

Pre-schoolers' Comprehension of Information Structure: Evidence from the Effect of Sentence Focus on Logical Scope

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1. Introduction

Despite the pervasive role of information structure (IS) in sentence meaning, its development in first language acquisition is still a relatively under-studied area. Although results are far from equivocal, a large part of the existing empirical research suggests that children's acquisition of IS in sentence comprehension is a particularly prolonged process (with certain findings suggesting the existence of an unusual asymmetry concerning the relation of perception and production of IS, perception becoming adult-like later during the course of language development than production; see Höhle et al. 2016). This characterization applies more or less equally to several of the related but independent informational roles that are together considered to encompass the domain of IS, including the distinctions of topic vs. comment, given vs. new, as well as focus vs. background, our main interest in this paper.

A body of research investigating the comprehension of sentences with focus particles like 'only' and 'also' shows that children's interpretation of sentences with focus is not adult-like in a range of languages (e.g. Crain et al. 1994, Notley et al. 2009). As they are semantically less complex, sentences containing simple prosodically marked focus constituents (also called 'free' focus) are potentially more revealing of children's understanding of the focus-background partition, however. While online measures indicate that pre-school children do process at least some of the contribution that focusing makes to the sentence (e.g. Sekerina & Trueswell 2012), the dominant finding from offline tasks with such sentences too is that pre-schoolers cannot use the contribution of focus in their comprehension in an adult-like manner (Cruttenden 1985, Wells et al. 2004, Chen et al. 2019, Surányi & Pintér 2022; though see Szendrői et al. 2018). A methodological component common to most previous offline tasks is that they targeted children's ability to identify and interpret a narrow focus by taking into account a relevant set of contrastive alternatives in the textual or situational context.

In this paper we employ a different approach: we investigate children's comprehension of focus through the impact focus has on the scope interpretation of logically potentially ambiguous sentences. In particular, we study the interpretation of (Hungarian counterparts of) negated disjunctive sentences like

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(1), which can be assigned either meaning (1a) (the “neither” reading) or meaning (1b) (the “not one or not the other” reading).

- (1) John doesn’t like broccoli or cauliflower.
 - a. It is not true that John likes broccoli or cauliflower.
 - b. John doesn’t like broccoli or he doesn’t like cauliflower.

The disparity between these two interpretations can be described in terms of a logical ambiguity arising from the two possible scope relations of disjunction and sentence negation. From this perspective, the “neither” interpretation emerges by interpreting disjunction in the direct scope of \neg – i.e. with narrow scope relative to \neg – negation (referred to as Disjunction Narrow Scope, or DNS reading, schematized in (2a)). Conversely, the “not one or not the other” reading is derived via disjunction scoping out of \neg – i.e. taking wide scope relative to \neg – negation (referred to as Disjunction Wide Scope, or DWS interpretation, represented schematically in (2b)).

- (2) a. NOT (p OR q) b. (NOT p) OR (NOT q)

It has been observed that languages differ with regard to the availability of the two scope interpretations (Szabolcsi 2002). In some languages, including English, Dutch, Greek, Romanian, and Korean, both logical scope readings seem accessible, though possibly the DNS interpretation may be preferred. For speakers of other languages, including Hungarian, Russian, Polish, Italian and Japanese, the DWS interpretation seems to be primary. It may be, nevertheless, that the DNS reading is also only dispreferred by adults rather than categorically unavailable to them in this latter language type (see Lungu et al. 2021, Surányi & Gulás 2022).

Experimental results from several languages suggested that, universally, young children may primarily access the DNS reading – even in those languages where the DNS interpretation has been claimed to be dispreferred in the respective adult language. Starting with Goro (2007), children’s supposedly universal preference of the DNS reading has almost exclusively been attributed to a learnability strategy called the Semantic Subset Principle (SSP; Crain et al. 1994). According to the SSP, when interpreting logically potentially ambiguous sentences, children initially prefer logically stronger interpretations. As the DNS reading entails the DWS reading, the SSP predicts the DNS interpretation to be preferred by children.

