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Learning to suspend implicated contrast

The acquisition of *ook* in Dutch

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Children acquire the meaning of *ook* ‘also’ in Dutch relatively late (Bergsma 2006), although this focus particle is highly frequent. We argue that this late acquisition is caused by a pragmatic rule: contrastive implicature. We follow Sæbø (2004), who argues that additives are used because without them, the sentences they appear in would be interpreted as contrastive in relation to the context. Data from a sentence completion task administered to Dutch L1 learners ($N = 62$, ages 4;0–5;11) show that, on average, four-year-olds do not distinguish sentences with *ook* from sentences without *ook*. Five-year-olds do better on sentences with *ook* but worse on sentences without it. We argue that they have generally acquired contrastive implicature: they apply the correct contrastive interpretation to sentences without *ook*, but overgeneralize this implicature to sentences with *ook*, before completely acquiring the meaning of *ook*.

Keywords: pragmatics, L1 acquisition, *ook*, also, contrastive implicature

1. Introduction

Scholars agree that children start to produce the additive particle *also* at a young age (Benazzo & Dimroth 2015; Nederstigt 2003; Jordens 2012). However, much is still unclear about the interpretation of *also* and its equivalents in other languages. What knowledge children need to develop to understand its meaning is under debate, and the age at which studies report they do so varies between three and six years old (Berger & Höhle 2012; Bergsma 2002; 2006; Costa & Szendrői 2006; Hüttner et al. 2004). Even if the interpretation of *also* is acquired at the earliest end of that age scale this is relatively late for such a highly frequent lexical item; e.g. Dutch *ook*, comparable in meaning and syntax to *also*, is the 17th most frequent word in spoken Dutch (uit den Boogaart 1975: 427). This raises the question: what

makes the interpretation of this word so difficult? We argue here that it is difficult for children to acquire the meaning of *ook*, because the development of *ook* depends on the more general pragmatic rule of contrastive implicature.

This study follows Sæbø's (2004) interpretation of additives. Sæbø (2004) argues additives are used because without them, the sentences they appear in would be interpreted as contrastive in relation to the context. Sæbø (2004) explains that the function of additives is to neutralize this contrastive implicature, and to establish a relation of similarity. This means their function strongly depends on contrastive implicature. We therefore hypothesize that children need to acquire this implicature in order to understand that *also* neutralizes this rule.

The data of this study verify our hypothesis and suggest a three-stage development of the acquisition of *ook* 'also', in which Dutch children initially do not distinguish between sentences with and without *ook*. They then acquire contrastive implicature, which we believe children temporarily overgeneralize to all sentences, including those with *ook*. Ultimately, of course, adult speakers do know the correct interpretation for both sentences with and without *ook*.

2. Contrastive implicature and the semantics of additive particles

Additive particles have been analyzed in various ways in the literature (e.g. König 1991; Krifka 1998; Zeevat 2009). Sæbø (2004) argues that analyses in which additives are assumed to be pure presupposition triggers cannot explain that their presence in a sentence is sometimes obligatory. Sæbø therefore proposes that additive particles are used to cancel a contrastive implicature. In this paper we adopt Sæbø's analysis of additives as it enables us to shed new light on the difficulties in acquiring their meaning.

Sæbø argues that sentences with additive particles like *too* as in (1) contain a contrastive topic, in this case *Tom*.

- (1) Tom has an expensive car (too).

A contrastive topic gives rise to an implicature that the predication made about the topic (in this case having an expensive car) does not hold for its alternatives. This implicature is called *contrastive implicature* and its effect becomes clear in (2), where the second part of the sentence implicates that the car that is owned by the alternative to Tom, Mike, is not expensive.

- (2) Mike has a red car and Tom has an expensive car.

Due to contrastive implicature, it is not pragmatically adequate to ascribe the same predicate to more referents that are alternatives to each other in context, as in (3).

- (3) Tom has a red car. #Mike has a red car.

The sentence *Mike has a red car* comes with the assumption that the predicate *having a red car* is not valid for its alternatives. This assumption is violated by the context in (3), since *Tom* has a red car as well. A natural context for (1) with *too* would be an utterance like (4).

- (4) Mike has an expensive car.

