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The Acquisition of Echo Questions*

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1. Introduction

Wh-questions in English can be divided into two types, echo question and non-echo question. An example of each type is given below.

- (1) a. What is Mary reading? (nonecho *wh*-question)
- b. Mary is reading WHAT? (echo *wh*-question)
- (In response to: Mary is reading xxxx.)

In nonecho questions, syntactic *wh*-movement is obligatory and the *wh*-phrase appears at the beginning of the sentence.¹⁾ In echo questions, on the other hand, the *wh*-phrase may stay *in situ*.

How early do English-speaking children learn the distinction between echo and nonecho questions? To our knowledge, there has been no acquisition research addressing this question. But this is an important question in the investigation of the acquisition of syntactic *wh*-movement.

As we have seen above, syntactic *wh*-movement is obligatory in non-echo questions in English. But there are languages in which it is optional (*e.g.* French²⁾) or forbidden (*e.g.* Japanese). UG, therefore, must be unspecified for the choice between these possibilities. Each language learner must choose a value for this parameter based on primary linguistic data.

A survey of CHILDES database³⁾ indicates that early linguistic input contains an abundance of echo as well as nonecho *wh*-questions. If there is a stage in English acquisition in which these question types are not distinguished, therefore, children might be

led to conclude that syntactic *wh*-movement is generally optional in English. This mistake, once made, would be difficult to recover from.

CHILDES database also shows that English-speaking children apply *wh*-movement consistently from the beginning. Why are they not misled by the echo questions in the input? As a first step to answering this question, we conducted an experiment on young English-speaking children's interpretation of echo and nonecho *wh*-questions. We report the results of this experiment in this paper.

The organization of the paper is as follows: Section 2 gives a brief introduction to the properties of echo *wh*-questions in English. Section 3 presents the experiment and its results. A discussion on the acquisition of syntactic *wh*-movement is given in section 4. Section 5 is the conclusion.

2. Properties of echo *wh*-questions

Let us introduce briefly the form and the functions of the echo questions we will be looking at in the paper. As the term indicates, an echo question is a (partial) repetition of a preceding utterance. In the type of echo *wh*-question we are interested in, the content and the word order of the triggering utterance are retained, except for a replacement of a word or a phrase by a *wh*-word.⁴⁾ Unlike in nonecho *wh*-questions, the *wh*-word can replace an X^0 , X^1 , or an XP element.⁵⁾ For example, all the sentences in (3) are possible echo questions to (2).

(2) John discovered a stable wormhole.

- (3) a. John discovered a stable WHAT?
- b. John discovered a WHAT?
- c. John discovered WHAT?

Echo *wh*-questions are uttered with a characteristic intonation; a rising intonation with a stress on the *wh*-word.

The basic function of an echo *wh*-questions is to request the repetition of the word(s) replaced by the *wh*-word, although it can also be used to express surprise or incredulity. In either case, the most straightforward way of answering an echo *wh*-question is to repeat the word(s) replaced by the *wh*-word.

- (4) a. (A) wormhole
b. (A) stable wormhole.
c. A stable wormhole.

3. Experiment

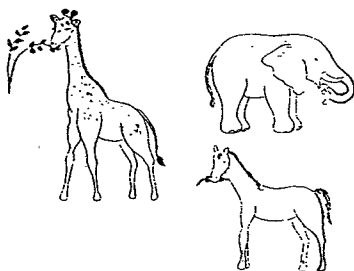
3.1 Purpose

The purpose of the experiment is to test if children can distinguish echo *wh*-questions from nonecho *wh*-questions. There are at least two logically possible ways of doing this. One is to elicit *wh*-questions from the children and see if they can make right choices between an echo nonecho question depending on the context. The other is to ask *wh*-questions to the children and see if their responses differ systematically depending on whether it is to an echo question or to a nonecho question. We decided here to pursue the latter approach.

3.2 Logic

Consider a picture depicting three animals, an elephant, a horse, and a giraffe. They are all eating something different: the elephant is eating a banana, the horse a carrot, and the giraffe tree leaves.

Figure 1



Suppose someone is asked the following question about this picture:

(5) What are the animals eating?

His answer would be something like the following:

- (6) a. The elephant is eating a banana, the horse a carrot, and the giraffe tree leaves.
- b. A banana, a carrot, and tree leaves.