An alternative possible account, however, may be based on the observation that in a range of constructions that involve a potential logical scope ambiguity, children prefer the surface scope reading more strongly than adults (Musolino et al. 2000, Conroy et al. 2009, Tieu 2015). On this alternative approach, the primacy of the DN reading for children can be attributed to the fact that it is in this reading that the relative scope relation between negation and disjunction corresponds to their surface precedence (and c-command) relations. A dominant explanation for such isomorphism effects in children’s resolution of scope ambiguities is based on the hypothesis that isomorphic logical interpretations are computationally less

costly than inverse scope readings (Anderson 2004, Brasoveanu & Dotlacil 2019). Non-isomorphic inverse scope readings are merely less easily available, rather than inaccessible, in pre-school age. Consonant with this general conclusion, a number of experiments have found that in negated disjunctive sentences of the type illustrated in (1), the inverse scope DWS interpretation, although dispreferred, is also accepted by pre-schoolers in addition to the surface scope DNS reading (e.g. Italian: 54%, Hungarian: 25%, French: 34%, Pagliarini et al. 2022).

In fact, surface scope interpretations are also generally primary in adults' resolution of logical scope ambiguities (Kurtzman & MacDonald 1993, Anderson 2004). Although this preference is milder than for children, it is hypothesized to result from the extra processing cost associated with the mental representation of the inverse scope in the same way as in the case of children (see Brasoveanu & Dotlacil 2021 for an overview). Adults' scope reading preferences have been argued to be shaped by a variety of factors apart from surface structure, including the information structural role of focus (Williams 1988, May 1988).

Larralde et al. (2021) suggest that it is this kind of association that underlies the results of their experimental study of French pre-schoolers' interpretation of negated disjunctive sentences like '(The dino ate the candy but) it didn't eat the apple or the pear'. In this study, the authors sought to gauge the (in)variability of the DNS reading in French, shown to be the predominant reading for both adults and children. To this end, their experiment compared two prosodic realizations of negated disjunctive sentences: a neutral realization and one in which the disjunctive (*ou* 'or') carried what the authors describe as 'marked prosodic stress'. Children were found to give significantly fewer DNS responses in the latter prosodic condition than in the former. The authors' account of this effect is based on two assumptions. First, marked prosodic stress on the disjunctive is taken to identify the disjoined phrase as the semantic focus of the sentence. Second, it is assumed that if a negated sentence contains a sentence-level focus, then negation must be in its background and because of this it must be interpreted with narrow scope with respect to that focus.

Although the influence of the prosodic manipulation on children's responses seems clear, neither of the two assumptions that jointly ascribe it to the effect of the information structural focus role is watertight. Beginning with the second one, focusing in a negated sentence is not uniformly associated with wide scope over negation: as discussed by Jackendoff (1972) and Partee (1993), the focused element may in fact take either wide or narrow scope. More generally too, no strict correspondence exists between the background domain of a focused element and its logical scope: it has been argued that focused elements may take both wide and narrow scope with regard to elements in their background (Erteschik-Shir 1997, Neeleman & van de Koot 2012).

The first of Larralde et al.'s two assumptions is also arguable. Assuming that the prosodic prominence associated with the disjunctive in Larralde et al.'s study is a marker of focus, it is doubtful that it can mark the whole disjoined phrase as the semantic focus, as the authors assume. This is because in French the semantic focus constituent is prosodically marked at its edge (Di Cristo 1998, Féry 2001).

Thus, the prosodic prominence of the disjunctor may at best induce focus on the disjunctor itself. Given the contrastive lead-in context of the critical sentences in Larralde et al.'s experiment ('The dino ate the candy, but...'), this focus on the disjunctor cannot be felicitously interpreted as a sentence-level focus, taking the rest of the sentence as its background.

