

Preschoolers' interpretation of the focus particle *csak* 'only' in Hungarian

Lilla Pintér

The paper reports on two experiments in which I tested whether Hungarian children can process the exhaustivity of sentences containing the focus particle *csak* 'only'. In line with previous studies concerning the interpretation of focus particles in different languages, I found that preschoolers at around the age of 5 are able to access the exhaustive meaning component of these constructions, though they are occasionally uncertain about which constituent they should associate this reading with. Interestingly, contrary to German-speaking children, they tend to expect the subject to be the focused constituent.

1. Introduction

The aim of this study is to experimentally investigate how Hungarian preschoolers interpret sentences containing the focus particle *csak* 'only'. Thus, I address the following research questions: 1) Do Hungarian preschoolers have access to the exhaustive meaning of these utterances? 2) Do they associate this reading with the same constituent as adult native speakers? I carried out two experiments to answer these questions. Firstly, I conducted a sentence–picture verification task, and secondly a forced-choice picture-selection task.

In addition to the work on the development of *only* in English (Crain et al. 1994, Gualmini et al. 2003, Paterson et al. 2003, 2005/2006, Hackl et al. 2015, among others), there are some recent studies on the acquisition of focus particles in other languages, e.g., *nur* in German (Müller 2010, Müller et al. 2011a,b, Berger & Höhle 2012) or *zhiyou* in Mandarin Chinese (Notley et al. 2009, Zhou & Crain 2010, Hu & Li 2014), which are claimed to behave similarly to their English counterpart. Although the semantics of the focus particle *csak* 'only' in Hungarian appears to be essentially the same as the ones in the languages just mentioned, it actually requires a different syntactic structure. As the focus of the sentence always occurs in the pre-verbal position, parsers not only have prosodic cues to identify the associate of the particle, but they can also make use of the word order. Therefore, it is reasonable to assume that the acquisition of the adultlike interpretation of *csak* will also be different to some extent.

The paper is structured as follows: section 2 presents the semantic properties of sentences with *csak* 'only'. Section 3 outlines the results of previous research regarding the acquisition of the interpretation of focus particles in different languages. Section 4 is dedicated to the two experiments I conducted, whereas section 5 summarizes the conclusions.

2. The meaning of the focus particle *csak* 'only'

Szabolcsi (1994) claims that the exhaustive meaning expressed by the particle *csak* 'only' is associated with the focused constituent of the sentence, similarly to the case of *only* in English. It is also true in both cases that the focused element must be in the scope of the focus operator. However, there is a major difference between the two languages with respect to focus marking. In English, as pinpointed by Jackendoff (1972), the focus within the c-command domain of the particle *only* is marked by stress; thus sentences like (1) yield three possible interpretations depending on the stress pattern, as illustrated in (2 a–c). However, in Hungarian, it is not only the prosody that changes the meaning of the sentence. As it can be seen in (3 a–c), there are also three different word orders, since the focused constituent always moves into the position immediately preceding the tensed verb.¹

(1) John only introduced Bill to Sue. (Gualmini et al. 2003:88)

(2) a. John only INTRODUCED Bill to Sue.
'The only thing that John did is introducing Bill to Sue.'

b. John only introduced BILL to Sue.
'The only person that John introduced to Sue is Bill.'

c. John only introduced Bill TO SUE.
'The only person to whom John introduced Bill is Sue.'

(3) a. John csak BE-MUTAT-T-A Sue-nak Bill-t.
John only PRT-introduce-PST-3SG Sue-DAT Bill-ACC
'The only thing that John did is introducing Bill to Sue.'

b. John csak BILL-T mutat-t-a be Sue-nak.
John only Bill-ACC introduce-PST-3SG PRT Sue-DAT
'The only person that John introduced to Sue is Bill.'

c. John csak SUE-NAK mutat-t-a be Bill-t.
John only Sue-DAT introduce-PST-3SG PRT Bill-ACC
'The only person to whom John introduced Bill is Sue.'

It is also important to mention that the particle *csak* does not necessarily occur in the position preceding the focused element. Although this is the canonical word order (4a), the particle can also appear in a post-verbal position, like in the case of (4b). Note, however, that the focus is still the constituent in the pre-verbal position; therefore this sentence is not ambiguous either.

(4) a. Csak MARI süt-ött sütemény-t.
only Mary bake-PST cake-ACC
'Only Mary was baking a cake.'

b. MARI süt-ött csak sütemény-t.
Mary bake-PST only cake-ACC
'Only Mary was baking a cake.'
* 'Mary was baking only a cake.'

¹ It is a well attested fact that in Hungarian the constituent called identificational focus undergoes syntactic movement from its base-generated position to the specifier of the focus projection, and thus verbal particles such as *be* in (3) appear in a post-verbal position in these cases. For a detailed discussion see É. Kiss (1998).

Examples like (4b) suggest that the particle *csak* does not form one constituent with the focused element in contrast with pre-subject *only* in English (as shown by the ungrammatical reading). It is, however, adjoined to the focus projection, and just like sentential adverbials or distributive quantifiers such as *mindenki* ‘everyone’, it can be attached from the right and thus appear in a post-verbal surface position.

The fact that, in Hungarian, focusing is also marked by syntactic means in addition to prosodic highlighting is crucial, since as the results of the experiments conducted by Gualmini et al. (2003) revealed, children at around the age of 5 cannot rely on prosodic cues when interpreting sentences containing *only*. While in the case of languages similar to English, the investigation of the interpretation of focus particles is also relevant to the problem of resolving ambiguity (first discussed by Crain et al. 1994), in the case of Hungarian, the acquisition of the particle *csak* is independent of the available strategies of disambiguation.

According to the analysis of Horn (1969), in the case of sentences containing the focus particle *only* in English, there are two meaning components, namely a presupposed one and an asserted one, as illustrated by (5).

- (5) Only Muriel voted for Hubert.
 Presupposition: Muriel voted for Hubert.
 Assertion: No one other than Muriel voted for Hubert. (Horn 1969:98)

Horn (1996) later modifies his theory by assuming that the positive meaning component of the sentence is in fact an existential presupposition. Thus, we only presuppose that *someone voted for Hubert* and that it is an entailment calculated from the two meaning components that *Muriel voted for Hubert*. Alternatively, van Rooij & Schulz (2007) propose that the positive contribution *Muriel voted for Hubert* (which is also called the prejacent of *only*) is merely a conversational implicature, while Beaver & Clark (2008) and Roberts (2011) discuss it as a backgrounded entailment. However, it has never been a source of a debate that in the case of sentences with focus particles the negative contribution (i.e., the component which expresses exhaustivity) is asserted², and this is the only relevant issue in the present study.

Kenesei (1986, 1989) and Szabolcsi (1994) provide a similar analysis with respect to the meaning of *csak* ‘only’.

- (6) Csak Péter alszik.
 only Peter sleep-3SG
 ‘Only Péter is sleeping.’ (Kenesei 1989:134)

Thus, in the case of (6), the assertion is that *No one other than Peter is sleeping*. It is also presupposed that *Peter is sleeping*. As Kenesei (1986, 1989) points out, the truth-conditions of this positive meaning component are not affected by the presence or absence of negation, which also strengthens the assumption that it is a presupposition.

