

Subject–Object asymmetry in Dutch children’s comprehension of *wie*-questions

Matthijs van der Meer, Wouter van Atteveldt,
Peter Coopmans and William Philip
Utrecht University/University College Utrecht and UiL-OTS

1. Introduction

Prior research on L1 acquisition of English suggests that preschool children find it more difficult to process subject *who* questions (S-WH) such as (1a) than object *who* questions (O-WH) such as (1b), long after they have acquired the basic syntax of such questions.

- (1) a. *Who is helping the boy?*
- b. *Who is the boy helping?*

However, evidence from previous research in support of this asymmetry is by no means conclusive, due to problems with specific experimental setups as well as a general difficulty examining this phenomenon in English. This paper describes a study conducted in Dutch that circumvents most of these problems.

2. Previous research

Although some research on Dutch L1 wh-acquisition has been done, this research was not concerned with subject/object asymmetry. For example, Kampen (1997) conducted a longitudinal study on the intermediate forms in wh-questions produced by Dutch children, and Kraemer (2000) investigated indefinites in (amongst others) wh-questions. However, neither study mentioned subject/object asymmetry, and the provided data does not allow for conclusions with respect to this phenomenon.

As for English, an experimental production study by Ervin-Tripp (1970) has

suggested that children make more errors in producing O-WH questions than in S-WH questions. This production finding has been replicated by Yoshinaga (1996). From the same study by Ervin-Tripp (1970) there is evidence that children also make more errors in the comprehension of O-WH questions, and this findings has been confirmed by Tyack & Ingram (1977). Ervin-Tripp (1970) and Wilhelm & Hanna (1992) also note that two common errors with O-WH (but not with S-WH) are the assignment of a S-WH interpretation to an O-WH sentence and the production of a S-WH sentence when an O-WH sentence seems to have been intended by the child.

Taken together these studies appear to argue in favor of the hypothesis that children do indeed have more difficulty in processing O-WH sentences. However, in the case of Tyack & Ingram (1977), the experimental setup seems to have contained infelicitous input — For example, the question “Who was helping the boy” was used, but the corresponding photograph did not depict anybody helping any boy. There is also research which reports no difference in processing difficulty (Stewart & Sinclair 1975); moreover, Cairns and Hsu (1978) observe more errors with S-WH questions than with O-WH questions, contravening the general trend. More importantly, though, there is a general problem with studying this phenomenon in English.

As (1a) and (1b) show, S-WH and O-WH sentences always have a different word order in English, and the O-WH order is non-canonical. This alone could lead to processing difficulties for children. Furthermore, because English also has *whom* as an optional accusative question word, it is not inconceivable that the use of *who* influences a child preference for a subject interpretation, since *whom*, in contrast, can only be interpreted as an O-WH.

A number of explanations have been offered for the apparent processing difficulty in O-WH sentences. Ervin-Tripp (1970) suggests that lexical acquisition of the [+animate] feature for *who* may influence children’s assignment to it of a subject reading, as animate agents often are subjects. Support from this comes from the observation of Ervin-Tripp’s longitudinal study that an upsurge of errors in the production and comprehension of O-WH sentences occurs approximately at the age of 3;0, but not before, as if triggered by acquisition of the knowledge that *who* is [+animate]. Another explanation is that English children experience a processing difficulty with O-WH simply because of the non-canonical word order of such sentences — O-WH requires OSV production and comprehension mechanisms which may be only weakly in place in English-learning children at the age in question. (English, of course, is an SVO language.) Finally, as O’Grady (1997) discusses, referring to Wanner & Maratsos (1976) and Stromswold (1995), O-WH sentences involve wh-extraction over a longer distance than S-WH questions. Combined with children’s limited working memory, this could explain the

increase the processing difficulty. Hildebrand (1987) found evidence in support of this hypothesis by testing sentences of varying syntactic complexity.