A potential explanation for the lower rate of children's DNS responses in the prosodic condition containing a stressed disjunctor is related to the fact, pointed out by the authors, that this prosodic realization sounds unnatural. It cannot at all be excluded that it is this unnaturalness that introduced more variance in children's reactions in the relevant experimental condition. An unnatural prosodic pattern may have led some children to associate the unusual prosody with the unusual scopal meaning, or to simply engage in guessing. This may well have brought down the rate of DNS responses compared to the neutral prosodic condition, in which it was close to ceiling levels. If that were the case, then the detected difference would not be a genuine semantic effect after all.

All in all, while Larralde et al. (2021) show convincingly that French preschoolers are sensitive to stress on the disjunctor in negated disjunctive sentences, it remains doubtful that the effect of their prosodic manipulation results from a distinction in terms of sentence-level focus. Another question left open is whether the impact of the prosodic difference on children's behavior is adult-like or unique to their age group.

As noted above, focusing a constituent in a negated sentence is not uniformly associated with wide scope over negation. In the experiment we present in this paper, we turn the tables and draw on a case in which focus does seem to systematically exert influence on logical scope: the case of focus on negation. Goodhue (2022) argues that when negation functions as the focus of the sentence, it involves focus on polarity, with the entire sentence falling in its background. He suggests that focus on negation is the default reading of negated sentences used as answers to a positive polar question, partly because the rest of the sentence is given (in the question) and partly because such questions make salient the positive proposition that contrasts in its polarity with its negated counterpart in the answer. Such negative sentences with polarity focus are systematically characterized by a tendency for negation to have wide scope over any quantified NP. To illustrate, the negation wide-scope reading of otherwise scope-ambiguous sentences like (3a) becomes dominant when they function as an answer to a corresponding polar question, as in (3b).

- (3) a. I didn't solve many problems.
 'It is not the case that I solved many problems.' (negation wide scope)
 'There are many problems that I did not solve.' (quantifier wide scope)
- b. A: Did you solve many problems?
 B: I DIDN'T solve many problems.

This pattern is also confirmed by experimental data. As shown by Baltazani (2002) on the basis of Greek, when negation is the prosodic focus of a sentence that contains a quantified noun phrase (her Experiment 1), it is preferably

interpreted as having wide scope with respect to that noun phrase. The correspondence between prosodic focus on negation and its wide scope also holds in Hungarian, as Turi (2020) demonstrated in a production study of Hungarian.

We capitalize on this influence of focused negation on scope interpretation in the experiment on negated disjunctive sentences reported below. The experiment seeks to address two main questions. (i) First, does focus on negation have a significant effect on pre-school children's scope interpretation of negated disjunctive sentences? (ii) Second, if it does, to what extent is this effect adult-like? By studying the potential effect of focus on pre-schoolers' logical scope interpretation, we hope to shed light on how mature children's abilities are at this age in exploiting focus-marking in their sentence comprehension.

2. Method

2.1. Participants

40 children participated in the experiment (19 girls and 21 boys, aged 4;0–6;10 years, average age: 5;3 years). Of these children, twenty were recruited through personal acquaintances of one of the authors, the rest were pupils of a kindergarten in Budapest. 38 adults participated as members of our control group (25 females and 13 males, aged 20–55 years, average age: 30 years). Adult participants were recruited through Prolific and were remunerated with a predetermined amount upon completion of the experiment.

2.2. Procedure

Our experiment employed a Truth Value Judgment (TVJ) task, using a series of animated visual stimuli to represent different truth conditions, pairing each with a pre-recorded audio of a test sentence. Specifically, participants were shown a PowerPoint presentation with an animal in the middle, and a table with a fruit on each of two plates in front of the animal. According to the frame story, the animation in each slide showed how many of these fruits the animal liked. The animal went to each of the two plates one after the other, and if it liked the fruit on the plate, it ate it (moving its hand to its mouth while making a munching sound), while if it didn't like the fruit on the plate, it didn't eat it (not moving its hand, pulling a sad face and making the sound of a disappointed sigh). The different animals, each occurring only once, either liked both of the fruits, or just one of them, or neither of them.