Mike is an alternative to the contrastive topic in (1), Tom. Without *too*, the contrastive implicature of (1), i.e. that alternatives to Tom do not own an expensive car, would be contradicted by the preceding context. Sæbø (2004) argues that *too* is used to prevent this contradiction by letting the presupposed alternative be added to the topic of the clause, as a result of which the contrast will not concern that alternative. In other words, additive particles like *too* prevent contrastive implicature from being applied and establish a relation of similarity. In Sæbø's words, their function is to "steer clear of contrasts that would otherwise be communicated" (p. 216).

Schmitz et al. (under review) empirically tested the hypothesis that *also* prevents a contrastive implicature from being applied. They asked a group of adult native speakers of Dutch to describe an abstract figure in relation to another figure, by finishing a sentence that either did or did not contain the word *ook* 'also'. For example, the participants had to describe a big dotted blue square that was next to a small dotted green square, by finishing either the sentence *dit is een* 'this is a', or *dit is ook een* 'this is also a'.

Schmitz et al. (under review) found that when participants finished the sentence without *ook*, they always mentioned differences between the two figures, for example the size or the color in the example above. They argue that this is the result of contrastive implicature. When the participants finished a sentence containing *ook*, they only mentioned similarities between the two figures, e.g. the dots or the shape in the example above. This empirically verifies the idea that *also* neutralizes the contrastive implicature as Sæbø (2004) suggests.

3. The acquisition of contrastive implicature and *ook*

Various studies suggest that children have difficulty acquiring the semantics of additive particles and that they only master them at the relatively late age of five or six (Bergsma 2002; 2006; Costa & Szendrői 2006; Hüttner et al. 2004). Bergsma (2006) carried out an experiment in which Dutch children heard a sentence, and had to choose a picture that best represented the sentence. For example, children

heard the sentence: *Ook de jongen aait de hond* 'lit: Also the boy pets the dog'. The results in Bergsma (2006) show that 53% of the three-year-old children chose a picture in which only a boy was petting a dog, instead of a picture in which both a boy and a girl were petting a dog. The asserted information conveyed by this sentence is compatible with the picture in which the boy is petting the dog. However, the presupposition introduced by *ook* indicates that there is someone else besides the boy who is petting the dog as well. Apparently, the three-year-old children were not able to use the presupposition introduced by *ook* when they interpreted the sentence. Only the six-year-old children consistently chose the picture that satisfied the presupposition.

Berger & Höhle (2012), however, question the results described by Bergsma (2006), arguing that her findings were due to task effects rather than a lack of competence. Berger & Höhle (2012) think that the children in the Bergsma (2006) experiment did understand that the presupposition introduced by *ook* was not satisfied, but gave priority to the asserted information when they interpreted the sentences. Because the sentence in which only a boy is petting a dog was strictly speaking not false, they refused to reject the picture. Berger & Höhle (2012) therefore hypothesize that the correct interpretation of *ook* and *auch* is acquired by the age of three.

To test this, they asked German children to reward a stuffed animal if it had completed a task consisting of two parts, for example eating an apple and a banana. A researcher would ask the animal (in this case a lion), who was played by a second researcher (translation by Berger & Höhle 2012: 394):

(5) Researcher:

Löwe, Du hast bestimmt die Banane gegessen!

Lion, you have surely the banana eaten!

'Lion, you have surely eaten the banana!'

Lion:

Weißt Du was? Ich hab (auch) den Apfel gegessen.

Know you what? I have (also) the apple eaten.

'Guess what? I have also eaten the apple.'

Berger & Höhle (2012) claim that in order to reward the lion after the *auch*-version of (7), children must use both the asserted information in the utterance (*I ate the apple*), as well as the information presupposed by *auch* 'also' (*alternatives to the apple were eaten*). Since 98% of the three-year-old children performed target-like on such sentences with *auch*, the authors conclude they had fully acquired the meaning of *auch*.

However, what Berger & Höhle (2012) do not discuss in detail is what happens in the sentences in which *auch* is absent. Three-year-olds rewarded the animal 64% of the time in such cases, but the adult-like response would be to think that the lion has only eaten the apple and should therefore not be rewarded. Berger & Höhle (2012) explain this result by suggesting that children have yet to develop a “contrastive interpretation” of unmarked sentences. Following Sæbø (2004), this would mean that children have not yet acquired contrastive implicature, and hence do not take the sentence *I ate the apple* to mean that the lion has not eaten the banana.