Considering the fact that the exhaustive meaning component is asserted (or proffered) in the case of sentences containing a focus particle, it is reasonable to predict that children at around the age of 5 are able to process it. In Hungarian, where identificational focus is also marked syntactically, it is also likely that the adultlike association with the focused constituent is easier and therefore earlier acquired than in the case of languages like English.

² Roberts (2011) tends to call it *proffered content* instead of *asserted content* in order to emphasize that it can also be asked or suggested not only asserted.

3. Previous experiments regarding the interpretation of focus particles

The interpretation of sentences containing focus particles has been the subject of several acquisition studies in the past two decades. The fact that children might assign a different meaning to these constructions compared to adult native speakers was revealed by the work of Crain et al. (1994). They found that preschoolers tend to associate the exhaustivity of the focus particle with the verb phrase irrespective of its surface position. For instance, if they were presented with the sentence under (7), the majority of children would not judge this statement as false if someone else was holding a flag too, while they did reject it if the cat was also doing something else besides holding a flag.

(7) Only the cat is holding a flag. (Crain et al. 1994:460)

Crain et al. (1994) hypothesize that the high proportion of non-adultlike responses (55%) is in line with a previous finding according to which in case of structural ambiguities, for example in the case of sentences like (8), young children and adults do not apply the same strategy.

(8) The big elephant is the only one eating peanuts.
 'The only thing eating peanuts is the big elephant.'
 'The only elephant eating peanuts is the big elephant.' (Crain et al. 1994:448)

When testing the interpretation of such constructions, they also found robust differences between the response patterns of the two age groups: whereas preschoolers accepted the sentence under (8) as true only in those cases in which nobody else was eating peanuts, adult native speakers strongly preferred the second reading which allows everyone to eat peanuts except the other elephants.³ As concluded by Crain et al. (1994), these findings can be explained by assuming that language learners attempt to choose the most restricted interpretation, i.e., the one that is only true under the narrowest range of circumstances, as opposed to adult parsers who tend to select the reading which makes the fewest restrictions in order to avoid unnecessary commitments. If it is indeed the case that preschoolers predominantly prefer the so-called "maximal commitment" reading, then it is not surprising that they do not obey syntactic restrictions on the scope of the focus particle but that they are VP-oriented even in the case of sentences like (7).

Paterson et al. (2003) argue against this analysis on the basis of the results of three experiments in which they compared the interpretation of sentences containing focus particles in different syntactic positions (9a, 9b) with that of sentences without focus particles (9c).

(9) a. The fireman is only holding a hose.
 b. Only the fireman is holding a hose.
 c. The fireman is holding a hose. (Paterson et al. 2003:270)

Crucially, their results appear to suggest the view that English-speaking children interpret sentences with and without *only* as having the same meaning. In each experiment, they found that the most frequent error type was the ignorance of the contrastive information expressed

³ It is important to mention that the authors did not use the same experimental design when testing the two age groups. While children were asked to judge the truth-value of the sentences with respect to the presented pictures, adult speakers only got the test sentences in written form, and their task was to describe one context in which the sentence is true and one in which it is not.

by the particle, not the non-adultlike association with focus. Therefore, Paterson et al. (2003) propose that young children fail to instantiate an explicit set of the alternatives of the focused constituent while mentally representing the meaning of the sentence containing a focus particle.

In a later study, Paterson et al. (2005/2006) investigate sentences in which the particle occurs in the pre-verbal position (10). Thus, the exhaustivity of *only* can be associated with either the verb or the direct object.

(10) The woman is (only) walking a dog. (Paterson et al. 2005/2006:264)

This time their findings are in line with those of Crain et al. (1994). Hence, even the youngest participants were able to differentiate between sentences with and without *only*, and in the case of sentences with a particle they preferred the more restricted verb-oriented interpretation. Moreover, in this study, even the majority of adult participants associated the particle with the verb. Therefore, Paterson et al. (2005./2006) conclude that both preschoolers and adults tend to favor the maximally informative reading of the sentences.

In order to test the previous hypotheses in two typologically distinct languages, Notley et al. (2009) compared children's interpretation of the particle *only* in English with that of the particle *zhiyou* in Mandarin Chinese. In the case of English, they followed two children's developmental progress from the age of 2. The findings clearly refute Paterson et al.'s theory (2003), since the participants were able to construct the set of the alternatives of the focused element at the age of 2;5 and 2;9, respectively. Interestingly, by the time they had achieved this level, they consistently started to associate the particle *only* with the verb phrase regardless of its syntactic position. This corresponds to the previous results of Crain et al. (1994), as well as to the responses of Mandarin Chinese speaking preschoolers whose task was to judge sentences such as (11).

(11) Zhiyou zhu xiansheng nadao-le yinse yingbi.
 only pig sir get-ASP silver coin
 'Only Mr. Pig got a silver coin.' (Notley et al. 2009:259)

Example (11) was presented in an "adult-true" condition where it was indeed only Mr. Pig who got a silver coin; however, it was not the only thing he got, since he won a gold coin as well. Preschoolers, as predicted by Crain et al. (1994), rejected this statement 90% of the time, arguing that Mr. Pig also got a gold coin. Thus, Notley et al. (2009) conclude that, in contrast with adults, young children tend to treat focus operators as sentential adverbials which c-command both the subject NP and the VP and can therefore be associated with each one of them.

This assumption was supported by the work of Zhou & Crain (2010), in which the previous findings concerning the Mandarin Chinese *zhiyou*-constructions were compared to the results of a new experiment investigating the role of negation in pre-verbal position (12).

(12) Zhiyou bai gou meiyou pa-shang da shu.
 only white dog not climb-up big tree
 'Only the white dog didn't climb up the big tree.' (Zhou & Crain 2010:987)

The prediction of Zhou & Crain (2010) was that the intervention of another operator between the pre-subject focus operator and the verb phrase would block their non-adultlike association, as illustrated by Figure 1.

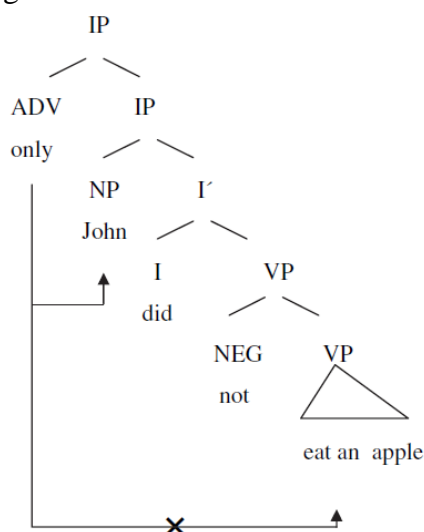


Figure 1. Zhou & Crain 2010:984, example (39b)

The results confirmed the hypothesis, given that in case of sentences with pre-verbal negation, none of the participants associated the exhaustivity of the particle *zhíyou* with the verb phrase. According to Zhou & Crain (2010), it is not entirely surprising that children expect the focus particle to take sentential scope and to be associated with the verb phrase, since several adverbs of quantification, such as *sometimes*, *usually* or *interestingly*, tend to behave like that. After realizing that, in the case of sentences like (11), the focus operator and the subject noun phrase form one constituent, they overwrite the former erroneous generalization and the mistake of VP-orientation does not occur anymore.