The animation was followed by the audio of an utterance, which, in the critical conditions, contained a negated disjunctive sentence. Each utterance was made by Little Elf, who was seated in the top left corner of the slides, and whose eyes got "blindfolded" at the very beginning of the presentation of the experiment. The two fruits were presented before the practice tasks, but during the practice and test phase, participants only saw the edges of the plates containing the fruits, but not which plate has which of the fruits. In each trial the participants' task was to decide whether or not the uttered sentence corresponded to the presented animation, i.e., they were expected to judge whether or not Little Elf's guess was

right. They were not required to justify their answers (though in some cases they did so spontaneously).

2.3. Material

The critical sentences, illustrated in (4), contained a subject, a negated transitive verb and a disjunctive object phrase, in an unmarked order.

- (4) A majom nem szereti a mandarint vagy a narancsot.
 the monkey not likes the tangerine.ACC or the orange.ACC
 ‘The monkey doesn’t like tangerines or oranges.’

This word order was compatible both with an information structurally neutral interpretation and with narrow focus on negation. Furthermore, the order was incompatible with focus on the disjoined object (or any of its subconstituents), because a constituent functioning as (or containing a subconstituent functioning as) a focus must generally be fronted to a preverbal position in Hungarian.

In the critical conditions, the animals interacted with the two fruits in two different ways, represented by two different animations. In one type of animation they disliked both fruits (the LIKES-NEITHER condition). Acceptance of the test sentence in this condition corresponded to acceptance of the DNS reading. In the other type of animation, illustrated in Figure 1, the animal liked exactly one of the two fruits (the LIKES-ONE condition). Acceptance of the test sentences in this condition indicated acceptance of the DWS interpretation. Scope interpretation (DNS or DWS) functioned as a within-subject condition.

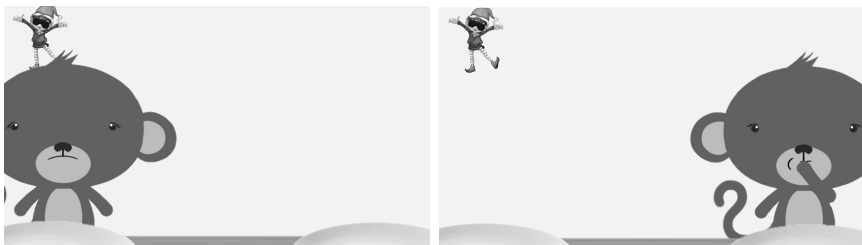


Figure 1: Animation presented in the LIKES-ONE condition

The critical sentences were presented with two different prosodic realizations, corresponding to two different information structural (IS) conditions. In one prosodic pattern, exemplified by the first pitch track in Figure 2, negation and each of the two disjuncts carried a prominent accent, and there was a prosodic boundary after the first disjunct, marked by a high boundary tone and a break (NEUT condition). This realization was information structurally neutral. Neutral sentences in Hungarian are characterized by an accent on the immediately preverbal element (here: negation), as well as on each content word (here: each nominal disjunct) (Kenesei & Vogel 1989).

In the other prosodic pattern, illustrated by the second pitch track in Figure 2, negation carried a prominent falling accent and was followed by no other major prominence or major prosodic boundary up until the end of the sentence (NEGFOC condition). This prosodic realization expressed narrow focus on negation. Narrow focus in Hungarian is associated with a falling accent and is typically followed by pitch compression or complete deaccenting in the post-focal domain (Kenesei & Vogel 1989). While there was a difference between the NEUT and the NEGFOC conditions in terms of information structural markedness, neither of the prosodic patterns can be considered unnatural for a negated sentence in this language.

