THE INTERACTION OF FOCUS PARTICLES AND INFORMATION STRUCTURE IN ACQUISITION

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1. Introduction

Previous research on the comprehension of focus particles indicated that generally children interpret sentences with the focus particle *only* not target-like (e.g., Crain, Ni & Conway, 1994; Paterson et al., 2003; for contrary results see Berger & Höhle, 2012; Müller, Höhle & Schulz, 2011; Müller 2012). Different accounts have been proposed to explain children's non adult-like comprehension of sentences with *only*. Whereas Paterson et al. (2003) assume that children have not yet mastered the semantic-pragmatic function of focus particles, Crain et al. (1994) suggest that children's difficulties are caused by an incorrect syntactic analysis of the sentence.

The present study explored how 6-year-old German speaking children interpret sentences with the focus particle *nur* ('only') across different sentence positions. In contrast to previous studies, canonical and non-canonical *nur*-sentences were used varying two factors: grammatical function of the focused constituent (subject vs. object) and position of the focused constituent (sentence initial vs. sentence final). Couched in an information-structural framework, we assume that the differences in performance are caused by differences in the focus alignment in these sentence types and depend on whether the focused constituent is subject or object.

This paper is organized as follows: The properties of information structure and the focus particle *only* are described in Section 2. Previous acquisition findings on the comprehension of *only* are reported in Section 3. In Section 4 we present our experiment and the results. We conclude with a discussion of our findings in the light of recent research in Section 5.

2. Information structure and the focus particle *only*

The concept of information structure refers to the division of a sentence into two information units that are distinguished by their information status: One unit represents new information, the other represents information that is regarded as given with respect to the previous discourse (e.g., Chafe, 1976; von Heusinger, 1999). The information structure of a sentence can be analyzed at the discourse level and at the sentence level, as illustrated in (1) for the sentence *Justus likes cookies.*

(1)

Discourse level	**Topic**	**Comment**	
	Justus	likes	cookies.
Sentence level	**Background**		**Focus**

At the discourse level, the topic refers to the discourse referent the sentence is about, which may have already been introduced in the previous discourse. The comment includes what is said about the topic (e.g. Jackendoff, 1972). At the sentence level, background refers to the information that is already given, whereas focus represents the new (or contrastive[1]) information and signals that there are propositional alternatives in the discourse. Normally, topic and focus are represented by different constituents in a sentence and are marked by distinct features (e.g., Molnár, 1991; von Heusinger, 1999): a) the topic typically occurs in the sentence initial position, whereas focus typically occurs in sentence final position; b) the topic constituent is often the subject, whereas the focus constituent is often the object of a sentence; c) while the topic constituent is already introduced in the previous discourse, focus refers to new/unknown information. Thus, example (1) illustrates the typical information structure of a sentence.

The focused element may be highlighted as such either using prosody (e.g. pitch accent) or syntax (e.g. word order) or both. Use of lexical items like focus particles is another way to mark focus. Focus particles (FP) like *only* modify the meaning of a sentence (Dimroth & Klein 1996) by putting the focused element into a specific relation to alternative elements given in the discourse. According to Rooth (1992), FPs are a special set of quantifying expressions that behave like semantic operators. They take

scope over the part of a sentence they c-command in the parse tree (Jacobs, 1983; König, 1991). The scope domain entails the element in focus, which is also called *related constituent* of the FP (Reis & Rosengren, 1997). Consider examples (2) and (3) with the FP *nur* ('only'):

(2) a. Mögen Justus und Peter Kekse?
Do Justus and Peter like cookies?
b. Nein. Nur [Justus]$_F$ mag Kekse.
No. Only [Justus]$_F$ likes cookies
No. Only [Justus]$_F$ likes cookies.

(3) a. Mag Justus Kekse und Äpfel?
Does Justus like cookies and apples?
b. Nein. Justus mag nur [Kekse]$_F$.
No. Justus likes only [cookies]$_F$.
No. Justus only likes [cookies]$_F$.

In (2) the FP *nur* occurs in a sentence initial position, preceding the subject. The subject-NP *Justus* is the related constituent and thus the focus of the sentences. In contrast, in (3) *nur* appears in postverbal position, preceding the object and the object-NP *cookies* is the related constituent of the FP.