An answer such as "Food" would be inappropriate according to a maxim comprising Grice's Cooperative Principle.⁶⁾

(7) Maxims on Quantity (Grice (1975)):

- a. Make your contribution as informative as is required (for the current purposes of the exchange).
- b. Do not make your contribution more informative than is required.

It is clear from question (5) that the speaker knows the animals are eating something, probably food. The question was asked because the speaker wanted more information concerning the type of food being eaten and had reasons to believe that the listener could supply them, which happens to be true. To respond by saying, "Food" in this situation would be a violation of Maxim (7) a..

What if the question is an echo question in response to the statement given in (8)?

(8) The animals are eating food.

(9) The animals are eating WHAT?

In this case, the most appropriate answer is, "Food." Responses such as the ones in (6), strictly speaking, ignore the request of the speaker: to have certain words repeated. They are at best too informative, in violation of Maxim (7) b..⁷⁾

We thus have a way of telling if a child can distinguish echo questions from nonecho *wh*-questions: We show him pictures

each depicting items (*e.g.* banana, carrot, and tree leaves) belonging to the same category (*e.g.* food), which are undergoing the same action (*e.g.* being eaten by an animal). We make a statement using the supercategory word ("The animals are eating food.") and then ask either an echo question requesting the repetition of the supercategory word ("The animals are eating WHAT?") or a nonecho question ("What are the animals eating?"). If the child systematically gives supercategory answers to echo questions and subcategory answers to nonecho questions, we have strong evidence that the child has learned the distinction between the two question types. Expected answers to the questions are summarized in Table 1.

Table 1

question answer	nonecho <i>wh</i> -Q	echo <i>wh</i> -Q
repetition (supercategory)	inappropriate	OK
subcategory	OK	inappropriate

As mentioned in section 2, there is another difference between echo and non echo *wh*-questions; the *wh*-word in an echo question can replace a word or a phrase of any level while the *wh*-word in a nonecho question can stand for only an XP element. If a child uses all N⁰, N' and NP in response to different types of echo questions but only uses an NP in response to nonecho questions, we would have another indication that he can distinguish the two question types.

3. 3 Design

We composed a story incorporating situations of the kind described in the preceding section. The narrator of the story is a

boy named Tom and he describes what he, his little sister Mary, and their mother did at the zoo one day. We prepared a picture for each situation. The story was recorded on a tape. In the experiment, the child listened to the story while looking at the corresponding pictures. After each key sentence, the tape was stopped and the experimenter asked the child a question; either an echo or a nonecho *wh*-question.⁸⁾

The situations were selected so that both the subcategory words and the supercategory words would be familiar to young children. We had four nonecho questions and six echo questions. There were three types of echo questions; one in which the *wh*-word replaces an N', one in which it replaces an N¹, and one in which it replaces an NP. The picture(P)—story(S)—question(Q) pairs used in the experiment are listed below.⁹⁾

(10) nonecho questions

- a. P : An elephant, a horse, and a giraffe, all standing.
S : ... we first saw the big animals.
Q : What did they see first?
- b. P : Mother riding on an elephant, Mary riding a horse, and Tom riding a giraffe.
S : ... we rode on some animals.
Q : What did they ride on?
- c. P : A pig eating a green pepper, a rabbit eating cabbage, and a duck eating green peas.
S : They were eating green vegetables.
Q : What were they eating?
- d. P : Mother eating cookies, Mary eating ice-cream and Tom eating a cake.
S : ... we had a little snack.
Q : What did they have?

(11) echo questions

- a. P : Mother picking a violet, Mary picking a tulip, and
Tom picking a dandelion.
S : ... we each picked a flower.
Q : They picked a WHAT? (N)
- b. P : Mother drinking lemonade, Mary drinking milk,
and Tom drinking orange juice.
S : ... we had cold drinks.
Q : They had cold WHAT? (N)
- c. P : An elephant eating a banana, a horse eating a
carrot, and a giraffe eating tree leaves.
S : They were eating their favorite food.
Q : They were eating their WHAT? (N')
- d. P : Mother eating a strawberry, Mary eating a
cherry, and Tom eating an apple.
S : ... we ate a red fruit.
Q : They ate a WHAT? (N')
- e. P : A duck, a pig, and a rabbit.
S : ... we saw the little animals.
Q : They saw WHAT? (NP)
- f. P : Mother holding a duck, Mary holding a pig, and
Tom holding a rabbit.
S : ... we held our favorite animals.
Q : They held WHAT? (NP)

The use of a tape-recorded story proved to be effective in allowing the child to answer the echo questions. If the narrator of the story was present in the experiment, he should be the one to answer the questions. But since he was unavailable, the experimenter could pretend to have missed parts of the story and ask the child for clarification.