3. A Dutch study

By conducting a Dutch study it is possible to avoid a key problem one faces investigating this matter in English. Unlike English, Dutch has syntactically ambiguous *wh*-questions, questions which allow both a S-WH and an O-WH interpretation:

- (2) *Wie zei je dat de beer natspoot?*
who said you that the bear wet-squirted?

The surface structure in (2) derives either from the deep structure in (3a), resulting in a S-WH interpretation, or from the deep structure in (3b), resulting in an O-WH interpretation:

- (3) a. *Wie zei je dat* [___ [*de beer natspoot*] _{VP}] _{IP} (S-WH)
 S O V
 b. *Wie zei je dat* [*de beer* [___ *natspoot*] _{VP}] _{IP} (O-WH)
 S O V

This property of Dutch eliminates the problem concerning non-canonical word order found in English since a single ambiguous test sentence elicits both S-WH and O-WH interpretations. Also, Dutch does not have the *who/whom* distinction English has.

3.1 Design and procedure

In our experiment we are interested in testing the hypothesis that children have increased difficulty in processing O-WH sentences compared to S-WH sentences. From this hypothesis, and a general economy principle, it follows that when children are confronted with ambiguous sentences such as (2) they will show a preference for the S-WH interpretation.

We also tested the sentence in (4), for which adults show a strong preference for a S-WH reading due to a prohibition against nonspecific subjects, to see to what extent Dutch children are sensitive to this specificity constraint. For an extended discussion of the specificity constraint in Dutch L1 acquisition, see Kraemer 2000.

- (4) *Wie zei je dat een beer natspoot?*
who said you that a bear wet-squirted?

Similar to (2), this sentence can be derived from either (5a) or (5b). It is ambiguous notwithstanding the prohibition against nonspecific subjects due to the fact that the Dutch determiner *een* does not necessarily indicate non-specificity. However, in our study (4) was embedded in a context that strongly discourages a specific reading of *een*, in order to bring out the possible effects of a nonspecific subject on the child's interpretation.

- (5) a. Wie zei je dat [_S [_O een beer [_V natspoot]_{VP}]_{IP}(S-WH)
 b. Wie zei je dat [een beer [_S [_O natspoot]_{VP}]_{IP}(O-WH)

The questions in (2) and (4) were embedded in a picture-story Truth Value Judgment task to hide their function as target input. The children were presented a story accompanied by a number of pictures. A hand-puppet, who couldn't see the pictures, later had to make guesses about the story. The child was asked to judge whether these guess were correct or not, and to reward correct guesses. The guesses were made even more felicitous by the hand-puppet boasting about its guessing ability, followed by the researcher's proposal to put this to the test.

In addition, the hand-puppet had the right to ask clarification questions at any point during the telling of the story. This first happened in the beginning of the experiment in a filler-story, and the child was urged to help the hand-puppet by answering his questions. The target questions (2) and (4), had to be presented as such clarification questions, because the TVJ-guesses cannot be wh-questions. Moreover, since the subject as well as the object interpretation was grammatical and contextually plausible, both possible answers for the hand-puppet would have been acceptable. (The story supplied an answer under each interpretation, at least in the case of (2)).

Presenting the target questions as clarification questions had many methodological advantages. First, it eliminated any possible 'yes bias' or 'reward bias'. Second, it forced the child to pay attention and to use her grammar to respond, finessing a major potential confounding effect in standard truth-value judgement paradigms. Third, and most importantly, the mere fact that a child responded correctly to one or the other of the two possible grammatical interpretations of the target questions provided clear evidence that she had indeed been paying attention and making use of her grammar to respond.

To control for a possible ‘last-seen-event bias,’ we constructed two versions of the test story, one in which the events providing answers to each interpretation of each target question were sequenced in one of two possible temporal orders and the other in which they were sequenced in the other temporal order. Each story was presented to a different set of children.