Only belongs to the group of restrictive FPs, i.e. *only* establishes an exclusive contrast between its related constituent and a set of alternatives (SoA). The SoA signals that there are alternatives with respect to the focus of the sentences (cf. Krifka, 2004; Rooth, 1992). The SoA is required for the sentence interpretation. Only by taking into account this set is the hearer able to interpret the FP-sentence. In example (3) the use of *nur* 'only' signals that in the given discourse *Justus* is the only person who likes cookies. The second individual *Peter* represents the SoA for which the property expressed by the related constituent is understood as being false.

In sum, in order to interpret sentences with *only* the child has to master the following tasks: She has to identify the sentence position of the FP and the related constituent. In addition, she must compute the SoA and integrate it into the current discourse model. Furthermore, the child has to establish an exclusive contrast between the referent of the related constituent and the SoA.

3. Previous research

Many studies have investigated children's understanding of the FP *only* across different languages (e.g., Berger & Höhle, 2012; Gualmini et al. 2003; Costa & Szendrői, 2006; Crain, Ni & Conway, 1994; Müller, Schulz & Höhle, 2011; Paterson et al., 2003). Crain et al. (1994) report that 3- to 6-year-old English-speaking children incorrectly assigned the meaning of (4b) to sentences with *only* in sentence initial position, preceding the subject (4a):

(4) a. *Only* the cat is holding a flag.
b. The cat is *only* holding a flag.

To account for this error pattern Crain et al. suggest that children have difficulty with the scope restriction of *only* and associate the FP with the VP of the sentence regardless of the surface position of the FP (for similar results cf. Notley et al., 2009).[2] Note that under the account of Crain et al. (1994) it remains unclear why children have difficulty with scope restriction.

Paterson et al. (2003) also found non-target-like interpretation of *only* in children but proposed an alternative account. They suggest that due to an instable representation of the SoA children ignore the meaning of the FP and thus interpret sentences with and without FP alike. In a picture-selection task, Paterson et al. found that 6- to 7-year-old English-speaking children pointed to the pictures that were a true description of the sentences without a FP, regardless of the sentence type used.

Müller, Schulz and Höhle (2011) investigated the comprehension of sentences with *nur* ('only') in German speaking 6-year-old children. The test material consisted of sentences with *nur* in pre-subject position (6a) and with *nur* in pre-object position (6b).

(5) a. Nur die Maus hat eine Gitarre.
Only the mouse has a guitar.
Only the mouse has a guitar.
b. Die Maus hat nur eine Gitarre.
The mouse has only a guitar.
The mouse has only a guitar.

The authors report that children performed target-like on sentences with the focused object (5b) but not on sentences with the focused subject (5a). Similarly Berger and Höhle (2012) report target-like performance for

nur-sentences focusing the object of the sentence. In their study already at age 3 German-speaking children showed an overall high performance when interpreting FP-sentences like *Ich habe nur den Apfel gegessen.* ('I've only eaten the apple.').

In sum, the results of previous comprehension studies show that children's performance depends on the sentence position of the FP. Better performance was found for sentences with the FP in pre-object or pre-verbal position than in pre-subject position. However, these studies exclusively used sentences with a subject-verb-object order (SVO). Therefore, the better performance on sentences with *only* in pre-object position could be due to the canonical non-initial sentence position of the focused element. Consider the information structures of sentences (5a) and (5b) given in (6) and (7).

(6)

Discourse level		**Topic**		
	Nur	die Maus	hat	eine Gitarre.
	Only	*the mouse*	*has*	*a guitar.*
Sentence level		**Focus**		

(7)

Discourse level	**Topic**		
	Die Maus	hat nur	eine Gitarre.
	The mouse	*has only*	*a guitar.*
Sentence level			**Focus**

As illustrated in (6) and (7), the information structure of both sentences differs in two aspects: sentence position of the focused element (initial vs. non-initial) and grammatical function of the focused element (subject vs. object). (7) displays the unmarked information structural form of the pre-object FP-sentence. In contrast, the information structure of the pre-subject FP-sentence in (6) is marked, because the subject is focused and the focused constituent occurs in sentence initial position. We hypothesize that children's weaker performance on sentences with the FP in sentence initial position is caused by the non-canonical information structural form and not by children's difficulty with the syntactic or semantic-pragmatic aspects of the interpretation of FP-sentences. This assumption still leaves open whether weaker performance is due to the sentence initial position of the focused element or to the non-canonical focus-subject alignment.

To address this question we developed a comprehension experiment using SVO-sentences and non-canonical OVS-sentences with the focused constituent in either sentence final (9) and (10) or sentence initial position (8).