Müller et al. (2011a,b) investigate children's interpretation of the particle *nur* 'only' in German, and Müller et al. (2011a) conclude that there are three stages of the development. Between the non-focus-sensitive level (stage 1) and the adultlike performance (stage 3) there is a stage at which children can access the exhaustive reading of the pre-object particle but not that of the pre-subject one. As a reason, Müller et al. (2011a) propose that young children classify the subject as topic and the object as focus, therefore sentences like (13a,b), where the subject is focused, are highly confusing for them.

- (13) a. Eine Gitarre hat nur die Maus.
 a guitar has only the mouse
 'Only the mouse has a guitar.'
- b. Nur die Maus hat eine Gitarre.
 only the mouse has a guitar
 'Only the mouse has a guitar.'

(Müller et al. 2011a:170)

Crucially, as Müller (2010) points it out, the interpretation of sentences with canonical (13b) and non-canonical word order (13a) do not differ significantly, which supports the assumption that it is not the scope assignment but the subject status of the focused constituent that is problematic for young children. Müller et al. (2011b) also provide an alternative explanation to the results of Paterson et al. (2003). After replicating the study with German-speaking

children, they argue that it is the lack of the verbal context that plays a major role in the case of this task. When they did not present the sentences in an out-of-the-blue context, but did add a short description of the pictures, children gave significantly more adultlike responses.

In a recently published study, Hackl et al. (2015) investigate the role of Question–Answer Congruence in the case of sentences containing the particle *only*. The basic assumption was that the source of children’s difficulties in the original study of Crain et al. (1994) and also in several other works was that the test sentences were presented as answers to the question “What happened?”. Crucially, Hackl et al. (2015) found that children at around the age of 5 can interpret both pre-subject *only* and pre-verbal *only* in an adultlike fashion if the test sentence is a congruent answer to the preceding question, i.e., if the focused constituent of the answer corresponds to the *wh*-element of the question (14a – A1, 14b – A2).

- (14) a. Q: Who is holding a flag?
 A1: Only THE CAT_F is holding a flag.
 A2: *The cat is only holding A FLAG_F.
- b. Q: What is the cat holding?
 A1: *Only THE CAT_F is holding a flag.
 A2: The cat is only holding A FLAG_F. (Hackl et al. 2015:206)

Moreover, the results of the incongruent condition of the experiment suggest that young children rely on this Question–Answer Congruence more than the syntactic position of the particle when determining the constituent they associate *only* with. For example in the case of (14a), they tend to interpret the answer A2 as “THE CAT_F is only holding a flag.” As opposed to this, adult speakers attempt to obey syntactic constraints even if the sentence is infelicitous.

In sum, previous studies found that young children tend to have difficulties with the acquisition of the adultlike interpretation of focus particles, typically in the case of pre-subject particles. It was proposed to be a consequence of the use of a non-adultlike strategy of disambiguation (Crain et al. 1994, Paterson et al. 2005/2006), the misanalysis of the scope of the particle (Notley et al. 2009, Zhou and Crain 2010) and the incorrect generalization of the topic status of the subject (Müller 2010, Müller et al. 2011a). There are also studies that managed to point out certain methodological problems of the previous works (e.g. Müller et al. 2011b, Hackl et al. 2015). Nevertheless, the assumption that preschoolers are unable to mentally represent the contrast set of the alternatives (Paterson et al. 2003) was ruled out based on the findings of several experiments from different languages (Notley et al. 2009, Zhou & Crain 2010, Müller 2011b, among others).

4. Experiments

In the following section, I present the results of two experiments conducted with Hungarian preschoolers that may contribute to the previously discussed findings concerning the acquisition of the adultlike interpretation of focus particles. Taking the particularities of sentences with *csak* ‘only’ into account as well, I posed the following research questions.

1. Can children at around the age of 5 process the exhaustive meaning component of sentences with the particle *csak*?
2. If so, can they also associate this exhaustivity with the prosodically and syntactically marked focused constituent within the scope of the particle?

3. Does the presence of a verbal particle, whose inverse position is an additional syntactic marker of focusing, make the association with focus easier?
4. Is there any difference between the interpretation of focused subjects and objects, as predicted by studies investigating English, German and Mandarin Chinese?

4.1. Experiment 1

Since preschoolers' interpretation of the focus particle *csak* 'only' had not been tested before, I decided to use one of the most widely accepted experimental methods, the sentence–picture verification task. However, instead of the commonly used binary truth-value judgment, participants were asked to respond by a more sensitive three-point scale.⁴ The idea of creating a Likert scale that can also be used by young children was put forth by Katsos & Bishop (2011), who investigated the acquisition of scalar implicatures. Their method was also adopted by Balázs & Babarczy (2014), who managed to test 4-year-olds' interpretation of the Hungarian pre-verbal focus this way. In the studies of Katsos & Bishop (2011) and Balázs & Babarczy (2014), the three-point scale consisted of differently sized strawberries. However, I assume that three smiley faces (a sad, a straight and a happy face) represent the values of the scale better, since the small strawberry, which is supposed to mean that the sentence does not match the picture, is also a reward.

Considering the research questions, in Experiment 1, I tested the sentences with *csak* 'only' in four conditions. In addition to the two control conditions, there was a critical condition which intended to measure the presence or absence of the exhaustive reading, and another one that showed which constituent participants associate exhaustivity with.

4.1.1. Participants

15 Hungarian speaking children (6 girls and 9 boys, mean age: 5 years 11 months) participated in the experiment. The control group consisted of 15 adult native speakers (7 women and 8 men, mean age: 37 years 5 months).

4.1.2. Materials and design

I conducted a sentence–picture verification task in which every test sentence contained the focus particle *csak* 'only', and it was the type of the picture that was varied. There were four conditions differing in the type of pictures, each of them represented by 8 sentence–picture pairs.

Control conditions:

- (i) *exhaustive condition*: the sentence is exhaustively true of the presented picture
- (ii) *false condition*: the sentence is false of the presented picture

⁴ I decided not to use a binary judgment as this research is part of a series of experiments in which I compare the interpretation of different focus constructions in Hungarian by using the same design and material, and in the case of certain constructions, especially in the case of structural focus without the particle *csak* where exhaustivity is claimed to be a presupposition, it would not be suitable for pointing out the presence or absence of the exhaustive interpretation. So the condition in which I expect participants to choose the middle option of the three-point scale is the non-exhaustive condition of the experiment testing sentences containing structural focus, not one of the conditions discussed in the present study.

Critical conditions:

- (iii) *non-exhaustive condition*: the sentence is not exhaustively true of the presented picture
 (iv) *exhaustive condition with a distractor*: the sentence is exhaustively true of the presented picture, but there is an additional distractor in the picture that can have an effect on the judgment of the sentence if the participant associates the exhaustive meaning with the wrong constituent

The test trials are illustrated by the sentence under (15) and the pictures in Figure 2.

- (15) Csak A NYUSZI emel-t-e fel a zászló-t.
 only the rabbit raise-PAST-3SG PRT the flag-ACC
 ‘Only the rabbit has raised the flag.’

