

Investigating the effect of prosodic markedness on the interpretation of simple disjunction in Romanian

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Abstract

According to Horn's (1984) Principle of Division of Pragmatic Labor, marked forms should have marked meanings. We investigate differences in the interpretation of two prosodically distinct forms of the disjunction *sau* in Romanian ('A *sau* B'): (i) neutral rise-fall prosody, and (ii) marked rise-fall-rise prosody, where both disjuncts are stressed. Adults typically interpret disjunction inclusively (*A or B, possibly both*) or exclusively (*A or B, but not both*), while children interpret it inclusively or conjunctively (*A and B*), cf. Singh et al. (2016) and Tieu et al. (2017). We ask whether similar preferences hold for Romanian and probe into the understudied role of prosody. Given adults' greater sensitivity to prosody compared to children (Götzner et al. 2013), we predict they might associate marked *sau* with the marked exclusive meaning more than children do. We tested Romanian-speaking adults and 5-year-olds using a forced-choice task, in which two puppets made guesses about what would happen, using either neutral *sau* or marked *sau*. While adults preferred neutral *sau* to describe contexts in which both disjuncts were true and marked *sau* for contexts in which only one disjunct was true, children selected the two disjunctions indiscriminately. We conclude that, unlike adults, children do not distinguish between prosodically marked and unmarked forms of disjunction.

Keywords: Romanian, first language, disjunction, markedness, prosody, experimental linguistics.

1. Introduction

Previous research on disjunction has extensively examined how disjunction is interpreted in adult and child language (Paris 1973, Braine & Romain 1981, Chierchia et al. 2001, Gualmini et al. 2001, Singh et al. 2016, Tieu et al. 2017, Huang & Crain 2020, Skordos et al. 2020, among others). In particular, disjunction has been argued to give rise to up to three interpretations: (i) an *inclusive* interpretation, which is made true when at least one of the disjuncts is true, (ii) an *exclusive* interpretation, on which

one but not both disjuncts are true, and (iii) a *conjunctive* interpretation, on which disjunction is interpreted effectively as a conjunction (both disjuncts must be true).

Despite the extensive literature on adults' and children's comprehension of disjunction, only a few studies have examined the role of prosody in the interpretation of disjunction (Pruitt & Roelofsen 2013, Meertens et al. 2019, Bleotu et al. 2023a, Göbel & Ronai 2023) and very few have done so in child language (Bleotu et al. 2023a, Jasbi et al. 2018, 2022). Our current study addresses this gap in the literature, investigating how prosody affects the interpretation of the simple disjunction *sau* 'or' in a disjunctive assertion such as (1), in child and adult Romanian.¹

- (1) Găina a împins trenul **sau** barca.
'The hen pushed the train or the boat.'

Relying on native speaker intuitions and intonational analyses, we argue that Romanian may employ (at least) two distinct prosodic patterns for the simple disjunction *sau*: (i) a neutral prosody, with no prosodic boundary after the first disjunct (*sau*_{NEUTRAL}, as in (2a)), and (ii) a marked prosody, where both disjuncts are stressed (*sau*_{MARKED}, as in (2b)).²

- (2) a. Găina a împins trenul **sau**_{NEUTRAL} barca.
'The hen pushed the train or the boat.'
b. Găina a împins trenul **sau**_{MARKED} barca.
'The hen pushed the train or the boat.'

Additionally, we assume the Principle of Division of Pragmatic Labor (Horn 1984), formulated in (3), which associates markedness in form with markedness in interpretation.

- (3) *Horn's Principle of Division of Pragmatic Labor* (Horn 1984):
Marked forms should have marked meanings.

On these bases, we hypothesize that marked *sau* should in principle be associated with a marked meaning, which we take to be the exclusive interpretation of disjunction, namely 'The hen pushed the train or the boat but not both'. In previous work of our own using a binary truth-value judgment task (Bleotu et al. 2023a), we observed no effect of prosody on the interpretation of disjunction in either adult Romanian or child Romanian. However, it is possible that participants' sensitivity to prosody was obscured by the fact that the different prosodic patterns were presented separately (as a between-subjects variable). In an effort to boost the interpretive contrast between the two intonational variants of *sau*, in the present experiment we employed a forced-choice experimental set-up so as to maximize the contrast between the two prosodic patterns. Participants were asked to choose between an utterance containing *sau*_{NEUTRAL} and an utterance containing *sau*_{MARKED} as the best description of

¹ Romanian employs several other forms to express disjunction: simplex (A *ori* B) or correlative (*sau* A *sau* B, *ori* A *ori* B, *fie* A *fie* B) conjunctions.