(8) *nur*SVO: Nur [der Elefant]$_F$ hat einen Ballon.
Only [the elephant]$_F$ has a balloon.
Only the [elephant]$_F$ has a balloon

(9) SV*nur*O: Der Elefant hat nur [einen Ballon]$_F$.
The elephant has only [a balloon]$_F$.
The elephant has only [a balloon]$_F$.

(10) OV*nur*S: Einen Ballon hat nur [der Elefant]$_F$.
A balloon has only [the elephant]$_F$.'
A balloon has only [the elephant]$_F$.

The information structure of the OVS pre-subject *nur*-sentence (9) is illustrated in example (11). As shown in (11) the focused constituent occurs in sentence final position, but the focus is realized on the subject NP *the elephant*.

(11)

Discourse level	**Topic**		
	Einen Ballon	hat nur	der Elefant.
	A balloon	*has only*	*the elephant.*
Sentence level			**Focus**

If children's weaker performance on *nur*SVO-sentences is due to the initial sentence position of the focused constituent then a better performance on SV*nur*O and OV*nur*S-sentences than on *nur*SVO-sentences is expected. In contrast, if children's performance is due to the non-canonical subject-focus alignment a better performance on SV*nur*O than on *nur*SVO and OV*nur*S-sentences is expected.

4. Study

4.1. Participants

Forty-eight 6-year-old children (27 girls and 21 boys; mean age: 6;9 years; range: 6;3 – 7;1 years) participated in this study. All children were monolingual speakers of German with typical language development and

were recruited from several schools in Potsdam, Brandenburg. In addition, 30 adults were tested as a control group.

For methodological reasons described below the children were divided into three groups each consisting of 16 children: Group 1) 10 girls and 6 boys, mean age 6;8, Group 2) 8 girls and 8 boys, mean age 6;9 and Group 3) 9 girls and 7 boys, mean age 6;9. The adults were divided into three groups as well, each consisting of 10 participants.

4.2. Method and materials

Using a truth-value judgment task, we presented each participant with one picture at a time and asked them to decide whether the sentence matched the picture or not. Each picture depicted four characters and their toys. There were four experimental conditions: *nur*SVO, SV*nur*O, OV*nur*S, and SVO control sentences without *nur*.[3] The sentences without FP were included to verify that the children could reject and accept sentences. Each test sentence was preceded by a verbal context introducing all characters and their toys depicted in the picture, i.e. the possible SoA was introduced verbally and not just visually. All test items were prerecorded by a female speaker; the element in focus was marked prosodically.[4]

Each *nur*-sentence condition consisted of eight test items, the control condition consisted of 16 items. In each condition half of the sentences matched the picture, while in the other half the sentences did not match the picture and required a no-response. Note that the test items in the yes-condition do not provide evidence about whether the child takes the FP into account when interpreting the *nur*-sentence. If the child ignores the FP, she could still correctly accept the sentence, because an interpretation without *nur* matches the picture as well. Therefore, only the expected no-responses were relevant for the analysis. Table 1 presents examples for the FP-sentence types in the no-response condition.

To balance the features 'grammatical function' and 'sentence position' across test items, each participant was tested with only two of the three *nur*-sentence conditions. Thus, the participants were divided into three groups (see table 2).

Table 1: Examples of test items in the expected no-response condition

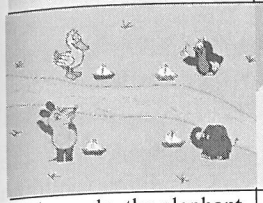
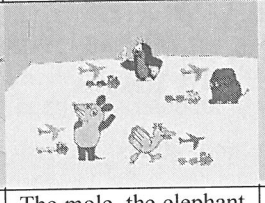
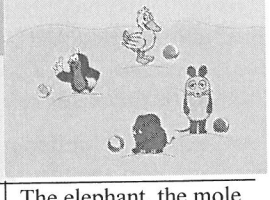
***nur*SVO**	**SV*nur*O**	**OV*nur*S**
		
The mole, the elephant and the mouse have a boat. **Test sentence** *Nur die Ente hat ein Boot.* Only the duck has a boat.	The mole, the elephant and the duck have an air plane and a train. **Test sentence** *Der Elefant hat nur eine Eisenbahn.* The elephant has only a train.	The elephant, the mole and the duck have a ball. **Test sentence** *Einen Ball hat nur die Maus.* A ball has only the mouse.

Table 2: Distribution of the experimental conditions

Condition	Group 1	Group 2	Group 3
*nur*SVO	8 items	8 items	-
SV*nur*O	8 items	-	8 items
OV*nur*S	-	8 items	8 items
Controls	16 items	16 items	16 items

In total each participant was tested with 32 sentences: 16 *nur*-sentences of two different conditions and 16 control sentences.