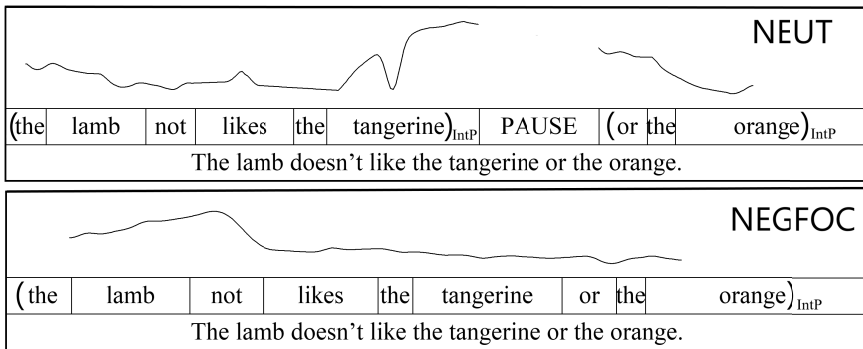


Figure 2: Typical melody of the test sentences in the two IS conditions

IS was a between-subject factor, in order to avoid carry-over effects of prosody: one group of children heard the critical sentences with a NEUT information structure (mean age = 5;5), while the other group were presented with a NEGFOC information structure (mean age = 5;4).

Scope interpretation and information structure were crossed in a mixed factorial design. Altogether ten negated disjunctive sentences like (4) were created, which differed from each other only in the choice of the animal functioning as the subject. All critical sentences were pre-recorded with each of the two information structures (NEUT, NEGFOC). In each IS condition, half of the ten audios were paired with each of the two critical animations representing the two scope conditions (LIKES-NEITHER, LIKES-ONE).

The critical stimuli were supplemented with three true and three false filler stimuli. Both types of filler stimuli were logically unambiguous conjunctive sentences, and they were also used to screen participants. Both types of filler stimuli were accompanied by animations in which the animal moved its hand to its mouth while making a munching sound both at the left-hand side and at the right-hand side plate, indicating that it liked both fruits. The lexical make-up and the information structure of the filler stimuli was the same in both IS groups. The stimuli were presented in the same pseudorandomized order in both groups.

3. Results

Responses were included in statistical analysis from participants who correctly judged the three true and three false filler sentences in a total of at least four cases. All 38 adult participants passed this screening condition, while one child had to be excluded. In addition, we had to exclude the responses of another child from the analysis, as his justifications revealed that he systematically evaluated the test sentences based on his knowledge of the world rather than the situation shown on the slides. Altogether 38 children were included in the analysis (19 girls and 19 boys, aged 4;1–6;10 years, average age: 5;4 years).

The number of acceptances of critical trials is treated as the dependent variable in our experiment. The mean rates of acceptance in the four experimental conditions in the two age groups are presented in Figure 3.

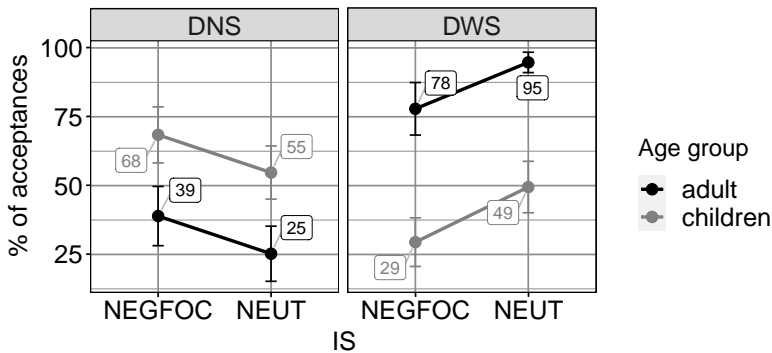


Figure 3: Acceptance rates (%) of test sentences in both scope-interpretations (DNS=LIKES-NEITHER, DWS=LIKES-ONE) and both IS (NEGFOC, NEUT) conditions across the two age groups (with SE)