We think that in order to understand the meaning of *also*, a child must understand the difference between a sentence with *also* (*I also ate the apple*), and a sentence without it (*I ate the apple*). Since many children in Berger & Höhle’s experiment do not distinguish between those two sentence types, we question the conclusion that they have acquired the meaning of *auch*. If a child has not yet acquired contrastive implicature, (s)he cannot recognize that the function of additive particles is to suspend this implicature.

We believe the relatively large proportion of correct responses to sentences with *auch* in Berger & Höhle (2012) could be caused by the same immature interpretation that is applied to sentences without *auch*. Crucially, this interpretation is incorrect for sentences without *auch*, but coincidentally correct for sentences with *auch*. This means that the 98% correct results of the three-year-olds in their study could consist of a group of 64% that coincidentally scores correctly on sentences with *auch* and a group of only 34% that has actually acquired the correct meaning of *auch*. It might very well be that the 34% of children who score correctly on sentences with *auch* is the same group that interprets sentences without *auch* correctly.

The present study tests the acquisition of contrastive implicature and additive particles, in order to gain insight in the relation between the two. We hypothesize that the development of *ook* ‘also’ depends on the more general pragmatic rule of contrastive implicature, and expect (on the basis of Sæbø 2004) the acquisition of *ook* in Dutch to follow a three-step change-for-the-worse-pattern. Children in the first stage have not yet acquired the rule of contrastive implicature, still lacking a system that regulates interpretations between sentences and their context. Children in stage one will therefore choose randomly between a contrastive interpretation and an interpretation of similarity, both for sentences with *ook* as well as those without *ook*. In the second stage, children acquire contrastive implicature and thus interpret sentences without *ook* correctly. Because they do not immediately understand that *ook* suspends this implicature, we expect them to initially overgeneralize the implicature to sentences with *ook*. Consequently, comprehension scores on *ook* should fall to below chance level, only rising up to target levels in the third stage, when children realize that *ook* neutralizes the contrastive implicature and thus interpret sentences with *ook* as similar in relation to the context.

4. Methods

4.1 Participants

We conducted a sentence completion task in which we asked children to finish sentences that did or did not contain the word *ook*. 31 four-year-old children (4;0–4;11, $M = 4;7$, $SD = 0;4$, 20 female) and 31 five-year-old children (5;0–5;11, $M = 5;5$, $SD = 0;2$, 17 female) successfully participated in this task and were therefore included in the analysis. Participants who had difficulty performing the task in general (i.e. could not complete sentences in any way) were excluded from the analysis. All children were monolingual Dutch learners and had no known speech or language disorders. Our control group consisted of 15 university students (18;1–28;9, $M = 22;3$, $SD = 2;7$, 8 female).

4.2 Materials and procedure

The method used by Schmitz et al. (under review), offers the possibility to examine how children understand sentences with *ook* in relation to their development of contrastive implicature. We adapted this task to make it more suitable for children, by using animals instead of abstract figures and by administering the task orally instead of in writing. Children were tested individually at school. The experimenter asked each child to sit at a laptop computer and explained that (s)he would see sets of two animals of the same kind accompanied by pre-recorded sentence pairs describing the pictures. Figure 1 shows an example of such a test item. The first sentence was a complete sentence such as (6), but the second sentence would stop in the middle, and the child was asked to complete it.

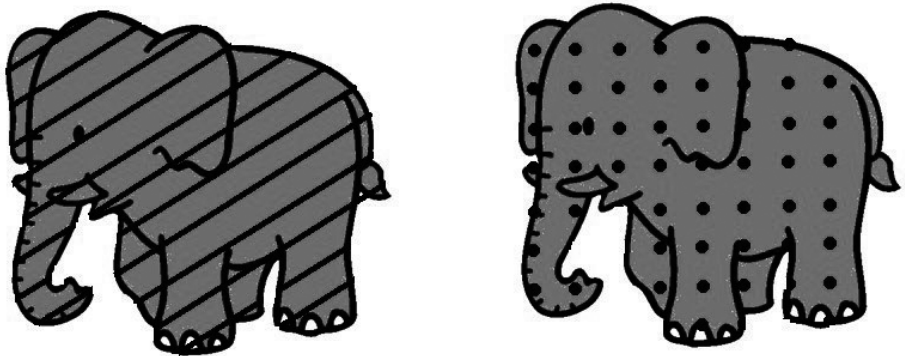


Figure 1. Example test item: left a striped gray elephant and right a dotted gray elephant