² The materials for this study can be accessed at the following OSF entry: https://osf.io/s35k9/?view_only=50e84fd58b36436cb8f9621ba3e75a84.

a situation. Our goal was to test whether Romanian 5-year-olds and adults could map a marked prosody to a marked meaning.

2. Previous research on disjunction

2.1. The acquisition of disjunction in first language

Disjunction has been argued to give rise to multiple readings for adults and children (Paris 1973, Braine & Romain 1981, Chierchia et al. 2001, Gualmini et al. 2001, Singh et al. 2016, Tieu et al. 2017, Huang & Crain 2020, Skordos et al. 2020, among others): inclusive readings (*A or B, possibly (A and B)*), exclusive readings (*A or B but not (A and B)*), and conjunctive readings (*A and B*). These readings are illustrated in Table 1.

Table 1. Possible interpretations of disjunction reported in the literature (some associated with adults, some with children)

Interpretation	Paraphrase associated with the example (1): <i>The hen pushed the train or the boat</i>
Inclusive	<i>The hen pushed one and possibly both.</i>
Exclusive	<i>The hen pushed only one, not both.</i>
Conjunctive	<i>The hen pushed both.</i>

In general, adults are reported to interpret simple disjunctions inclusively or exclusively, while they interpret complex disjunctions exclusively in most contexts (Nicolae & Sauerland 2016, although see also Nicolae et al. 2024 for a more fine-grained distinction among complex disjunctions and their possible interpretations). Thus, in a context in which the interlocutor wants to go to the supermarket to buy some fruit, a speaker could utter a sentence such as (4), which would not necessarily be taken to mean that the market only has one or the other type of fruit. Rather, a more natural interpretation of (4) is that the supermarket has strawberries or cherries, and possibly even both, but the speaker is ignorant with respect to which.

- (4) They have strawberries **or** cherries at the supermarket.

The plausibility of the exclusive and inclusive readings is resolved pragmatically through world knowledge (Felton & Jasbi 2023). In contexts such as (5), for instance, the simplex disjunction *or* is clearly interpreted exclusively, as the two alternatives exclude each other. In contrast, the complex disjunction *either...or* in (6) is typically associated with an exclusive interpretation regardless of contextual considerations. Therefore, unlike (4), the example in (6) does seem to strongly imply that the supermarket has only one of the two types of fruit.

- (5) Sophie is in Boston **or** Paris.

- (6) They have **either** strawberries **or** cherries at the supermarket.

The general explanation is that adults compute an exclusivity implicature from disjunctive sentences. Hearing the weaker alternative *or*, as in *A or B*, leads to the

activation of the stronger alternative *and*, the negation of the alternative sentence containing *and* thus generating the scalar implicature: *It is false that A and B*.

Interestingly, children seem to behave differently from adults. In several studies, they have been found to treat simple and complex disjunctions alike, reportedly assigning inclusive or conjunctive interpretations in English (Chierchia et al. 2001, Singh et al. 2016, Huang & Crain 2020, Skordos et al. 2020), French and Japanese (Tieu et al. 2017), and Romanian (Bleotu et al. 2023a), but inclusive or exclusive interpretations in German (Sauerland & Yatsushiro 2018).

Children's inclusive interpretation of disjunction is generally explained through a preference for logical interpretations over pragmatic ones (Noveck 2001, Papafragou & Musolino 2003). Scalar implicatures have been claimed to pose challenges for children, with different explanations proposed in the literature. On one family of proposals, children have difficulties accessing the stronger scalar alternative (e.g., they fail to activate *and* when they hear *or*), or they struggle to negate the stronger alternative (Barner et al. 2011, Chierchia et al. 2001, Gualmini et al. 2001, Singh et al. 2016, Tieu et al. 2016, 2017). Others argue children's difficulties lie in their perception of the stronger alternative as being relevant (Skordos & Papafragou 2016).