Statistical analysis was conducted in R with the *lme4* package (Bates et al. 2015). The generalized linear mixed model obtained after performing backward elimination included scope interpretation, IS and age group as interacting independent variables, with subject as the sole random intercept with no random slopes. The analysis revealed a significant interaction between scope interpretation and age group ($\chi^2 = 102.2055$, $p < .0001$) and between scope interpretation and IS ($\chi^2 = 27.8093$, $p < .0001$).

We explored these interactions through pairwise comparisons using the *lsmeans* package (Lenth 2016), employing Bonferroni correction. With regard to the interaction between scope and age group, pairwise comparisons revealed that the interaction effect is due to the fact that while children produced higher acceptance rates of test sentences in the LIKES-NEITHER than in the LIKES-ONE condition ($z = 4.738$, $p < 0.0001$), adults exhibited the opposite behavior by accepting test sentences more in the LIKES-ONE than in the LIKES-NEITHER condition ($z = -9.096$, $p < 0.0001$). It is the opposite direction of the significant

effect exerted by scope interpretation in the two age groups that appears to have resulted in the lack of a main effect of scope in the overall model.

Concerning the interaction between scope and IS, pairwise comparisons revealed that the interaction stems from the fact that participants accepted test sentences of the LIKES-NEITHER condition more when paired with the NEGFOC rather than the NEUT IS ($z = 2.262$, $p = 0.0237$), while they accepted sentences of the LIKES-ONE condition at a higher rate when assigned with the NEUT rather than the NEGFOC IS ($z = -3.646$, $p = 0.0003$). To explore the interaction between IS and scope interpretation further, we carried out pairwise comparisons to investigate the effect of IS in the two scope conditions in each age group. Results revealed that both for adults and children the difference between the two IS conditions reached statistical significance only in the LIKES-ONE scope condition, with more acceptances in the NEUT information structure than in NEGFOC (adults: $z = -3.054$, $p = 0.0023$; children: $z = -2.051$, $p = 0.0403$). Although the observed mean values were higher in the NEGFOC condition than in the NEUT condition in both age groups, the effect of IS remained nonsignificant in the LIKES-NEITHER scope condition in the case of both adults and children. The opposing direction produced by the effect of scope interpretation in the two IS conditions appears to have led to the absence of a significant main effect of scope in the overall model. The uniform overall behavior of the two age groups suggested by these results is further supported by the fact that, while, as noted above, scope and IS were in significant interaction with each other, no three-way interaction involving scope and IS with age group was found ($\chi^2 = 2.7882$, $p = 0.0949$).

The two scatterplots presented in Figure 4 explore the patterns of interspeaker variation underlying the mean judgment rates in the four experimental conditions in each age group. As this figure shows, while adults tend to give more uniform judgments within each information structural condition, even in the child group the majority of subjects are relatively consistent in their responses: they align closely with one of the four corners, leaving the center of the plots unoccupied.