4.3. Procedure

The experiment was presented on a computer. The children were tested individually after school in their day care center. At the beginning of the experiment the experimenter introduced a hand puppet to the child explaining that the puppet is friends with the characters (a mouse, an elephant, a mole, and a duck taken from the well-known German children TV-show "The Program with the Mouse"). The child was told that the puppet had a lot of pictures of the mouse and their friends that she wanted to show to the child. The experimenter informed the child that the puppet sometimes made mistakes when describing pictures and asked the child to

judge whether the puppet's descriptions were right or wrong. An experimental session lasted for about ten to 15 minutes. The participants of the adult control group were tested individually as well.

4.4. Results

As expected, children and adults showed no problems with the interpretation of the test sentences in the yes-response condition (children ranging between 92% and 100% correct; adults 100% correct) as well as with the control sentences (children ranging between 95.3% and 100% correct; adult 100% correct). As mentioned before, for the statistical analysis only the expected no-responses were taken into account. Table 3 summarizes the proportion of correct no-responses for the three *nur*-sentence types for children and adults.

Table 3: Proportion of correct no-responses

Condition	Children			Adults		
	Group 1	Group 2	Group 3	Group 1	Group 2	Group3
*nur*SVO	59.4% SD=1.9	76.6% SD=0.25	-	92,5% SD=0,86	90% SD=0.97	-
SV*nur*O	100%	-	100%	97.5% SD=0,28	-	100%
OV*nur*S	-	84.4% SD=1.26	78,2% SD=1.63	-	100%	100%

SD= standard deviation

We first analyzed the data within each group using the Wilcoxon-test. Children of group 1 performed significantly better in the SV*nur*O-condition than in the *nur*SVO-condition ($Z=2.640$; $p < .001$). Children of group 2 gave the expected no-response in 76.6% of the cases in the *nur*SVO-condition and in 84.4% of the cases in the OV*nur*S-condition. The statistical analysis revealed that the difference is not significant ($Z= .813$; $p = .416$). The analysis for group 3 revealed that children performed significantly better in the SV*nur*O-condition than in the OV*nur*S-condition ($Z=2.060$; $p < .05$). The adult groups performed at ceiling in all test conditions, and no significant differences between the test conditions were found (group 1: $Z= .447$; $p = .655$; group 2: $Z=1.342$; $p = .180$; group 3: 100% expected no-responses in both conditions).

In a next step, we compared the performance of children and adults in each group using the Mann-Whitney-U-test. The analyses revealed that adults in group 1 performed significantly better on *nur*SVO-sentences than children ($Z=2.193$; $p< .05$) while no difference was found for SV*nur*O-sentences ($Z=1.265$; $p= .698$). No differences between adults and children were found in group 2 neither in the *nur*SVO-condition ($Z= .592$; $p= .592$) nor in the OV*nur*S-condition ($Z= 1.678$; $p= .093$). Also for group 3 there were no statistical differences found neither for SV*nur*O-sentences (adults and children 100% correct answers) nor for OV*nur*S-sentences ($Z=1.681$; $p= .093$).

5. Discussion and conclusion

The aim of the present study was to investigate how 6-year-old German speaking children interpret sentences with the FP *nur* across different sentence positions. The results show that children performed better on SV*nur*O-sentences than on *nur*SVO and OV*nur*S-sentences. As expected, children in group 1 showed a weaker performance on *nur*SVO than on SV*nur*O-sentences. No difference was found for children in group 2 between *nur*SVO and OV*nur*S-sentences. Children in group 3 performed better on SV*nur*O than on OV*nur*S-sentences. With respect to our main research question our data clearly indicate that children's weaker performance on sentences containing a focused subject in sentence initial position is due to the non-canonical subject-focus alignment. If children associated the focus with the sentence final position we would have expected children in group 2 to perform better on OV*nur*S than on *nur*SVO-sentences. However, this pattern was not found. Based on our findings, we assume that children's difficulties with sentences containing a focused subject result from the preference for subjects to function as the topic of a sentence. Similar preferences for subjects as topics, based on reading studies, have been reported for adults (e.g., Frazier 1999). Frazier (1999) postulated a topic-default for subjects. Within this approach, we propose that children prefer the subject to be the topic of a sentence as well. If a sentence contains a focused subject children are faced with the conflict of assigning topic or focus to the subject (cf., Molnár, 1991). We argue that in case of conflict children adhere to the topic-default for subjects. Consequently, children incorrectly analyze the subject as topic and hence the object as the focused constituent. Our account differs from Crain et al.'s (1994) approach, which in our view predicts that children have little difficulty with OV*nur*S-sentences because in this case the scope restriction is unambiguous. As for the question how in our topic-default account the FP contributes to the sentence interpretation, we assume that