The source of the conjunctive interpretation has been subject to even more debate. Some have suggested it corresponds to a genuine semantic/pragmatic interpretation (Singh et al. 2016, Tieu et al. 2017, Sauerland & Yatsushiro 2018), while others attribute it to an experimental artifact (Huang & Crain 2020, Skordos et al. 2020). According to Singh et al. (2016) (and further argued by Tieu et al. 2017), the conjunctive interpretation of disjunction is the result of an implicature. According to Sauerland & Yatsushiro (2018), disjunction is ambiguous between an inclusive meaning and conjunction. In contrast, according to Huang & Crain (2020) and Skordos et al. (2020), the conjunctive interpretation arises in contexts where the disjunctive statement exhaustively mentions all the objects in the display. In such cases, the disjunctive statement does not add new information to the discourse context, and so children tend to assign it the more informative conjunctive interpretation. This latter view has recently been challenged by Bleotu et al. (2023a), who found that Romanian-speaking children assigned conjunctive interpretations to certain forms of disjunction even when the display included other objects in addition to those mentioned in the disjunctive utterances.

2.2. The interpretation of disjunction in child Romanian

While Romanian-speaking children's ability to derive implicatures has been investigated for existential quantifiers, cardinals, and epistemic adverbs (Stoicescu et al. 2015, Bleotu 2021a, 2021b, Bleotu et al. 2021, 2022), implicatures of disjunction have only recently been studied. Bleotu et al. (2023a) investigated multiple forms of disjunction in child Romanian, looking at whether findings such as those described in Section 2.1 would carry over to Romanian. While preceding studies focused on the contrast between simple and complex disjunctions, Bleotu et al. (2023a) also examined whether there would be variability between different types of simple and complex disjunctions, probing both prosodic and morphological complexity.

Romanian represents an ideal language for testing disjunction, given that it has multiple forms of disjunction (Bîlbîie 2008): both simple disjunctions with distinct prosodies, such as neutral *sau* and marked *sau*, as well as complex disjunctions with

distinct morphology, such as *sau...sau* ‘either...or’, which consists of the reduplication of the simple disjunction morpheme (similar to Japanese *ka* vs. *ka...ka*), and *fie...fie* ‘either...or’, which is morphologically unrelated to the simple disjunction (similar to French *ou* vs. *soit...soit*).

Bleotu et al. (2023a) adopted the experimental design in Tieu et al. (2017), a truth-value judgment task in Prediction Mode rather than Description Mode (Singh et al. 2016). This was done to license ignorance inferences, which often characterize disjunctive statements, i.e., inferences about the speaker’s lack of knowledge about which disjunct was true. Participants had to evaluate whether a puppet named Bibi made correct guesses about the outcome of a situation. The experiment involved three scenes (see Figure 1): in Scene 1, participants saw a picture and were introduced to the character in the picture; in Scene 2, Bibi the puppet appeared on screen to make a guess about what would happen next, and in Scene 3, participants saw what happened and had to say if Bibi had guessed right or not. Bibi’s guesses took the form of disjunctive sentences such as those in (7).

- (7)
- a. Găina a împins trenul **sau**_{NEUTRAL} barca.
‘The hen pushed the train or the boat.’
 - b. Găina a împins trenul **sau**_{MARKED} barca.
‘The hen pushed the train or the boat.’
 - c. Găina a împins **sau** trenul **sau** barca.
‘The hen pushed either the train or the boat.’
 - d. Găina a împins **fie** trenul **fie** barca.
‘The hen pushed either the train or the boat.’

The test sentences were presented in two kinds of conditions: (i) **1-disjunct-true (1DT)**, where only one disjunct was made true (*The hen pushed only the train*), and (ii) **2-disjunct-true (2DT)**, where both disjuncts were made true (*The hen pushed both the train and the boat*). The 2DT condition is exemplified in Figure 1.

Figure 1. Sample experimental item (neutral *sau* in 2DT)



SCENE 1: There once was a hen who loved to play with her toys, and she especially loved to push them around. One day her papa gave her two new toys: a train and a boat. The hen was very happy to play with them. Let’s see if Bibi can guess what happened next!

SCENE 2: EXPERIMENTER: Bibi, tell us, what happened next?

BIBI: *Găina a împins trenul sau barca.*

‘The hen pushed the train or the boat.’

EXPERIMENTER: Let’s see if Bibi’s right!

SCENE 3: (following animation of the hen pushing both objects down the hill)
Look, the hen pushed this, and this! Did Bibi guess right?