- (6) *Dit is een gestreepte grijze olifant*
 This is a striped gray elephant
 ‘This is a striped gray elephant.’

The two animals were always different in one way and similar in another. Figure 1 shows two elephants of the same color, but one has stripes and the other has dots. In all animal pairs, either the color or the pattern (stripes, dots, solid) varied, and the other factor was the same in both animals. The color was always mentioned last to ensure the reading in which the color modifies the animal (and not the pattern) was the only available reading (i.e. only the elephant was gray, not the stripes).

The incomplete sentence about the second drawing either had the form in (7) or the form in (8), i.e. did or did not contain *ook*.

- (7) *Dit is een...*
 This is a...
 ‘This is a...’
- (8) *Dit is ook een...*
 This is also a...
 ‘This is also a...’

Because the sentences without *ook* contained an indefinite article, completing these sentences with *ook* would be ungrammatical, as *ook* (like English *also*) cannot appear between an article and a noun.

The experiment contained 30 animal pairs, 16 of which were critical test items, and 14 were fillers. We used two versions with a different order of items to compensate for potential order effects.

Half of the 16 critical items required a sentence including *ook* to be completed, the other half did not include the focus particle. Picture pairs were assigned to only one of these two conditions. Whether the color or the pattern (stripes/dots/solid) of the animals differed was counterbalanced within each condition, meaning all possible combinations were equally distributed between sentences with and without *ook*.

Of the 14 fillers, half were pairs of two completely different animals. The accompanying recording only mentioned the animal, e.g. *dit is een olifant* ‘this is an elephant’. The remaining fillers were similar to the critical items but the incomplete sentence contained a negation: *dit is niet een...* ‘this is not a...’

4.3 Scoring

The target-like response to critical trials without *ook* is to satisfy the contrastive implicature by mentioning the difference between the two animals. For Figure 1,

either *gestippelde olifant* ‘dotted elephant’ or mentioning both adjectives (*gestippelde grijze olifant* ‘dotted gray elephant’) are target-like ways to complete (7), because it is possible to distinguish between the two animals on basis of these descriptions. A non-target-like completion contains only similarities, e.g. (*grijze*) *olifant* ‘(gray) elephant’. This is the target-like completion of sentences with *ook*, (8) in this example. If any differences were mentioned, the response was considered non-target-like. If the participant repeated the sentence incorrectly, instead of finishing it, the response was labeled as *other*, and thus also non-target-like.

5. Results

Table 1 and Figure 2 summarize our results. Both present the mean proportion of correct responses to sentences with and without *ook* per age group.

Table 1. Mean proportion of correct responses to sentences with and without *ook* per age group

Age group	N	Sentences without <i>ook</i>			Sentences with <i>ook</i>		
		<i>M</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>SD</i>	<i>SE</i>
Four-year-olds	31	0.66	0.48	0.030	0.48	31.7	0.032
Five-year-olds	31	0.87	0.34	0.022	0.29	0.45	0.029
Adults	15	0.95	0.22	0.020	0.97	0.18	0.016