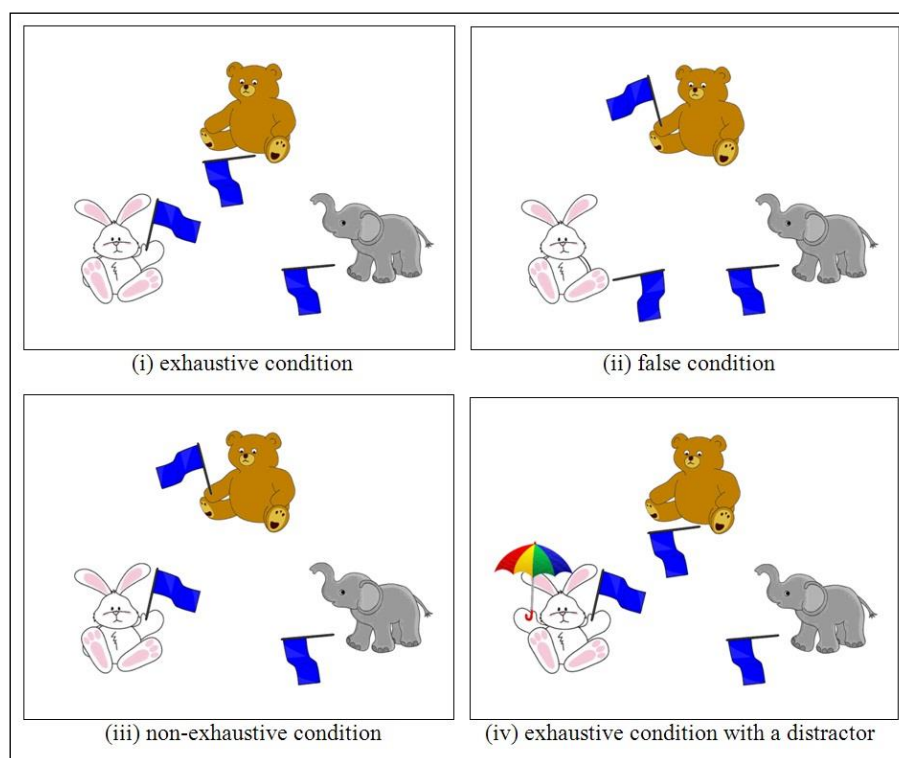


Figure 2. The four test conditions

Although each test item contained the particle *csak*, I tested four different sentence types, as illustrated in (16–19). The focused constituent was the subject in one half of the test sentences (16, 17), and the object in the other half (18, 19). Test sentences can also be divided into two groups with respect to the presence (16, 18) or absence (17, 19) of the verbal particle, the syntactic position of which is an important cue of focusing. Thus, it is also possible to analyze the role of these features in the interpretation of the sentences with focus particles.

- (16) Csak A NYUSZI emel-t-e fel a zászló-t. subject focus,
 only the rabbit raise-PAST-3SG PRT the flag-ACC verb with particle
 ‘Only the rabbit has raised the flag.’

- (17) Csak A KISLÁNY sétáltat-ja a kutyá-t. subject focus,
 only the girl walk-3SG the dog-ACC verb without particle
 ‘Only the girl is walking the dog.’

- (18) A teknős csak A HÁZ-AT színez-t-e ki. object focus,
 the turtle only the house-ACC colour-PAST-3SG PRT verb with particle
 'The turtle has coloured only the house.'
- (19) A maci csak A SZÁNKÓ-T húz-za. object focus,
 the bear only the sled-ACC pull-3SG verb without particle
 'The bear is pulling only the sled.'

It is also important to note that I only tested the interpretation of utterances with canonical word order, i.e., sentences in which the focus particle *csak* immediately precedes the focused constituent.

In addition to the 32 test items, there were also 4 familiarization items and 24 filler items. Because of the large number of items, I divided them into two lists, which were administered to the children on two separate occasions. One half of the participants received the A list first and the B list second. The other half received them in the opposite order.

4.1.3. Procedure

Participants were tested individually by using a Toshiba Satellite L500–1EP notebook (screen size: 15.6"). Pairs of the auditory and visual stimuli, i.e., the recorded sentences and the pictures, were presented in a randomized order, using the SR Research Experiment Builder software.⁵ There were short familiarization phases at the beginning of each session, in order to ensure that participants understood the task itself and could correctly respond by using the scale. Crucially, I used sad, straight and happy smiley faces to differentiate between the options of 'false', 'in-between' and 'true' (Figure 3).



Figure 3. Smiley faces used as a three-point scale in Experiment 1

When testing young children, the smiley faces were printed on cards and it was the experimenter who recorded their choice in the computer, whereas adults were asked to press the buttons with smiley stickers on them.

4.1.4. Results

As the three response types⁶ form an ordinal scale, I analyzed the data by using non-parametric tests.⁷ For the same reason, I always calculated the median as the average value of the eight responses given in one condition by one participant. In addition to the rank-tests of these median values, I also analyzed the proportion of the response types in each condition.

Firstly, let us take a look at the results of the group of preschoolers, more accurately at the average values of their scores in the four conditions.

⁵ Auditory stimuli were recorded by using TASCAM US-144mkII equipment.

⁶ Henceforth, the responses are represented by numbers: 1 – sad face, 2 – straight face, 3 – happy face.

⁷ For the statistical analyses is used the software R (<http://www.R-project.org>).

Condition	Average scores of preschoolers															Median	SD		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				
<i>exhaustive</i>	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
<i>false</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0.258
<i>non-exhaustive</i>	1	1	1	1	2	2.5	1	1	1	1	1	1	1	1	2	3	1	1	0.667
<i>exhaustive plus distractor</i>	3	3	3	3	3	3	3	2.5	3	3	3	3	3	3	1	3	3	3	0.523

Table 1. Average scores given by preschoolers in different conditions

In the case of the two control conditions, children responded exactly as predicted. In the *exhaustive condition*, the median of the eight responses was 3 in the case of each participant, so the group's median value is also 3. In the *false condition* the median of the group is 1, with a low standard deviation of 0.258, so preschoolers correctly rejected the sentence by giving a sad face in these cases. Considering the first critical condition, i.e., the case of *non-exhaustive* pictures, I found that the median of the eight responses given in this condition is also 1 in the case of the majority of children; however, there is a participant whose average score is 3, so it is not surprising that we have the highest standard deviation (SD = 0.667) here. The sentences were mostly accepted in the *exhaustive plus distractor condition*, just like in the *exhaustive* one, but the standard deviation was quite high (SD = 0.523) in this condition as well.

After comparing the average scores given by preschoolers in the different conditions with 6 Wilcoxon signed-rank tests, it can be seen clearly how they interpret sentences containing the particle *csak* 'only'. Most importantly, I found that the scores given in the *non-exhaustive condition* differ significantly from those given in the *exhaustive* ($V=105$, $p < 0.001$) and in the *exhaustive plus distractor* ($V=102.5$, $p < 0.001$) conditions; however, they do not differ significantly from the scores given in the *false condition* ($V=10$, $p = 0.08897$). The scores of the *exhaustive plus distractor condition* differ not only from those of the *non-exhaustive* one but also from those of the *false condition* ($V=105$, $p < 0.001$); as opposed to this, there is no significant difference in case of the comparison with the *exhaustive condition* ($V=3$, $p = 0.3711$). Finally, in line with the predictions, the scores given in the two control conditions differ significantly from each other ($V=120$, $p < 0.001$).