Bleotu et al. (2023a) found that adults were generally exclusive across the board for all disjunctions. Nevertheless, they were slightly more inclusive with neutral *sau* than with marked *sau*, though the exclusive interpretation was the preferred one for both (morphologically) simple disjunctions. In contrast to adults, children were inclusive on all *sau*-based disjunctions (neutral *sau*, marked *sau*, complex *sau...sau*), while they were primarily conjunctive with the complex *fie...fie*. The results were somewhat surprising given that previous studies found no difference in children's interpretation of simple and complex disjunctions. The authors concluded from these findings that different forms of disjunction give rise to different interpretations in child Romanian. Specifically, they suggested that a possible explanation for the conjunctive behaviour associated with *fie...fie* may have to do with the fact that this form involves reduplication of an item syncretic with the present subjunctive of the verb *a fi* 'to be' in Romanian. Thus, participants may simply interpret *fie...fie* as the coordination of two subjunctives ('be it A be it B'), ending up with an 'A or B' interpretation by reducing the irrealis to realis (see Tulling & Cournane 2022).

In another study, Bleotu et al. (2024) experimentally investigated the possibility that the conjunctive interpretation of disjunction may be due to an experimental artifact (Skordos et al. 2020, Huang & Crain 2020). According to Huang & Crain (2020), children may interpret disjunction conjunctively because of a repair strategy that they rely on when the use of disjunction is uninformative or not ideal in the context. Previous experiments (such as the one by Tieu et al. 2017) involved backgrounds where a character is presented alongside two objects and the disjunctive utterance exhaustively mentions both of these objects. In a guessing task, where one knows that the character may act upon (at least one of) the two objects, it may be considered underinformative to say that the character will act upon object A or object B. Hence, to correct for this issue, children strengthen the interpretation of disjunction to conjunction. Interestingly, in previous experiments on Romanian, testing multiple types of disjunction in both a set-up involving two objects and a set-up involving four objects, we found that, while children tended to be conjunctive with *fie...fie* in set-ups involving two objects, they became less conjunctive and more inclusive in set-ups involving four objects. The proportion of children who responded conjunctively, however, remained high. Children's behaviour was different with *sau*-based disjunctions, which they interpreted inclusively in both set-ups (involving two and four objects). In sum, there does seem to be some effect of task observed in the interpretation of *fie...fie*, with children becoming more inclusive in set-ups involving four objects. Importantly though, a considerable number of children persisted in their conjunctive interpretation of *fie...fie* even with four objects, suggesting that this interpretation cannot be wholly explained as an experimental artifact.

3. The role of prosody in interpretation

As far as prosodic complexity is concerned, the results reported in Bleotu et al. (2023a) suggest that it has no effect on adults' or children's interpretation of disjunction. In adult language, neutral *sau* seems to mainly give rise to exclusive interpretations, similarly to marked *sau*, and only secondarily to inclusive ones. As for children, both

neutral and marked *sau* mainly give rise to an inclusive interpretation. Importantly, however, it is worth noting that prosodic complexity was tested as a between-subject variable in the previous study. Exposing participants to these disjunctions separately (i.e., in different tasks), could have made it difficult for them to access underlying differences between them. For this reason, we believe it is worth exploring whether adults and children have clear associations between the different prosodic patterns of *sau* and its possible meanings, in situations in which they are exposed to both forms in direct contrast. In other words, do adults and children prefer to associate marked *sau* with contexts where only one disjunct holds and neutral *sau* with contexts where both disjuncts hold? What is the relationship between marked and neutral prosody and marked (exclusive) and neutral (inclusive) interpretations? Before delving into our experiments, we first address the important roles of prosody and contrast in interpretation.

Prosody has been shown to influence the activation of stronger alternatives in implicature derivation (Fraundorf et al. 2010, Gotzner et al. 2013, 2016, Spalek et al. 2014); in particular, for examples such as (8), contrastive L+H* accents seem to facilitate recognition of a contextual alternative to the accented item, compared with non-contrastive H* accents. Interestingly, in comparison to contrastive accents, focus-sensitive particles such as *only* or *also* lead to a slowdown in recognition.

- (8) The judge and the witness followed the argument. ({Only/also}) {the JUDGE/the judge} believed the defendant. (Gotzner et al. 2013: 2346)

Recently, work on intonation and implicatures by Göbel & Ronai (2023) has found that Rise-Fall-Rise intonation is associated with higher rates of scalar implicatures compared to both Fall intonation and Concession intonation. This was found to be the case both in the production and the comprehension of utterances such as those in (9) involving adjectives of different strengths.