The test story was embedded in a set of several other stories, which functioned as filler items for this experiment, and was preceded by instructions and a brief warm-up. Each child was tested individually by two native speakers of Dutch (the first 2 co-authors) in a quiet area of the preschool that the child was attending. The adult subjects were tested without the use of the hand-puppet.

3.2 Subjects and materials

77 monolingual Dutch preschool children were tested, as well as 20 adults. The children ranged in age from 4;3 to 6;9, with a mean age of 5;7, and were divided into two groups, “Group A” and “Group B”, depending on which set of test materials they received. The test materials for Group A are given below in Figure 1. The same story was presented to Group B subjects, except that the order of scenes 2 and 3 was reversed, as was the order of scenes 5 and 6. The target questions SP-DEF and SP-INDEF correspond to sentences (2) and (4). The hand-puppet is required to make 2 guesses about the story. The 1st was a correct guess, the 2nd incorrect.

Figure 1.

Scene 1



Experimenter: This story is about two apes and a bear who are watering the plants. One ape is wearing a blue shirt (shown as dark here), the other a red one (shown as light here).

Puppet, did you hear that? What happened?

Puppet: Ummm... every animal is watering the plants! (1st Guess)

Experimenter: Is he right?

Child: yes / no

Scene 2



Experimenter: Now the red (light) ape has an idea! He turns around, and squirts the bear! The blue (dark) ape sees it, and laughs his head off!

Scene 3



Experimenter: The bear thinks it's fun, and then squirts the blue (dark) ape!

Puppet: Wait a second. Twice squirting has taken place. *Wie zei je dat het beertje natspoot?* (SP-DEF)

Child: The red ape (=S-WH) / the blue ape (=O-WH)

Scene 4



Experimenter: Then three elephants arrive on the scene. They have seen what happened. Look, there is also a bucket of water.

Scene 5



Experimenter: Oh, look! One of the elephants squirts the red (light) ape!

Erratum.

Unfortunately, the printed version contained the wrong pictures for scenes 4 and 5.

Scene 6



Experimenter: Then the blue (dark) ape says: “I can do that too!” and he squirts one of the elephants.

Puppet: Not so fast! Twice squirting has taken place. *Wie zei je dat een olifant nat spoot?* (SP-INDEF)

Child: The red ape (= O-WH) / the blue ape (= S-WH)

Experimenter: Tell us Puppet. Can you guess what just happened?

Puppet: Hmmm, I know! Every elephant has been squirted! (2nd Guess)

Child: yes / no

3.3 Results

11 of the 77 children were excluded because of missing data. 19 were classified as “Failers” because they had failed to make a correct judgement of one or both of the hand-puppet’s guesses. That is, either they had incorrectly judged the 1st guess to be false (5 children), or they had incorrectly judged the 2nd guess to be true (14 children). This left 47 “Passers”. Neither for the 47 Passers, nor for the 19 Failers, nor for the Passers and Failers combined, did we find a significant effect of order group (see Table 1). Thus, we collapse Groups A and B.

Additionally, there was no significant effect of chronological age when we divided all the children into a younger group ($n=25$, age range 4;1–5;4, mean 4;11) and an older group ($n=41$, age range 5;5–6;9, mean 5;11), nor when we divided the Passers into these two age groupings (see Table 2). There was a significant age effect with the Failers on the INDEF condition; however, this appears to be a statistical artifact: only 3 of the 8 Failers who were Younger Kids chose the S-WH interpretation under the INDEF condition, while all 11 of the Failers who were Older Kids gave this response. Taken together, these statistical analyses suggest that

Table 1. Kruskal–Wallis test with H adjusted for ties on the significance of order grouping

	N	DEF	INDEF
Passers	47	$p \leq 0.4206$	$p \leq 0.7205$
Failers	19	$p \leq 0.2563$	$p \leq 0.6086$
Passers & Failers	66	$p \leq 0.2485$	$p \leq 0.4563$

age was not a relevant factor in this experiment, so we will collapse the two chronological age groups in subsequent analyses.