In addition to the average scores, it is also reasonable to analyze the proportion of the response types, i.e., the ratio of the sad, straight and happy faces chosen by preschoolers.

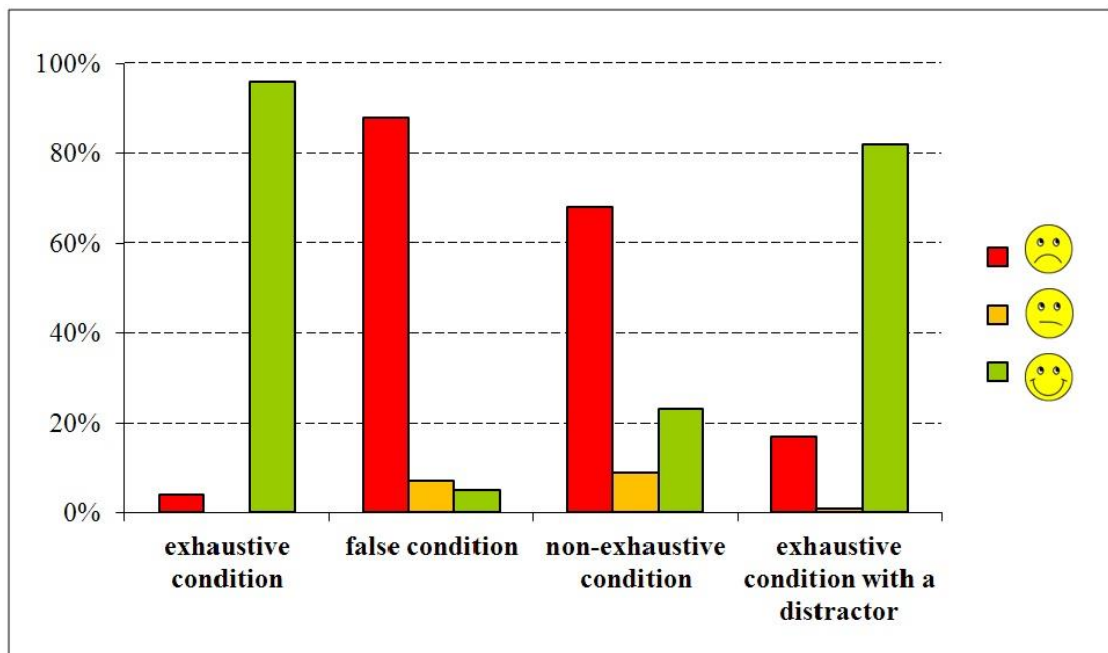


Figure 4. Proportion of response types in the group of preschoolers

According to the Friedman ANOVA test, the frequency of the response types differ significantly between the four conditions ($\chi^2(3) = 234.075, p < 2.2e-16$). The *post hoc* tests also confirm the results of the analysis of the average scores: the difference is significant between the pairs of the conditions, except in the case of the *non-exhaustive* and the *false* conditions, and in the case of the *exhaustive* and the *exhaustive plus distractor* conditions.

In order to find out whether the different features of the test sentences have an effect on the interpretation, I compared the proportion of response types given in the case of various sentence types. In the *non-exhaustive* critical condition, neither the presence of the verbal particle ($\chi^2(2) = 1.4559, p = 0.4829$), nor the type of the focus ($\chi^2(2) = 0.1767, p = 0.9154$) has a significant effect, according to the chi-square tests (Figure 5).

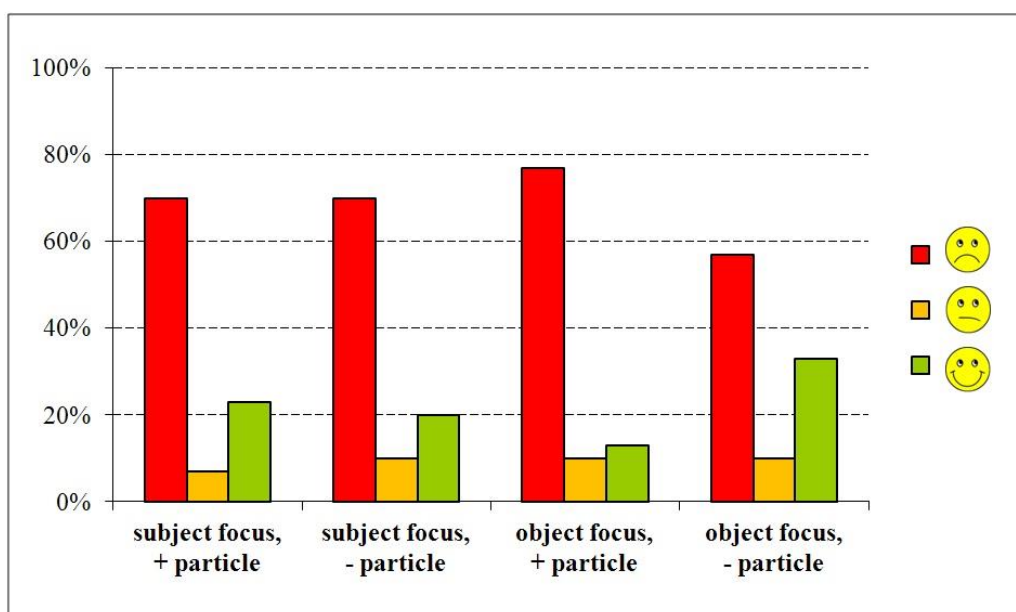


Figure 5. Proportion of response types in the *non-exhaustive* condition

As opposed to this, in the *exhaustive plus distractor* critical condition, this is only true for the presence of the verbal particle ($\chi^2(2) = 1.8909$, $p = 0.3885$), whereas the subject or object role of the focused constituent appears to affect the interpretation significantly ($\chi^2(2) = 13.0727$, $p < 0.01$). More precisely, if children rejected the sentences with *csak* ‘only’ in the *exhaustive plus distractor* condition, they typically did so in the case of focused objects (Figure 6).

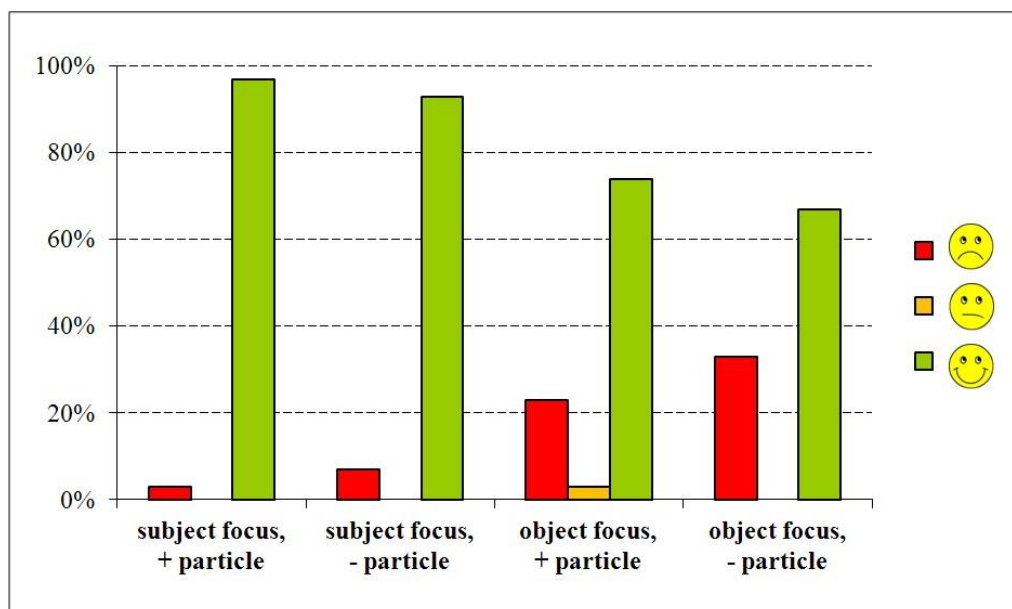


Figure 6. Proportion of response types in the *exhaustive plus distractor* condition

Turning to the results of the adult control group, the overall average scores of both the control conditions and the critical conditions are the same as those in the group of preschoolers. Although the standard deviations were higher in the critical conditions than in the control ones, these values are still relatively low.