- (9) Emma: a. Was the winner ecstatic? (*strong*)
 b. Was the winner happy? (*same*)
 You: She was happy.
 Given your response, do you think Emma would conclude that the winner was not ecstatic? *Yes/No*

Of relevance for us, this pattern was observed for the <*and*, *or*> scale as well. Pruitt & Roelofsen (2013) and Meertens et al. (2019) investigated how prosody modulates the interpretation of questions containing disjunction. Two types of questions may arise, depending on the prosody involved: (i) Alternative Questions (AltQs), illustrated in (10a), which involve an obligatory pitch accent (emphasis) on each disjunct (giving rise to multiple accents) and a final falling boundary tone, and (ii) Polar Questions (PolQs), illustrated in (10b), which do not necessarily involve multiple accents and where the boundary tone is typically a rise (Bartels 1999, Biezma & Rawlins 2012, Han & Romero 2004a, 2004b, Roelofsen & van Gool 2010). At the interpretive level, AltQs are understood as questions asking the interlocutor to make a choice between two alternative disjuncts, whereas PolQs do not focus on the individual disjuncts but instead ask the interlocutor whether or not they want one or the other.

- (10) a. Do you want coffee_{L*H}-**or** tea_{H*L-L%}?
Which one of the following do you want: coffee or tea? [AltQ]
b. Do you want coffee **or** tea_{L*H-H%}?
Is it true that you want coffee or tea? [PolQ]

Concerning the role of prosody in children's interpretation, the literature is divided: some studies suggest that children are not sensitive to prosody (Crain et al. 1994, Choi & Mazuka 2003, Sekerina & Trueswell 2012, Bleotu et al. 2023b), while others suggest the opposite (Snedeker & Yuan 2008, Ito et al. 2012, Armstrong 2014, 2020, Yatsushiro et al. 2019, Jasbi et al. 2018, 2022). To give an example, by relying on prosody, children appear to be able to identify epistemic stances such as disbelief (Armstrong 2014, 2020, among others). Of the studies above, only Jasbi et al. (2018, 2022) deal with disjunction. These authors conducted an annotation study of *or*-productions in child-directed speech in the Providence corpus (Demuth et al. 2006), annotating *or*-productions for interpretation (exclusive, inclusive), intonation (Flat, Rise, Rise-Fall) and consistency of disjuncts (Consistent, i.e., when replacing *or* with *and* was possible, otherwise Inconsistent). They found that when disjunction was associated with a Rise-Fall contour (e.g., *Wanna stay or go?*) or when there was inconsistency between the disjuncts, the disjunction was more likely to be interpreted exclusively. However, since Jasbi et al. (2018, 2022) only focused on the Rise-Fall contour of questions, it remains unclear what we will find with respect to prosodic markedness in affirmative disjunctive sentences.

As detailed in the previous section, Bleotu et al. (2023a) found that children were not sensitive to the different prosodic contours in their interpretation of the simple disjunction *sau*, always assigning inclusive interpretations. Based on such findings, it is unclear whether Romanian adults and children will exhibit differences in their interpretation of marked *sau* and neutral *sau* in the current study. We hypothesize that they might distinguish the two, given the use of a forced-choice task in which participants hear utterances with neutral *sau* and marked *sau* in direct contrast to each other, given that contrast is known to play an important role in interpretation.

4. The role of contrast

Studies have shown that linguistic contrast can boost awareness of the interpretive differences between two items or structures in children (Chierchia et al. 2001, Foppolo et al. 2012, Ozturk & Papafragou 2015). When children hear an utterance on its own, interpreting it may be more challenging if there is no benchmark for comparison. In fact, it has been found that children tend to display more adult-like behaviour in felicity judgment tasks, which employ forced-choice as a methodology: children typically witness a situation, two puppets each describe that situation by means of an utterance, and children have to then decide which of the two puppets said it better. An essential aspect of this task is that it relies on contrast, which enhances children's sensitivity to existing differences among items/structures.

As an example, in Experiment 3 of Chierchia et al. (2001), designed to probe the interpretation of *or* under the scope of *every*, children were tested with a felicity judgment task where they were asked to reward with a coin the puppet who produced the best description of a situation. They were familiarized with a scene involving

farmers and animals and learned that every farmer decided to clean both a horse and a rabbit. Then, two puppets described the situation slightly differently: one uttered a sentence with *or* as in (11a) and the other a sentence with *and* as in (11b). Children correctly rewarded the puppet who uttered the statement with *and* 93.3% of the time.