In order to satisfy the felicity conditions¹⁰⁾ for asking nonecho *wh*-questions, the person who asked the questions in the experiment did not look at the picture.¹¹⁾ The questions would then be

felicitous because the child had access to information that the speaker did not.

3. 3 Results

The experiment was administered to thirteen three- and four-year-old children. The results are summarized in Table 2.

Table 2

Subject	Age	% of repetition (supercategory)answers		% of category match for answers to echo-Qs
		non-echo-Q	echo-Q	
A	3	0	100	83 (+17 ¹²⁾)
B	3	75	100	50
C	3	0	100	75 (+25)
D	3	0	100	50
E	4	0	67	50
F	4	100	100	100
G	4	25	100	67
H	4	0	100	80 (+20)
I	4	0	67	50
J	4	75	100	67
K	4	75	100	83
L	4	100	100	50
M	4	50	100	67
average		38%	95%	67% (72%)

The results were quite striking. Four of the thirteen children (A, C, D, and H) always gave supercategory answers to echo questions and subcategory answers to nonecho questions. Two other children (E and I) missed only a couple of echo questions. There is hardly any doubt that these children have learned the distinction between echo and non-echo questions.

Five children (B, G, J, K, and M) gave some subcategory answers to nonecho questions while always using supercategory answers to echo questions. Obviously, this experiment has a bias towards the supercategory answer.¹³⁾ But the fact that they swit-

ched to subcategory answers only in response to nonecho questions indicates that these children, too, have learned the distinction.

Two children (F and M) always gave supercategory answers. Have they not learned the distinction between the two question types yet? We do not believe that this is the case, at least for one child. As can be seen in Table 2, Child F always picked the right type of category in respondeing to echo questions while generally using NPs for nonecho questions. This suggests the knowledge of the distinction. The experiment is inconclusive about the competence of Child M; she could either not have learned the distinction or just have been exceptionally sensitive to the bias of the experiment.

Overall, the percentage of supercategory answers to echo questions are significantly higher than those to nonecho questions. (Significant by a category-group *t* test ($t(12)=5.325$, $p<.001$).) In summary, the experimental results strongly indicate that most of the children have learned the distinction between echo and non-echo *wh*-questions.

4. Discussion

In this section, we discuss a little more in detail the issues raised in the introduction.

We have found that English-speaking children can distinguish echo and nonecho *wh*-questions by age three of four. But just how early is this distinction learned? If they do not know this distinction when they start using *wh*-questions, the presence of echo *wh*-questions in the input might still mislead the child into concluding that syntactic *wh*-movement is generally optional in English. In order to probe into children's early competence, let us look at the record of a child's spontaneous utterances in the CHILDES database. We restrict our attention to the data on Eve, the youngest child studied by Roger Brown and his colleagues¹⁰.

Eve was one year and six months old when the study began. She was at the beginning of the multi-word stage but the majority of her utterances were still two-words long. She already exhibits a stable SVO word order in her noninterrogative sentences.

- (12) a. read the puzzle. (file 01, line 136)
- b. man taste it. (file 01, line 587)
- c. fish are swimming (file 02, line 1034)
- (From CHILDES/BROWN/EVE)

Searching through the first few files, we find a number of spontaneous object *wh*-questions. They all have the *wh*-word at the beginning of the sentence.

- (13) a. what that? (file 04, line 420)
- b. what doing (#) Mommy? (file 05, line 56)
- c. where Eve pencil? (file 06, line 934)
- d. where Pap go? (file 06, line 1088)
- (ibid.)

Eve clearly has learned that syntactic *wh*-movement is obligatory in English. But it is not clear whether she knows the distinction between echo and nonecho questions at this stage.

Eve's mother uses a lot of echo *wh*-questions when speaking to Eve. Eve's responses are usually appropriate but they are also appropriate as responses to corresponding nonecho questions.