Condition	Average scores of adult participants															Median	SD		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				
<i>exhaustive</i>	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0
<i>false</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
<i>non-exhaustive</i>	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0.352
<i>exhaustive plus distractor</i>	3	3	3	2.5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0.129

Table 2. Average scores given by adult participants in different conditions

The outcomes of the 6 Wilcoxon signed-rank tests comparing adult’s average scores reveal the same relations between the paired conditions. Not only do the scores given in the *exhaustive* and *false* control conditions differ significantly ($V=120$, $p < 0.001$), but this was the case between the *exhaustive* and *non-exhaustive* ($V=120$, $p < 0.001$), the *non-exhaustive* and the *exhaustive plus distractor* ($V=120$, $p < 0.001$), and the *false* and the *exhaustive plus distractor* ($V=120$, $p < 0.001$) conditions. However, the observed difference is not significant between the *false* and *non-exhaustive* ($V=0$, $p = 0.3458$), and the *exhaustive* and *exhaustive*

plus distractor ($V=1$, $p = 1$) conditions. It is also important that in this age group, none of the sentence types affected the interpretation of the critical pictures significantly.

Finally, after comparing the results of preschoolers with those of the adult control group, no significant difference between the two age groups were found in any of the conditions, according to the Wilcoxon rank-sum test. Note that in the case of the *non-exhaustive* ($W=129.5$, $p = 0.3263$) and the *exhaustive plus distractor* ($W=104.5$, $p = 0.5501$) critical conditions, these findings suggest that preschoolers interpret sentences with the focus particle *csak* 'only' in an adultlike fashion.

4.1.5. Discussion

In this section, let us review the findings of Experiment 1 and draw some conclusions. As the results of the control conditions are exactly as predicted, I am only focusing on the responses given in the two critical conditions.

First of all, the fact that the scores participants gave in the *non-exhaustive condition* do not differ significantly from those given in the *false condition* indicates that the fulfillment of the requirement of exhaustivity and the truth of the presuppositional content are equally necessary. With respect to the example under (15), this means that both children and adults chose the sad smiley face both in the case of the picture where the rabbit and the bear raise a flag (iii) and where the bunny does not raise the flag at all (ii). Moreover, this is true in the case of each sentence type, i.e., neither the grammatical role of the focused constituent, nor the presence or absence of the verbal particle affects the interpretation of this picture type.

Considering the second critical condition, the analysis of the average scores suggests that the incorrect association of the exhaustivity of *csak* 'only' was infrequent in both age groups. However, it is not the case that Hungarian preschoolers can always associate the exhaustivity of the focus particle with the same constituent as adult speakers. As was revealed by the comparison of the sentence types sharing the same features, the grammatical role of the focused element has a significant effect on the interpretation of the pictures in the *exhaustive plus distractor condition*. These findings suggest that for preschoolers the association with focus is harder in case of an object focus than in case of a subject focus. Nevertheless, it is also important to mention that in the case of sentences with subject focus or object focus, the word order of the sentence was different as well, since the focused subjects were always in a sentence-initial position, while the focused objects were in a non-sentence initial position (as in the examples 16–19). Therefore, it is crucial to conduct another experiment in which the word order of the sentence is controlled as well, so that it will be possible to tell whether it is indeed the grammatical role of the focus that is responsible for the mistakes of preschoolers.

The conclusion drawn from Experiment 1 is that, in line with the prediction based on previous studies, Hungarian children at around the age of 5 are able to process the exhaustive meaning component of the sentences containing the particle *csak* 'only' in an adultlike fashion. Although the mistake of the incorrect association of the exhaustive reading was not common in the group of preschoolers, almost all of these errors are related to the sentences containing an object focus. This necessitated conducting Experiment 2 as a follow-up study.

4.2. Experiment 2

The aim of Experiment 2 is to answer the question raised in the discussion of Experiment 1 by comparing the interpretation of four different sentences types in which the grammatical role of the focus and the word order are varied.

This time, I conducted a forced-choice picture-selection task, where, in each trial, participants were presented one sentence and four pictures simultaneously, and they were asked to put the picture(s) for which the sentence is true into a green box and the picture(s) for which it is not true into a red box.

This method is drawn from the work done by Paterson et al. (2003, 2005/2006), where participants were helped in identifying the contrast set of the focused constituent by seeing all the alternative picture types together. However, I decided to design the experiment as a forced-choice task, not as a free-choice one, since, as Paterson et al. (2005/2006) also admitted, in case of a free-choice task, it is possible that children only choose the picture that best matches the meaning of the sentence and they do not take any other pictures into consideration. With the forced-choice method, I can avoid this because the trials do not end until the participants make a decision in the case of each picture presented.

4.2.1. Participants

20 preschoolers (9 girls and 11 boys) participated in this experiment. They were, however, approximately one year younger than the participants of Experiment 1: this time I tested children between the ages of 4;6 and 5;2 (with a mean age of 4 years 11 months), since I assumed that the correct association of the exhaustive meaning of the focus particle would be harder for them, and their mistakes could reveal the source of the problem.

4.2.2. Materials and design

With respect to the sentence types, there were two independent variables: the grammatical function of the focus and the word order. Both variables had two values: subject focus or object focus, and word order with sentence-initial focus (SVO/OVS) or word order with non-sentence-initial focus (OSV/SOV), respectively. Thus, the two variables gave rise to the following four conditions, illustrated by the examples under (20–23).⁸

- | | |
|---|---|
| (20) <u>Csak A MACI</u> húz-za a szánkó-t.
only the bear pull-3SG the sled-ACC
'Only the bear is pulling the sled.' | Condition 1: Subject focus, <u>S</u> VO |
| (21) A szánkó-t <u>csak A MACI</u> húz-za.
the sled-ACC only the bear pull-3SG
'Only the bear is pulling the sled.' | Condition 2: Subject focus, <u>O</u> S <u>V</u> |
| (22) <u>Csak A SZÁNKÓ-T</u> húz-za a maci.
only the sled-ACC pull-3SG the bear
'The bear is pulling only the sled.' | Condition 3: Object focus, <u>O</u> V <u>S</u> |

⁸ As the presence or absence of the verbal particle did not have a significant effect in Experiment 1, this time I only used sentences without verbal particles.