- (11) a. Every farmer cleaned a horse **or** a rabbit.
b. Every farmer cleaned a horse **and** a rabbit.

Similarly, in Experiment 5 of Foppolo *et al.* (2012), designed to investigate children's ability to access the *not all* implicature of *some*, children saw a picture of five chipmunks taking a shower. Two puppets described what happened. One puppet described this situation by means of an underinformative but true utterance containing *some* as in (12a). The other puppet described the situation using the more pragmatically appropriate utterance containing *all* as in (12b). Children were found to choose the stronger statement 95% of the time.

- (12) a. **Some** chipmunks are taking a shower.
b. **All** chipmunks are taking a shower.

Along the same lines, Experiment 2 of Ozturk & Papafragou (2015) also used a felicity judgment task, in which children had to evaluate the contrast between an underinformative sentence containing *may* such as (13a) and a sentence containing *is* such as (13b) or *has to* such as (13c). Children's performance was found to be significantly different from chance, suggesting the linguistic contrast helped to highlight the difference in strength between *may* and *is/have to*.

- (13) a. The cow **may be** in the yellow box.
b. The cow **is** in the yellow box.
c. The cow **has to be** in the yellow box.

As far as prosodic contrast is concerned, Armstrong (2014) used a felicity judgment task, which asked participants to compare the intonation contours adopted by two different speakers: one corresponded to short echo-questions, namely, a $\uparrow H^*L\%$ contour simply marking questionhood, as in (14a), and the other corresponded to a $L^*HL\%$ contour marking both questionhood and disbelief, as in (14b). Children were found to be able to identify the character who did not trust the speaker at a relatively high rate (i.e., the character who employed the intonational contour $L^*HL\%$).

- (14) a. $\uparrow$ Un mono?
'A monkey?'
b. $\uparrow$ $\downarrow$ Un mono?!
'A monkey?!'

It is thus not only the contrast between different linguistic forms that impacts interpretation for children, but also the contrast between two different prosodic patterns of the same linguistic form.

5. Current experiment: Who guessed better?

Our current study investigates whether Romanian 5-year-old children map different prosodic variants of the disjunction *sau* to different interpretations. In particular, we investigate whether the two groups tend to prefer marked *sau* to neutral *sau* in contexts where only one disjunct is true, and neutral *sau* to marked *sau* in contexts where both disjuncts are true.

5.1. Predictions

Regarding adults, we consider their possible performance in light of two approaches: the Markedness Approach and the Exclusivity Bias. According to Horn's Principle of Division of Pragmatic Labor (Horn 1984), marked forms should have marked meanings (see (3) above); therefore, prosodically marked disjunctions should have marked meanings, which we assume correspond to exclusive interpretations. Prosodically unmarked disjunctions should then have unmarked meanings, namely inclusive interpretations. Therefore, under a Markedness Approach, of the two disjunctions, adults should prefer neutral *sau* in contexts where both disjuncts are true (2DT contexts), whereas in contexts where only one disjunct is true (1DT contexts), marked *sau* should be preferred due to its marked form. Even though both forms are logically compatible with the 1DT context, assuming a one-to-one mapping of form, meaning, and context (Slobin 1973), if participants associate the unmarked form with the 2DT context, they should prefer to associate the marked form with 1DT contexts. As discussed in the previous section, contrast may enhance participants' association of different prosodic patterns with different interpretations/scenarios.

On the other hand, a previous study using a truth-value judgment task (Bleotu et al. 2023a) suggests that the prosody-semantics mapping in interpretation leans towards exclusive meanings in the case of adults, for both neutral *sau* and marked *sau*. This has been observed for adults in studies of simple disjunction across different languages: English (Chierchia et al. 2001, Singh et al. 2016, Nicolae & Sauerland 2016, Huang & Crain 2020, Skordos et al. 2020), French and Japanese (Tieu et al. 2017), and German (Sauerland & Yatsushiro 2018). Building on the empirical data presented in these studies, one might propose an overarching Exclusivity Bias in adults: if the context allows it, adults prefer the exclusive interpretation of disjunction over the inclusive one. This bias could in principle override adults' sensitivity to the contrast between the disjunctions in a felicity judgment task. That is, adults with an exclusivity bias would tend to interpret both marked and unmarked forms of disjunction exclusively; they would thus select marked and neutral *sau* to a similar extent, across the 1DT and 2DT contexts. Such a result would be in line with the exclusive response patterns reported in Bleotu et al. (2023a). Table 2 displays the predictions for adults on the two different approaches.