Table 2. Kruskal–Wallis test with H adjusted for ties on the significance of age grouping

	N	DEF	INDEF
Passers	47	$p \leq 0.7840$	$p \leq 0.9880$
Failers	19	$p \leq 0.6086$	$p \leq 0.0029$
Passers & Failers	66	$p \leq 0.1841$	$p \leq 0.8002$

The results are as shown in Table 3. The difference between adults and Passers as regards S-WH interpretations under the DEF condition was significant (Kruskal–Wallis, $p \leq 0.045$). For adults, there was a significant contrast in performance between DEF and INDEF (sign test, $p \leq 0.039$). For the Passer children, there was no such contrast. There was no significant difference in performance between adults and Passer children under the INDEF condition. The same pattern of performance was observed with the Failers, and with the Failers and Passers combined as a single child group.

4. Conclusion

The avoidance of the O-WH interpretation by children under the DEF condition supports our hypothesis that children have more difficulty processing O-WH questions, under the assumption of the general economy principle that children will avoid the more difficult interpretation. The argument is strengthened by the fact that structural factors have been eliminated by using a single ambiguous test question. Note, moreover, that our findings for the adults confirm that this question really is ambiguous, since approximately 50% of the adults assigned the S-WH interpretation under the DEF condition. Yet the children strongly prefer the S-WH interpretation. Comparing responses under DEF and INDEF, we see that the

specificity-induced contrast for adults is not observed for children. However, it is impossible to conclude from this that children are not sensitive to the sensitivity constraint; there is no significant difference between the INDEF interpretation between children and adults. Thus, the avoidance of the object interpretation of the INDEF question by children can be caused by the general subject/object asymmetry observed by children as well as by the specificity constraint. In order to determine whether children are sensitive to the specificity constraint, this factor will have to be isolated from the subject/object asymmetry.

References

- Cairns, Helen and Jennifer Ryan Hsu (1978) "Who, Why, When, and How: A Developmental Study", *Journal of Child Language* 5, 477–488.
- Ervin-Tripp, Susan (1970) "Discourse Agreement: How Children Answer Questions", in *Cognition and the Development of Language*, ed. John R. Hayes, 79–106. Wiley: New York.
- Hildebrand, Joyce. (1987). The acquisition of preposition stranding. *Canadian Journal of Linguistics*, 32: 65–85.
- O'Grady, William (1997) *Syntactic Development*. University of Chicago Press: Chicago, Illinois.
- Kampen, Jacqueline van (1997) *First Steps in Wh-movement*. Ph.D. dissertation, Universiteit Utrecht.
- Kraemer, Irene (2000) *Interpreting Indefinites: An Experimental Study of Children's Language Comprehension*. Ph.D. dissertation, Max Planck Institute, Nijmegen.
- Steward, Jean, and H. Sinclair. (1975). "Comprehension of questions by children between 5 and 9", *International Journal of Psycholinguistics* 3: 17–26.
- Stromswold, Karin. 1995. The acquisition of subject and object *wh*-questions. *Language Acquisition* 4: 5–48.
- Tyack, Dorothy and David Ingram (1977) "Children's Production and Comprehension of Questions", *Journal of Child Language* 4, 211–224. Cambridge, Massachusetts.
- Wanner, Eric, and Michael Maratsos (1978) "An ATN approach to comprehension", *Linguistic theory and psychological reality*, ed. M. Halle, J. Bresnan, and G. Miller, 8: 139–150.
- Wilhelm, Andrea, and Ken Hanna (1992) "On the acquisition of *wh*-questions", *Calgary Working Papers in Linguistics* 15: 89–98.
- Yoshinaga, Naoko (1996) "WH Questions: A Comparative Study of Their Form and Acquisition in English and Japanese." PhD dissertation, University of Hawaii at Manoa.