- (23) A maci csak A SZÁNKÓ-T húz-za.
 the bear only the sled-ACC pull-3SG
 'The bear is pulling only the sled.'

Condition 4: Object focus, SOV

There were 2 items in each condition, which resulted in 8 test trials, and there were also 8 filler trials. In case of the filler trials, the number of the pictures supposed to be judged as true was controlled: in 4 trials the half of the pictures matched the meaning of the sentence, in 2 trials three of them, while in 2 trial only one of them. Thus, the ratio of the 'true' and 'false' choices was not obvious in the case of the test trials, either.

The picture types of the test trials were the same as those of Experiment 1, however, this time the different types were presented simultaneously on separate cards (Figure 7).

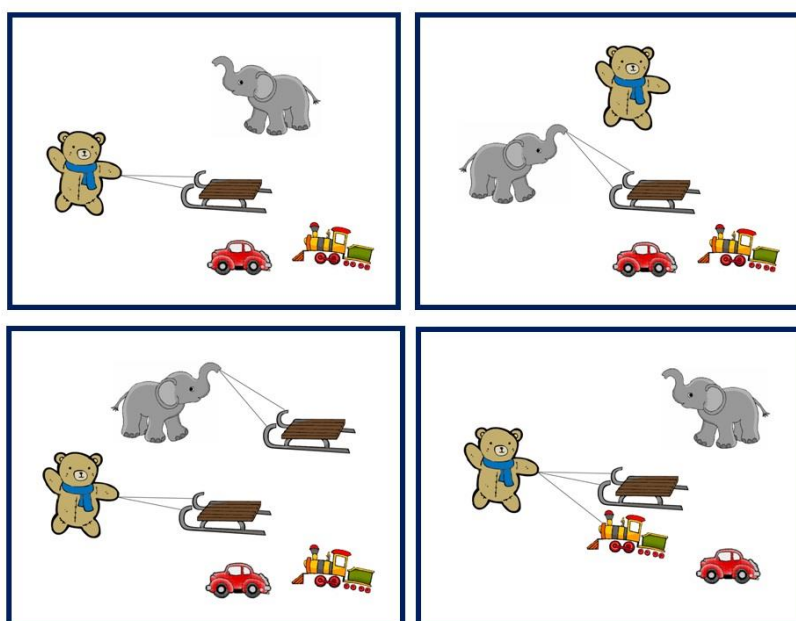


Figure 7. The four cards presented simultaneously in Experiment 2

The position of the different picture types was controlled as well, in order to rule out the possibility that children create a strategy based on the location of the cards.

4.2.3. Procedure

The participants were individually tested; however, this time two experimenters were available for assistance. One of them described the task and recorded the responses, while the other one played a puppet in the form of a hedgehog. The child then had to teach the meaning of the sentences to the puppet by sorting out the cards into the two boxes. The 16 trials were presented in a pseudo-randomized order, and it took approximately 15 minutes for a child to complete the task.

4.2.4. Results

In this experiment, the crucial data is the ratio of the 'true' and 'false' decisions, especially in the case of the critical pictures, i.e., in the *non-exhaustive* and in the *exhaustive plus distractor* types. When performing a chi-square test on these critical picture types, I first compared the results of the four conditions which differed individually in the characteristics of test

sentences. I then contrasted the pairs of conditions sharing one of the properties (sentences with subject focus versus object focus, and sentences with different word orders).

With respect to the *non-exhaustive* pictures, the results show that there is a significant difference between the interpretations of the four sentence types: $\chi^2(3) = 17.1925$, $p < 0.001$.⁹ As Figure 8 shows, the ratio of the rejections, i.e., the exhaustive interpretations, was 82.5% in the case of the sentences with subject focus and SVO word order, 75% in the subject focus, OSV word order condition, 65% in the object focus, OVS word order condition, and only 57.5% in case of the object focus, SOV sentence type. The individual comparison revealed that there is a significant difference between the results of subject focus SVO and object focus OVS sentences ($\chi^2(1) = 6.5717$, $p < 0.05$), between those of the subject focus OSV and object focus SOV sentences ($\chi^2(1) = 6.4396$, $p < 0.05$), and most robustly in the case of subject focus SVO and object focus SOV sentences ($\chi^2(1) = 13.5865$, $p < 0.001$).¹⁰

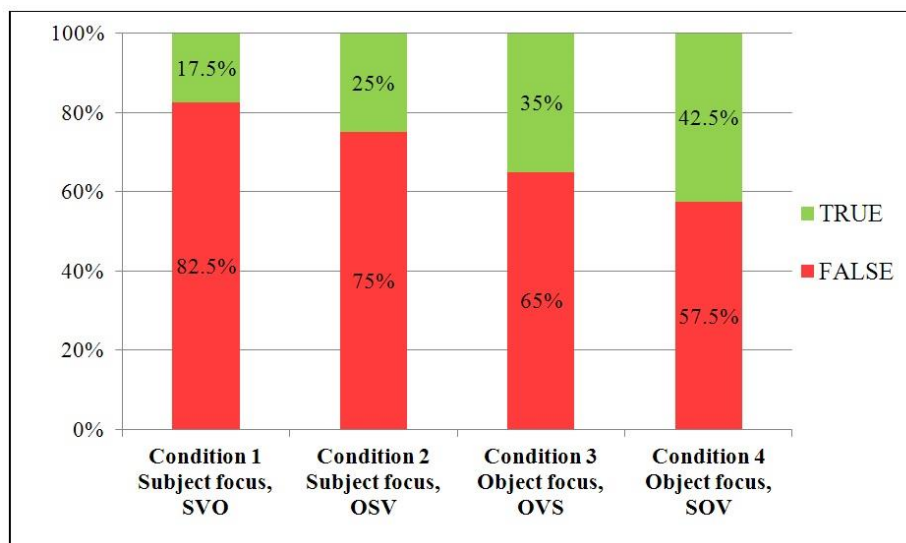


Figure 8.

The distribution of responses given in the case of the non-exhaustive picture type

When I grouped the responses for subject focus (Condition 1 and 2) and compared them to object focus (Condition 3 and 4), I found that sentences with subject focus were interpreted exhaustively in significantly more cases than sentences with object focus ($\chi^2(1) = 6.881$, $p < 0.01$). In contrast, there was no significant difference between the interpretation of sentence types containing sentence-initial *csak* ‘only’ (Condition 1 and 3) and non-sentence-initial *csak* ‘only’ (Condition 2 and 4): $\chi^2(1) = 1.1667$, $p = 0.2801$.

In the case of the picture type *exhaustive plus distractor*, the sentence type did not have any significant effect on the exhaustive interpretation: $\chi^2(3) = 7.24$, $p = 0.06463$. Moreover, neither the type of the focus ($\chi^2(1) = 2.4537$, $p = 0.1172$), nor the word order ($\chi^2(1) = 0$, $p = 1$) had an effect. The individual comparisons revealed one difference though: the results of the subject focus SVO condition differed significantly from those of the object focus OVS condition ($\chi^2(1) = 4.9154$, $p < 0.05$). The latter condition, as can be seen in Figure 9, was the one in which the ratio of the incorrect (false) answers was the highest: here, the pictures with the distractor were rejected in 80% of the cases.

⁹ Because of the low sample sizes, I always applied Yates’s continuity correction in case of chi-square tests.