Table 2. Predictions for adults in the felicity judgment task (FJT)

Approaches	1DT	2DT
Markedness	marked <i>sau</i>	neutral <i>sau</i>
Exclusivity Bias	no preference (chance performance)	no preference (chance performance)

Regarding children, it is unclear how they should behave. If they are sensitive to markedness in a similar way to adults, they should prefer marked *sau* in 1DT contexts and neutral *sau* in 2DT contexts. If, on the other hand, as shown in Bleotu *et al.* (2023a), children interpret both neutral *sau* and marked *sau* inclusively to a similar extent, one might propose that they exhibit an Inclusivity Bias: they are generally inclusive with *sau*-disjunctions, adopting its logical meaning and failing to derive exclusivity implicatures. If this is the case, we predict that children might be at chance in their selections of neutral *sau* and marked *sau* in both 1DT and 2DT contexts, since both disjunctions are equally compatible with the two contexts. The predictions for children are given in Table 3.

Table 3. Predictions for children in the felicity judgment task (FJT)

Approaches	1DT	2DT
Markedness	marked <i>sau</i>	neutral <i>sau</i>
Inclusivity Bias	no preference (chance performance)	no preference (chance performance)

5.2. Participants

We tested 20 5- to 6-year-olds (mean age 5;02, 12 male, 8 female), recruited at a kindergarten in Bucharest, and 26 Romanian adult native speakers recruited from the undergraduate student population at the University of Bucharest. The study was approved by the Research Ethics Committee in Bucharest (89/20.03.2023).

5.3. Procedure

In line with the considerations presented in Section 4, we employed a felicity judgment task. Participants were introduced to a guessing competition between two puppets (Bibi the giraffe and Lulu the tiger): one puppet made a guess containing neutral *sau*, the other used marked *sau*. Participants then had to choose the better guesser of the two. Figure 2 exemplifies the experimental task in a 2DT context. Importantly, the order of presentation of the utterances was randomized to prevent participants from associating a certain puppet with a particular type of disjunction.

Figure 2. Sample experimental item for a 2DT context



SCENE 1: There once was a hen who loved to play with her toys, and she especially loved to push them around! One day her papa gave her two new toys: a train and a

boat! The hen was very happy to play with them. Let's see if Bibi can guess what happened next!

SCENE 2: EXPERIMENTER: Bibi, Lulu, tell us, what happened next?

BIBI: *Găina a împins trenul sau_{NEUTRAL} barca.*
'The hen pushed the train or the boat.'

LULU: *Găina a împins trenul sau_{MARKED} barca.*
'The hen pushed the train or the boat.'

EXPERIMENTER: Who guessed better?

SCENE 3: (following animation of hen pushing both the train and the boat down the hill) Look, the hen pushed this and this! Who guessed better? Lulu or Bibi?

5.4. Materials

5.4.1. Experimental items

Our decision to test the disjunction *sau* was informed by a corpus study conducted on Romanian Web 2016 (roTenTen16), the largest existing online Romanian corpus, consisting of 3,142,636,172 tokens. We found that *sau* 'or' was the most frequent simple disjunction (raw frequency: 10,522,873 tokens), followed by *ori* (raw frequency: 677,502 tokens). However, the corpus was not coded for intonation, so it is unclear what intonation was associated with the identified *sau* disjunctions.

Based on our own native speaker intuitions, as well as the judgments of other native speakers that we consulted, we decided to test two prosodic variants of the disjunction *sau*: a neutral variant and a marked variant, using a within-subjects design.

The experimental materials consisted of 15 pairs of utterances: one member of each pair was uttered by Bibi the giraffe, and the other by Lulu the tiger. There were two practice trials involving pairs of simple, non-disjunctive utterances: one puppet made a correct guess, and the other a bad guess. These were then followed by eight experimental pairs of disjunctive utterances employing neutral *sau* and marked *sau*, as illustrated in (15): 4 pairs for the 1DT context (where the hen pushed only the train), and 4 pairs for the 2DT context (where the hen pushed both the train and the boat). Additionally, there were five filler pairs (16), consisting of non-disjunctive true and false utterances, which allowed us to verify that participants understood and were paying attention to the task. Appendix 1 provides the full list of sentences.