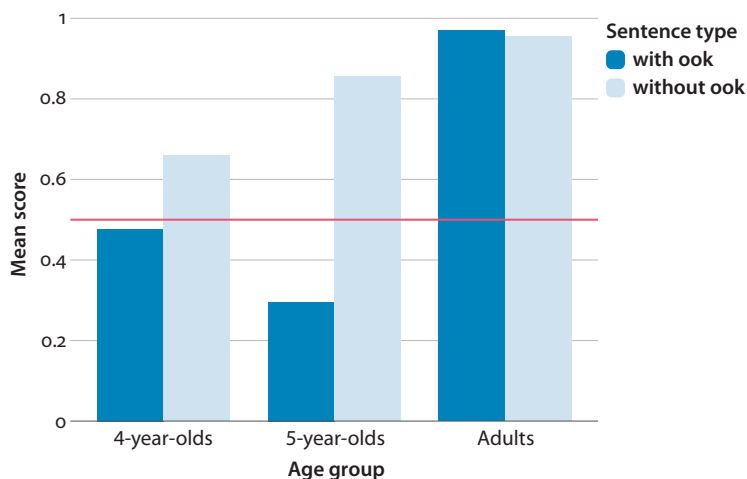


Figure 2. Mean proportion of correct responses to sentences with and without *ook* per age group

We conducted a logistic regression using the generalized linear mixed effects model from the *lme4* package (Bates et al. 2015) in R (R Core team 2016) to compare the responses of the children in our sample. We included age group (four- and five-year-olds), sentence type (with or without *ook*) and their interaction as predictors for the outcome response (target-like or not target-like). We included participant and item as random factors. Sentence type was included as random slope for participant, because it was a within-subjects factor. The model did not converge with age group as a random slope for item, so we did not include age as a random slope.

Results from the statistical analysis did not reveal a significant main effect of Age ($\beta = 1.32$, $SE = 1.40$, $z = 0.83$, $p = 0.41$), indicating that children do not significantly score better on our complete task as they age.

There was, however, a significant main effect of Sentence type ($\beta = 21.16$, $SE = 2.12$, $z = 4.06$, $p = 4.9 \times 10^{-5}$, 95% confidence interval = 4.98–102.76), i.e. four- and five-year-olds together score better on sentences without *ook* than on sentences with *ook*.

The model revealed a significant interaction between age group and Sentence type ($\beta = 40.35$, $SE = 3.41$, $z = 3.01$, $p = 0.0025$, 95% confidence interval = 3.78–531.74). This means that the older children are, the bigger the difference between the higher scores on not-*ook*-sentences and the lower scores on *ook*-sentences becomes. When the model is performed with only the four-year-olds, there is no significant effect of sentence type ($\beta = 3.20$, $SE = 2.29$, $z = 1.40$, $p = 0.16$), meaning there is no evidence that four-year-olds were influenced by the presence of *ook* in their response, as was the case for four-year-olds and five-year-olds together.

Another generalized linear mixed effects model was used to analyze the control group. The adults scored correctly on 96% of the critical items (95% confidence interval = 93–98%). We therefore conclude that adult Dutch speakers performed correctly on our task. The adults showed no significant effect of Sentence type ($\beta = 10 \times 10^{-6}$, $SE = 245.67$, $z = 1.67$, $p = 0.094$), meaning there is no evidence that adults performed better on either sentence type.

Our prediction of a three-stage development is supported by our results. In the first stage, at four years old, the mean scores on sentences with and without *ook* are both around chance level. For the second stage, we predicted that children acquire contrastive implicature but overgeneralize this to sentences with *ook*. Five-year-olds indeed outperform four-year-olds on the sentences without *ook* and therefore more often apply the correct contrastive interpretation to sentences without *ook*. Simultaneously, the chance of correctly interpreting sentences with *ook* decreases. The significant interaction illustrates that when the scores on sentences without *ook* rise, those on sentences with *ook* fall. This interaction supports the prediction

that the contrastive implicature is overgeneralized: correctly interpreting sentences without *ook* goes together with incorrectly interpreting sentences with *ook*.

For the third stage we predicted that scores on both sentences with and without *ook* would be target-like. We see that adults score close to ceiling on both sentence types. Neither child group performed this well, suggesting the meaning of *ook* is acquired after the age of five.

Some children regularly responded with the name of the animal only (e.g. ‘this is (also) an... elephant’). These children are clear examples of the first phase: they do not feel the urge to respond contrastively and could therefore choose the easiest option. However, they sometimes also apply this strategy to sentences with *ook*, which is coincidentally a correct interpretation for those sentences.