- (14) a. Eve : get it.
 Mother : get what?
 Eve : that.
- b. Eve : xxx one.
 Mother : you want what?
 Eve : spoon. (file 03, *ibid.*)

It is almost impossible to tell just by looking at records of mother-child interaction of this sort whether the child has learned the special function of echo questions. What we need to do, if possible, is to revise an experiment that can be used with very young

children.

We have defined the problem based on the assumption that the position of the *wh*-word in the input is what signals to the child the presence or absence of syntactic *wh*-movement in the language. This assumption, however, may be wrong. There is the possibility that the *wh*-movement parameter is linked to a more basic parameter of UG, say the word order parameter, and as soon as the value of the first parameter is set, the value of the *wh*-movement parameter is set also. This idea is effective in explaining a puzzle in Japanese acquisition as well the problem raised in this paper.

In Japanese, the basic word order is SOV and there is no syntactic *wh*-movement. Japanese children seem to know this fact from an early stage.¹⁵⁾ This is a puzzle in view of the fact that input contains a lot of scrambled utterances, with the *wh*-word at the beginning of the sentence.¹⁶⁾ Why don't children conclude that syntactic *wh*-movement is optional in Japanese?

The puzzle resolves itself if the fact that Japanese is head-final automatically leads to the initial assumption that syntactic *wh*-movement is absent in the language. English children, on the other hand, will assume that *wh*-movement in regular sentences is obligatory, the language being head-initial. These initial assumptions, of course, may be revised by positive evidence, which may be necessary in the acquisition of languages like French, in which *wh*-movement is optional in the matrix clause although it is head-initial.

This is just a speculation at this point but we believe that it is an idea worth examining. The early stages of the acquisition of French becomes particularly interesting from this perspective. This will be the topic of a future research.

5. Conclusion

We conducted an experiment testing if English-speaking chil-

dren know the distinction between echo and nonecho *wh*-questions. The results of the experiment indicate that this distinction is learned before children reach age four.

Notes

- * This research was conducted as a part of a project led by Tom Roeper and Jill deVilliers. I am grateful to their support and advice on every aspect of this work. I would like to thank Dana MacDaniel, Tom Maxfield and Yukio Otsu for helpful suggestions. Thanks also to Arnold Well, Katerina Leftheris, and teachers and children at Fort Hill Nursery School for their generous help.
- 1) More precisely, a [+WH] COMP must contain a *wh*-element at S-structure. For discussions on this topic, see Lasnik and Saito (1989) and references cited therein.
- 2) In the matrix clause.
- 3) Child Language Data Exchange System. Cf. MacWhinney and Snow (1985).
- 4) For other types of echo questions, see Quirk *et. al.* (1985), pp.835 - 838.
- 5) As Quirk *et. al.* (1985) point out, even the stem of a word can be replaced by a *wh*-word:
 - (i) A : Astronomers have discovered some more black holes.
B : They've discovered some more WHATs?
 - (ii) A : She sat there and ratiocinated.
B : She sat there and WHATted? (Quirk *et. al.* (1985), p.836)
- 6) Cf. Grice (1975).
- 7) Grice has some qualifications concerning the second maxim. See Grice (1975) for details.
- 8) The instructions given to each child at the beginning of the experiment was as follows:
I have a story on a tape and Katerina has some pictures that go with the story. I want you to look at the pictures while listening to the tape. When I am not sure about something in the story, I will ask you a question. Maybe you will know. Could you tell me what happened in the story when I ask you a question?
- 9) This is not the order of sentences presented in the experiment.
- 10) Cf. Austin (1975) and Searle (1969).

- 11) The pictures were shown to the child by another person.
- 12) The category of a phrase is sometimes ambiguous. For instance, "red fruit" could either be an NP or an N' depending on the context. When the response was not the exact repetition of the part replaced by the *wh*-word, but could belong to the same category under one interpretation, we counted them separately.
- 13) In this experiment, at least two factors influence the responses other than the type of question given to the child. One is the picture and the other is the story. The presence of the picture encourages the subcategory answer and the story encourages the supercategory answer. We hoped that these two factors would balance each other. The story, however, seems to have had a stronger effect.
- 14) Cf. Brown (1973).
- 15) Cf. Okubo (1967), Clancy (1985), and references cited therein.
- 16) The problem is complicated by the fact that there are studies indicating that young children have trouble interpreting scrambled sentence. Cf. Hayashibe (1975) and Sano (1977).

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