¹⁰ The significant difference between the sentence types subject focus SVO and object focus SOV is particularly surprising, given the fact that they did not differ in the non-exhaustive condition of Experiment 1, where only these two types were tested.

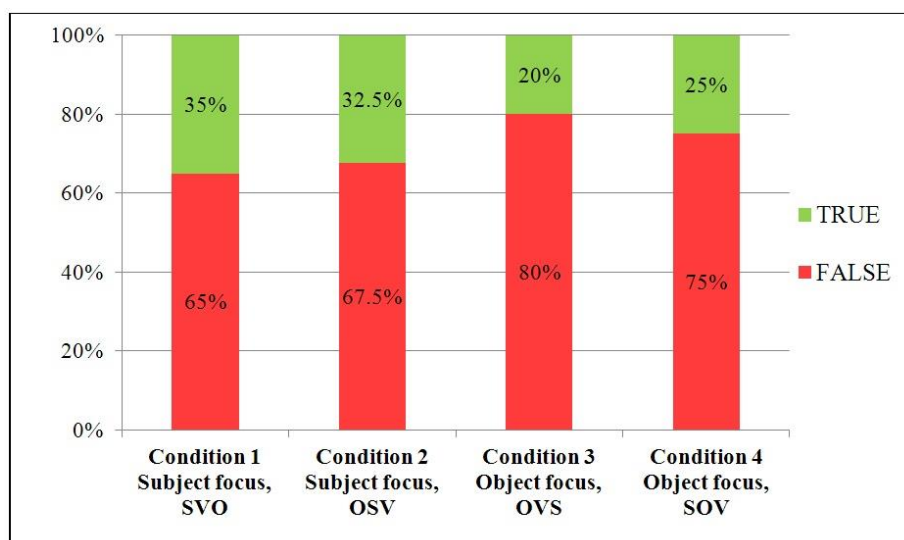


Figure 9.

The distribution of responses given in the case of the *exhaustive plus distractor* picture type

However, within each condition, the distribution of the responses is unexpected in the case of this picture type, especially in comparison with the results of Experiment 1, where preschoolers mostly gave a happy smiley face to the puppet despite the presence of the distractor in the picture. This is probably due to the different experimental design, but it is also possible that the age of the participants plays a major role.

4.2.5. Discussion

In order to explain the findings of Experiment 2, let us discuss the response patterns of the different picture types together. Considering the frequency of rejections in both of the critical conditions, the conclusion is that there were more correct responses in the case of sentences with a focused subject: they were rejected in 82.5% (SVO) and 75% (OSV) of the time in the case of *non-exhaustive* pictures, and they were accepted in 35% (SVO) and 32.5% (OSV) of the time in the case of the *exhaustive plus distractor* type. In contrast, sentences in which the focused constituent was the object were rejected only in 65% (QVS) and 57.5% (SOV) of the time with respect to *non-exhaustive* pictures, and they were only accepted in 20% (QVS) and 25% (SOV) of the time in the case of the *exhaustive plus distractor* type. Interestingly, sentences with object focus were interpreted exhaustively more frequently in the case of the *exhaustive plus distractor* picture types (80%, 75%) than in the case of the *non-exhaustive* type (65%, 57.5%), which clearly indicates that preschoolers associate the exhaustivity of the particle *csak* 'only' with the subject, rather than with the object. This is in line with the findings of Experiment 1; however, here, this finding is much more robust, and it is obviously not the word order of the sentences that affects the exhaustive interpretation, since this variable does not have a significant effect in any of the conditions.

Nevertheless, the remarkable difference between the results of the two experiments can be due to a task effect. Note that 9 children out of the 20 (45%) rejected all the pictures but for the *exhaustive* one. This indicates that, in spite of the forced-choice method, one cannot exclude the possibility that they search for the one picture that gives the best description of the uttered sentence, and then they put all the other cards into the red box.

Alternatively, it is also possible that it is not the type of sentences but the type of pictures that is being misinterpreted by young children. Considering the picture conditions in Figure 2 and Figure 7, it can be seen that the *non-exhaustive* picture type of sentences with subject focus is similar to the *exhaustive plus distractor* type of sentences with object focus: there are two agents performing two separate actions, e.g. a bear and an elephant is pulling a sled. On the other hand, the *exhaustive plus distractor* pictures of sentences containing subject focus is just like the *non-exhaustive* picture type of object focus sentences, as in both cases one agent is performing two actions, e.g. the bear is pulling a sled and a train. Adopting the hypothesis of É. Kiss et al. (2013), according to which children tend to choose pictures that are easier to segment into identical sub-events, one could propose that the adultlike interpretation of the former pictures in which there are two clearly separate events is more frequent. However, this is only true in the case of the *non-exhaustive* scenarios where these pictures are presented together with sentences containing subject focus (see Figure 8). Yet it is undoubtedly true that the responses given in the case of one kind of picture are quite similar. This can be seen in the case of Condition 1–2 in Figure 8 and Condition 3–4 in Figure 9, as well as in the case of Condition 3–4 in Figure 8 and Condition 1–2 in Figure 9. Thus, we cannot rule out the possibility that in the event of seeing two active agents in a given situation, preschoolers tend to associate the exhaustivity of the focus particle with the subject, irrespective of the actual focus of the presented sentence.

5. Conclusion

To conclude the results of the study, I come back to the research questions posed earlier.

Firstly, the experimental findings proved that Hungarian preschoolers do have access to the exhaustivity expressed by the particle *csak* ‘only’. This is in line with the claim by Kenesei (1986, 1989) and Szabolcsi (1994), according to which this meaning component is asserted and therefore easy to acquire. Hungarian children’s data also support the hypotheses of Notley et al. (2009) and Müller et al. (2011a,b), according to which preschoolers at around the age of 4 can mentally represent the contrast set of the focused constituent, in contrast to the assumption by Paterson et al. (2003).

However, questions concerning the association of the exhaustive meaning with the focused constituent cannot be answered so straightforwardly. While the results of Experiment 1 suggested that Hungarian preschoolers do not have problems with finding the right element to be the associate of *csak*; younger children in Experiment 2 performed poorly when judging pictures from the *exhaustive plus distractor* type. Interestingly, the problem of VP-orientation discussed by Crain et al. (1994), Notley et al. (2009) and Zhou & Crain (2010) did not occur, which can, however, be due to the different structure of the Hungarian focus constructions. I can also not confirm the hypothesis of Müller et al. (2011a,b), since, as opposed to the results of German-speaking children, Hungarian preschoolers unexpectedly prefer the subject focus reading and not the object focus reading. The possibility of the influence of the different word orders of these sentences was ruled out in Experiment 2. Finally, as opposed to the predictions, the presence of the verbal particle signifying syntactic reordering does not seem to support the adultlike association with focus. Even if this is the case, the results of the present study do not refute the hypothesis that syntactic focus marking in Hungarian does help parsers and thus also language learners to find the associate of the focus particle, since the tendency to misinterpret these sentences is rather weak, especially compared to the cases of the English *only* or the Mandarin Chinese *zhiyou* particles.

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Lilla Pintér

Pázmány Péter Catholic University, Hungary

Research Institute for Linguistics of the Hungarian Academy of Sciences

pinter.lilla@nytud.mta.hu

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