6. Discussion

Our results are in accordance with the findings discussed in Bergsma (2002; 2006); Costa & Szendrői (2006) and Hüttner et al. (2004): *ook* appears to be a relatively difficult word that is not learned before the age of five. Moreover, our results explain why *ook* is difficult to learn and why young children (cf. Berger & Höhle 2012) seem to interpret sentences without *ook* incorrectly as well. Our results suggest that *ook* is difficult to learn because it depends on the acquisition of contrastive implicature. Furthermore, children interpret unmarked sentences incorrectly, as well as sentences with *ook*, because they have yet to learn this implicature.

On a theoretical level, our findings support Sæbø (2004), who analyzes *too* in English as a lexical item that suspends contrastive implicature. Our analysis, in which children rely on the development of contrastive implicature to acquire *ook* ‘also’, supports the idea that suspending this implicature is indeed the main function of this additive particle.¹

A reviewer suggested analyzing the scores on the fillers containing a negation, as (some) children may not have (completely) understood the task. Of the 62 children, only 23 consistently responded correctly on those fillers (i.e. made one mistake at most). However, it almost never occurred that a child mentioned the wrong animal, color or pattern, meaning they at least understood they had to describe the animal on the right. Consequently, low scores on the negation-fillers are not problematic for critical items without *ook*: describing the right animal is what the task requires them to do. Note that it is unlikely that poor performance on *ook*-sentences is caused by children not knowing that they have to finish a sentence:

1. Unfortunately, a comparison between all hypotheses pertaining to the meaning of *also* goes beyond the scope of this paper.

of the 23 children who did well on the negation-fillers, only three also correctly completed sentences with *ook*. Moreover, a regression with a linear model showed that scores on the negation-fillers were not predictive for the scores on *ook*-trials ($\beta = 0.15$, $SE = 0.12$, $t = 1.28$, $p = 0.20$). Therefore, it is not the case that correct performance on negation-fillers entails correct performance on *ook*-trials.

Our data are not compatible with the claim put forward by Berger & Höhle (2012). They argue that the three-year-old children in their study fully understand *auch* 'also'. However, the present study shows that five-year-old children still do not understand what *ook* 'also' means, and suggests that the interpretation of sentences with *ook* depends on the interpretation of those without *ook*. The results on sentences without *ook/auch* should therefore be taken into account when assessing a child's knowledge of the word.

The four-year-old participants we tested responded similarly to both sentences with and without *ook*. The children in Berger & Höhle (2012), however, scored almost 100% on sentences with *auch*. This result is unexpected given our hypothesis and results, and further research is needed to investigate the cause for this discrepancy. One possible explanation could be that children entertain a premature analysis of *ook* and *auch* before they acquire the definite interpretation that neutralizes the contrastive implicature. This premature interpretation leads to a correct interpretation of the sentences in Berger & Höhle (2012) (*I have also eaten the apple*), but does not suffice to interpret the sentences in the present task (*this is also a gray dotted elephant*) correctly. Put differently, the premature interpretation only works for a subset of the constructions in which adults can interpret *ook* and *auch* correctly. Children must then ultimately reanalyze their premature hypothesis and notice that *ook/auch* is a functional item that neutralizes the contrastive implicature, in order to interpret all occurrences of this particle with one single interpretation. Children need the final interpretation explained in this paper to reach complete adult-like comprehension.

7. Conclusion

This study investigated the comprehension of Dutch *ook* 'also' by four and five-year-old children. Earlier research was inconclusive with respect to the precise age at which the correct interpretation of this word is acquired (Bergsma 2002; 2006; Berger & Höhle 2012). More importantly, it was unclear why it is learned at a relatively late age and what factors influence the acquisition of its meaning. We hypothesized that the correct comprehension of *ook* depends on the pragmatic rule of contrastive implicature. This rule determines how unmarked sentences are interpreted, namely as contrastive in relation to the context. *Ook* prevents this

implicature from being applied. The results showed a three-stage development pattern of *ook* that is consistent with our hypothesis.

In the first stage, children interpret both sentences with and without *ook* either as contrastive or similar in relation to the context. In the second stage, children learn contrastive implicature, which causes scores on sentences without *ook* to rise. However, the contrastive implicature is initially overgeneralized to the sentences with *ook*, which causes scores on *ook* to drop. In the third stage, children learn that *ook* suspends the contrastive implicature and perform target-like on both sentences with and without *ook*.

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