dog climb who barked?
Because he had a ladder.
Because he wanted to save the cat.

de Villiers takes this data to suggest that children treat *how*-questions as if they meant "how come" questions (p. 158). This line of approach is highly appealing in that *how-come* questions have a similar semantics to *why*-questions. But it seems to have difficulty accounting for the data from the present study; if my subjects had treated *how*-questions as *how-come* questions, then they would have allowed only upstairs readings for *how*-questions, because *how-come* questions do not allow downstairs readings, as shown in (8):

- (8) a. **How come** Johnny said to Dad that there was a bunch of guys walking?
✓Because he thought it was cool (UC reading).
*Because they wanted to walk shoulder to shoulder (DC reading).
- b. **How come** Johnny said to Mom that there was an old dog running?
✓Because he felt sorry for her (UC).
*Because the dog was behind all the other dogs (DC).

But, as shown above in (5-6), my subjects did allow DC readings for *how*, suggesting that they did not equate *how*-questions with *how-come* questions.

What is then responsible for this peculiar interpretation of *how* by younger children? One possibility that I would like to explore is that *how* and *why* may be more deeply interconnected than they appear to be.

Semantic evidence for this idea comes from the fact that in adult grammar, 'how' (the abstract *how*) is interpreted as something like 'why' (the abstract *why*) in certain contexts. For example, factive verbs like 'know' in English seem to take 'how' in order to express the reason for reaching the state denoted by the verb, as illustrated by (9):

- (9) a. **How** do you know that John will come to the party?
b. **Because** he told me so.

Notice that the same fact holds for Korean, as shown in (10), although English and Korean are not closely related to each other:

- (10) a. Jon-i phathi-e o-l-kes-ul ne-nun **ettehkey** a-ni
 J.-NOM party-to come-that-ACC you-TOP **how** know-Q
 ‘How do you know that John will come to the party?’
- b. **Waynamyen** ku-ka na-ekey kulehkey malha-ess-e
Because he-NOM I-DAT so say-PAST-DCL
 ‘Because he told me so.’

What the data (9a) and (10a) show is that in certain contexts, it is perfectly grammatical to answer *how*-questions with *because*-clauses. It is important to note that it in fact becomes rather odd when *why* replaces *how* in the same context, as shown in (11) and (12):

- (11) a. #/??**Why** do you know that John will come to the party?
 b. **Because** he told me so.
- (12) a. #/??Jon-i phathi-e o-l-kes-ul ne-nun **way** a-ni
 J.-NOM party-to come-that-ACC you-TOP **why** know-Q
 Lit.: ‘Why do you know that John will come to the party?’
- b. **Waynamyen** ku-ka na-ekey kulehkey malha-ess-e
Because he-NOM I-DAT so say-PAST-DCL
 ‘Because he told me so.’

It seems that the oddity of (11a) and (12a) comes from the fact that these sentences inquire about the *manner* in which the hearer came to know about John’s coming to the party, rather than the *reason* for knowing about it. Asking about the reason for knowing something seems a bit unnatural in an ordinary conversational setting.⁶

Support for the interconnectedness of ‘how’ and ‘why’ comes from the syntactic side as well. It has been noted that in Chinese (and also Korean and Japanese, as far as I am aware), ‘how’ and ‘why’ form a natural class distinct from ‘when’ and ‘where’ (Huang 1982). In Chinese, ‘when’ and ‘where’ belong to the “nominal-operator” category, on a par with ‘who’ and ‘what’, and ‘how’ and ‘why’ belong to the “non-nominal operator” category. The two types of operators differ crucially in that only nominal-operators can occur as arguments of postpositions and can be extracted across barriers (see Huang’s Chapter 7 for details).

Huang suggests that this classification of *wh*-operators may also hold for English, because *when* and *where* can both occur as the objects of prepositions, as shown in (13), but *why* and *how* cannot, as shown in (14):

⁶ Sentences (11a) and (12a) may sound appropriate when uttered during a trial in order to find out for what purposes it is relevant to know that John will come to the party.

- (13) a. **From where** did he come? (Huang's (41), p.536)
b. **Since when** have you been here?
- (14) a. ***For why** did he come?
b. ***By how** did he come?

Taken together with the semantic closeness between *how* and *why* discussed above, the similar syntactic distribution of 'how' and 'why' seems to strongly suggest that in Universal Grammar (UG), 'how' and 'why' are encoded with some overlap between them.

In view of this line of reasoning, the children's apparent confusion between 'how' and 'why' seems highly expected. If these two operators indeed intersect in UG, it is then entirely plausible that younger children will use them interchangeably until they receive sufficient enough input from the adult data, because in their grammars, 'how' and 'why' are similar in many ways. Therefore, children will not fully differentiate between 'how' and 'why' as the way adults do until a later stage of acquisition.

5. Closing Remarks

The present study examined children's knowledge of the Adjunct Island Constraint that is at work in a phonologically *covert* syntactic environment, namely, *there*-sentences with participial codas. The obtained data provide strong evidence that participial codas constitute strong barriers, supporting the analyses that treat them as adjunct islands (e.g., McNally 1997 and Chomsky 1999). Given that the children, as young as three, never allowed extraction across these phonologically covert islands, we can conclude that they have a remarkably sophisticated knowledge of the highly complex syntactic structure of *there*-sentences.

One unexpected yet interesting finding of the present study was that younger children tend to give *why* interpretations to *how*-questions. In attempt to explain this phenomenon, I suggested that in UG, 'how' and 'why' may be encoded with some intersection between them and hence a precise differentiation between them may not occur until a later stage of acquisition. It is my hope that this claim will be verified by a more fine-grained analysis of the syntax and semantics of 'how' and 'why' across languages and the acquisition thereof.

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