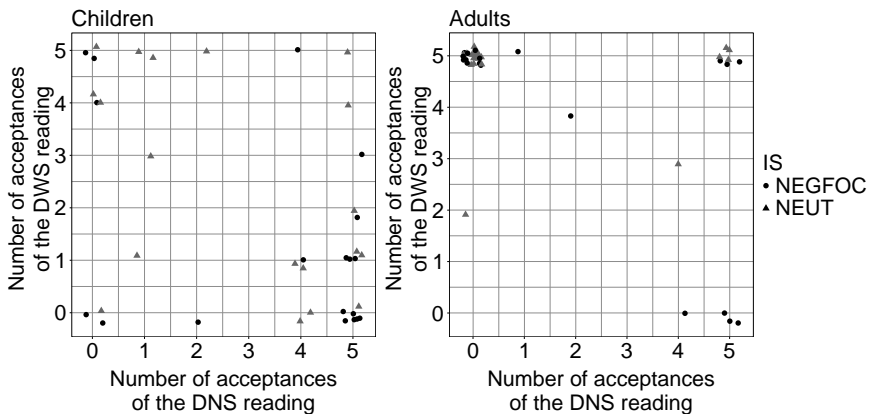


Figure 4: Number of acceptances of the two readings per participant

4. Discussion

In order to gauge pre-schoolers' comprehension of the contribution of the focus information structural role to sentence meaning, our experiment investigated whether sentence-level focus on negation has an effect on the availability of the surface and inverse scope readings of negated disjunctive sentences in Hungarian pre-school children, and if so, whether this effect is adult-like. Our findings show that while children's baseline rates of acceptance of each scope reading differed from those of adults, both for children and for adults focus on negation numerically speaking shifted interpretive preferences away from the inverse scope (DWS) reading and toward the surface, narrow scope reading of disjunction (DNS). This pattern, giving rise to the overall interaction between the factors of target scope and IS, was adult-like in children's responses in that the effect of IS was significant in both age groups when the target reading was DWS, and remained nonsignificant in both when the target reading was DNS. The results revealed that the overall impact of IS on children's acceptance rates of the two scope readings were no different from its impact on adults' acceptance patterns.

Since focusing marks the relationship between the sentence and its context, our finding that focus on negation affects logical scope interpretation in pre-school children ties in with earlier results indicating that children's scope interpretation is sensitive to contextual factors of discourse relevance. In particular, Gualmini (2004, 2008) and Gualmini et al. (2008) argued that the inverse scope interpretation of sentences like *Every horse didn't jump over the log* is more readily available for children if it provides information that entails an answer to the salient Question Under Discussion raised by the discourse.

The shift in readings toward the DNS interpretation in the adult group is also consistent with earlier findings that focus on negation tends to be associated with wide scope of negation over quantified NPs (Baltazani 2002, Turi 2020): it shows that this also obtains in the scopal interaction of negation with disjunction. Children appear to be adult-like in the way this effect shapes their interpretation of negated disjunctive sentences, including the asymmetry that out of the two target scope conditions it was the acceptance of the DWS target reading that reached significance. This asymmetry between the two scope conditions may be coincidental, due to the small sample size, but its replication across the two age groups suggests that it may reflect a genuine difference. Assuming this difference to be real, we propose that it may derive from an inherent discrepancy between the way the two tested information structures are related to the acceptability of two target scope interpretations.

In particular, NEUT IS scopally neutral: it does not preclude either one of the two scope readings. NEGFOC IS, on the other hand, matches the DNS reading but mismatches the DWS reading. We hypothesize that a match between a target scope reading and the information structure of the sentence is necessary for the acceptance of the scope reading. As a consequence, a mismatch between a target scope reading and IS reduces the acceptability of that scope interpretation. This is what happens when the DWS target scope is presented to participants in the NEGFOC IS condition. Although it is necessary, a match between the target scope

reading and IS is not sufficient for the acceptance of that scope. In other words, just the matching of the IS with a certain scope reading cannot make that scope reading readily available for a speaker, if other factors make it dispreferred. This is in line with the mainstream modular view of the processing of scope in which information structure, as an interface subsystem of the grammar, acts as a filter on, rather than a direct generator of, logical scope interpretations; the primary licenser of scope interpretations is the grammar (e.g., Reinhart 2006, Brasoveanu & Dotlacil 2019). To the extent that the acceptance of the DNS reading is elevated by the NEGFOC IS as compared to the NEUT IS, this is simply because the NEGFOC IS is less equivocally compatible with the DNS interpretation than the NEUT IS is. Put differently, if the target reading is DNS, the NEGFOC IS blocks the competing DWS reading and this may indirectly cause a higher acceptance rate of DNS; by contrast, if the target reading is DWS, the NEGFOC IS blocks the target reading itself, directly causing it to be less accepted. This is what may cause the observed asymmetry in the results that the blocking effect that the NEGFOC IS exerts on the acceptance of the DWS target reading is more robust than its boosting effect on the acceptance of the DNS target interpretation.

