# The Acquisition of Echo Questions

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## 1. Introduction

*Wh*-questions in English can be divided into two types, echo questions and non-echo questions. 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.

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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.

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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.* French[2]) 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 the CHILDES database[3] indicates that early linguistic input contains an abundance of echo as well as nonecho *wh*-questions.[4] 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.

The 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 to be discussed in this 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.[5] Unlike in nonecho *wh*-questions,

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2. In the matrix clause.
3. Child Language Data Exchange System, *cf*. MacWhinney & Snow (1985).
4. See Maxfield (this volume).
5. For other types of echoes, see Quirk *et al* (1985), pp. 835-838.

the *wh*-word can replace an $X^0$, $X'$, or an XP element.[6]
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.
Appropriate answers to the questions listed in (3) are
given in (4).

(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 and 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.

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6.  As Quirk *et al* (1985, p.836) 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?

## 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
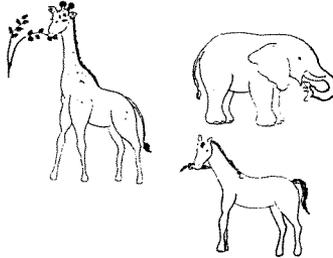


Suppose someone is asked the following question about this picture:

(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.[7]

(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 that 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

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7.  *Cf.* Grice (1975).

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.[8]

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**

| answer \ question | nonecho *wh*-Q | echo *wh*-Q |
|---|---|---|
| repetition (supercategory) | inappropriate | OK |
| subcategory | OK | inappropriate |

As mentioned in section 2, there is another difference between echo and nonecho *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

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8.  Grice has some qualifications concerning the second maxim. See Grice (1975) for details.

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question can stand for only an XP element.  If a child
uses all $N^0$, $N'$ 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.[9]

The situations were selected so that both the
subcategory words and the supercategory word 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 $N^0$, one in which it replaces an $N'$, and one
in which it replaces an NP.  The picture(P)-story(S)-
question(Q) pairs used in the experiment are listed
below.[10]

(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?

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9.  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?
10.  This is not the order of sentences presented in the
experiment.

   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 conditions[11] for asking nonecho *wh*-questions, the person who asked the questions in the experiment did not look at the pictures.[12]  The questions would then be felicitous because the child had access to information that the speaker did not.

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

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11.  *Cf*. Austin (1975) and Searle (1969).
12.  The pictures were shown to the child by another person.

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**Table 2**

|          |     | % of repetition (supercategory) answers | | % of category match for answers to echo-Qs | |
|----------|-----|------------|--------|--------|--------|
| Subject  | Age | non-echo-Q | echo-Q | | |
| A        | 3   | 0          | 100    | 83     | $(+17^{13})$ |
| 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) gave
the inappropriate subcategory answer to only two of the
six echo questions while giving appropriate answers the
rest of the 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.[14]  But the fact that they
switched 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

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13.  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.
14.  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.

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 responding 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
nonecho *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
or 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
colleagues[15].

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 01, line 1034)
       (From CHILDES/BROWN/EVE)

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15.  *Cf.* Brown (1973).

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        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 very difficult to tell just by looking at records
of mother-child interaction of this sort whether the
child has learned the special function of echo quest-
ions.  What we need to do, if possible, is to devise 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.[16]  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.[17]  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, as soon as learning that the language is
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 future research.

## 5. Conclusion
We conducted an experiment testing if English-
speaking children 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.

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16.  *Cf.* Okubo (1967), Clancy (1985), and references cited
therein.
17.  The problem is complicated by the fact that there are studies
indicating that young children have trouble interpreting scrambled
sentences.  *Cf.* Hayashibe (1975) and Sano (1977).

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