children interpret the *nur*SVO sentences without the FP (e.g., *Only the duck has a boat.* as *The duck has a boat.*). Unlike Paterson et al. (2003) we assume that children's difficulties with FPs are not caused by problems with the integration of the SoA in the actual discourse model. The results on the SV*nur*O-sentences indicate that children are able to represent the SoA and to establish an exclusive contrast between the referent related to the FP and the SoA. We assume that children interpret *nur*SVO sentences without taking into account the meaning of the FP *nur,* because there is no adequate SoA given in the actual discourse of the experiment (cf. Table 1), which would allow an alternative interpretation, i.e. the association of the FP with the object of the sentence (*Only the duck has boat.* as *The duck has only a boat.*). In this case the SoA would consist of toys other than a boat belonging to the duck. However, there are no further toys besides the boat. If the SoA contains no further referents, there are no alternatives regarding the focused constituent (cf. Krifka, 2004). Thus, there is no exclusive contrast that the child can establish between the object and the SoA, and the use of the FP is unmotivated and infelicitous. As a consequence, the child does not take the FP into account when interpreting *nur*SVO sentences and instead interprets the sentence as having the meaning of a SVO sentence without the FP.

In sum, our study showed that children's interpretation of sentences with FPs is influenced by the grammatical function of the focused element. Children prefer the subject to be the topic of a sentence. In sentences in which the subject is focus-marked by the FP, they analyze the subject as topic and the object incorrectly as focus. If the topic-default postulated for adults also holds for children, we should see its effects for sentences without FPs that contain a focused subject like *[Der Maulwurf]$_F$ hat einen Ball* ('The mole has a ball.'). Whether this is borne out has to be resolved by future studies.

Notes

[1] Contrastive focus signals information that is contrary to the presupposition of the hearer.

[2] Note that test sentence (4b) is ambiguous. The FP can associate either with the VP *holding a flag* or with the NP *a flag*. The results by Crain et al. (1994), however, suggest that children treat the sentence as unambiguous, with the FP having scope over the NP. For a detailed discussion of the related "isomorphism effect" see Musolini et al. (2000) and Gualmini (2004).

[3] We decided not to include the sentence type *nur*OVS to keep the structure of the lead-in sentences the same across conditions (cf. Table 1).

[4] One reviewer inquired about children's sensitivity to word stress properties of the focused element across different sentence positions. In an eye-tracking study Höhle et al. (2009) showed that 2-to 4-year old children are able to use prosodic information to identify correctly the related constituent of the FP *also.*

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THE INTERFACE HYPOTHESIS AND L2 ACQUISITION OF JAPANESE PRONOUNS BY L1 ENGLISH SPEAKERS

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Abstract

This paper reports on an experimental study that examines the applicability of the Interface Hypothesis (Sorace & Filiaci, 2006). The Interface Hypothesis suggests that acquisition of knowledge at external interfaces (e.g., the discourse-syntax interface) can be persistently problematic for second language speakers, whereas other domains of knowledge (e.g., internal interfaces, pure syntax) are acquirable. The study compares second language acquisition of two different functions of Japanese pronouns: the syntactic/semantic function and the discourse function. A group of first language English speakers interpreted Japanese overt and null pronominals in embedded or subordinate clauses, which served either function. The results show that acquisition of the discourse function is no more problematic than acquisition of the syntactic/semantic function. These results do not support the Interface Hypothesis and support the view that problems with interfaces are not domain specific (White, 2011a).

1. Introduction

The purpose of this study is to test the Interface Hypothesis (henceforth IH) (Sorace & Filiaci, 2006; Belletti, Bennati & Sorace, 2007) through comparing acquisition of two domains of knowledge of pronouns by L1 English speakers of L2 Japanese. The IH originally suggests that grammatical aspects involving syntax and other cognitive domains (e.g. the discourse-syntax interface) are less likely to be acquired than pure syntax, which does not require knowledge at interfaces (Sorace, 2006). More recently, Sorace (2011) has divided interfaces into two types: (i) internal interfaces which require coordinating different domains within the grammar (e.g., the syntax-semantic interface) and (ii) external interfaces