The judgments exhibited substantial variation in both age groups, which (both in adults and even more so in pre-schoolers) predominantly stemmed from differences between participants. This is in line with the recognition that since logical scope reading preferences are a resultant of multiple factors, they display considerable interspeaker variation (Kurtzman & MacDonald 1993).

The fact that for the overwhelming majority of adult participants in the NEUT IS condition the DWS reading was consistently acceptable aligns with Szabolcsi's (2002) characterization of Hungarian as a language in which the DWS reading is dominant. At the same time, the fact that a non-negligible minority of these participants systematically accepted not only the DWS but also the DNS reading confirms that this may be a tendency or strong preference rather than a completely uniform pattern across speakers. This finding of the availability of the (overall dispreferred) DNS interpretation in Hungarian, resulting in 25% acceptances in the NEUT condition, matches the response pattern of the Hungarian adult control group in Pagliarini et al. (2022), who also accepted the DNS reading approximately a quarter (28%) of the time.

Moving on to children's acceptance rates of the two readings in our experiment, the proportions detected in the NEGFOC IS condition (DNS: 68%, DWS: 29%) are comparable to those found in Pagliarini et al.'s (2022) group of Hungarian pre-schoolers (DNS: 75%, DWS: 25%). The overall distribution of response patterns across participants seen in the NEUT condition also aligns with previous experimental results, according to which in languages like Hungarian, in which the preferred reading for adults is DWS, only a minority of children are adult-like at a pre-school age, and for a large part of them only the DNS reading is available (whether due to the Semantic Subset Principle or because of the processing advantage of surface scope). Nevertheless, the absolute mean acceptance rates obtained in the NEUT IS condition (DNS: 55%, DWS: 50%) are remarkably different from those in Pagliarini et al. (2022). This divergence may be due to methodological differences. We point out one of them here. The

discourse context in which the target sentences were embedded differed across the two experiments in non-trivial ways. In the Pagliarini et al. study the discourse context licensed an expectation that the animal character figuring in the target sentence should eat at least one of the two vegetables that it was offered (a pepper and a carrot). Specifically, after suggesting that vegetables are healthy, each animal was invited to eat the vegetables on the plates, rewarding it with a gold medal if it ate both and with a silver medal if it ate one of them. By contrast, the animal received a sad face if it failed to eat at least one vegetable. In such a discourse context, the truth of the affirmative counterpart of the negated target sentence (namely, that the animal ate the pepper or the carrot) can be considered expected. Textual (Musolino & Lidz 2006) or situational contexts (Viau et al. 2010) that license such an expectation have been shown to make the wide scope interpretation of negation more easily accessible to children. If our reasoning is on the right track, the experimental discourse context employed by Pagliarini et al. may have been more conducive to the DNS reading than ours, which was neutral in this regard.

5. Conclusion

In this paper we investigated the comprehension of focus at pre-school ages by capitalizing, for the first time we believe, on a general and systematic effect of sentence-level focus on logical scope. In particular, we showed experimentally that focus on negation significantly influences pre-schoolers' scope interpretation of negated disjunctive sentences, and the pattern of this effect is no different from what is seen in adults. This outcome may shed new, informative light on the long-standing observation from a range of studies according to which the acquisition of the comprehension of focus is a prolonged process reaching into early adolescence. Our findings suggest, tying in with some recent results from online experimental measures, that children do have the competence to exploit focus-marking in comprehension already at pre-school ages in a task which, unlike most previously employed offline experimental tasks, does not require children to take into account a relevant set of contrastive alternatives present in the context.

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