- (15) a. *Găina a împins trenul sau_{NEUTRAL} barca.*
'The hen pushed the train or the boat.'
b. *Găina a împins trenul sau_{MARKED} barca.*
'The hen pushed the train or the boat.'
- (16) a. *Maimuța și-a luat umbrela.*
'The monkey took her umbrella.'
b. *Maimuța și-a luat cizmele.*
'The monkey took her boots.'

It is worth noting that the experimental contexts contained the two objects mentioned in the disjunctive statement, and no others. This decision was taken on the basis of previous findings that children interpret *sau*-based disjunctions inclusively, regardless of the number of backgrounded objects in the context (see Section 2.1). Given that in the current experiment we targeted neutral *sau* and marked *sau*, set-ups

involving both two and four objects were expected to yield similar results. Consequently, for simplicity, we opted for a set-up involving two objects only.

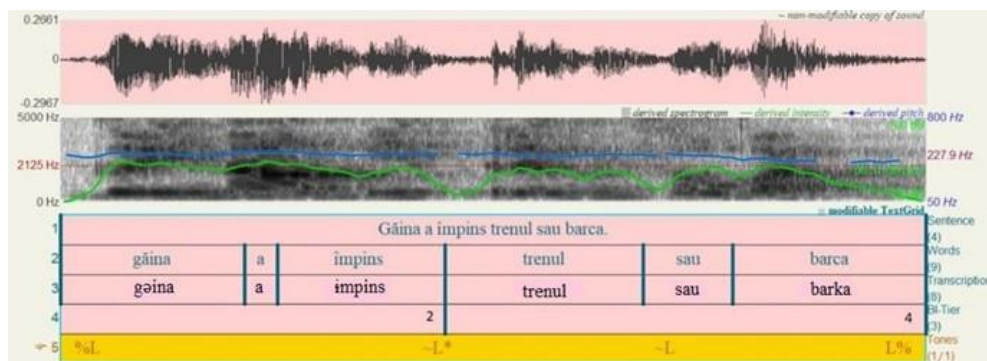
5.4.2. Intonational analyses of neutral sau and marked sau

We use the Ro-ToBI annotation system, as developed by Jitcă et al. (2009, 2015). As an intonational descriptive model, the Ro-ToBI annotation system labels only single pitch events. Their grouping into prosodic units results from the information of the break-indices tier that refers to the beginning or to the end groups. We extended the ToBI annotation system to better capture the behavior of Romanian prosodic units by introducing a more general concept of pitch accent. Instead of defining pitch accent as a local pitch movement during the accented syllable, we use it to annotate all events that generate focus in Romanian intonation (pitch accents and/or emphasis). This allows us to distinguish between local (narrow) pitch events (generated by pitch accents at the syllable level) and broad pitch events (generated by certain pitch patterns at the prosodic word level and even at the prosodic group level).

The Romanian intonation system has both pitch accents: monotonal (H^* , L^*) and bitonal ($L+H^*$, $L+>H^*$, $H^*+>L$, $H+!H^*$, $H+L^*$, L^*+H), as well as boundary tones ($L\%$, $H\%$, $LH\%$, $HL\%$). The latter occur mostly at the boundary of intermediary phrases (ip) or intonational phrases (IP). We employed Praat (Boersma & Weenink 2022) for our prosodic analysis.

We analyzed the constructions using neutral *sau*. These neutral constructions reveal the use of L^* , a pitch accent with a low target tone pitch movement, which can also have a tendency of keeping the pitch movement close to a low tonal level during a prosodic word. Alongside the boundary type $L\%$, L^* is usually expected in statements. However, according to Jitcă et al. (2015), in certain Romance languages, including Romanian, specific pitch accents such as $L+<H^*$ or H^* are only employed in a pre-nuclear position. As can be seen in Figure 3, the low tone is maintained throughout the whole prosodic construction if we rely on the pitch movement (marked in blue). However, some intensity (marked in green) rises at the beginning of the words *găina* ‘hen.the’ and *trenul* ‘train.the’ which are probably correlated with the lexical accents on *-i-* and *tre-*. The level of F_0 at the beginning of the word *barca* ‘boat.the’ may also indicate a $H+L^*$ nuclear tone.

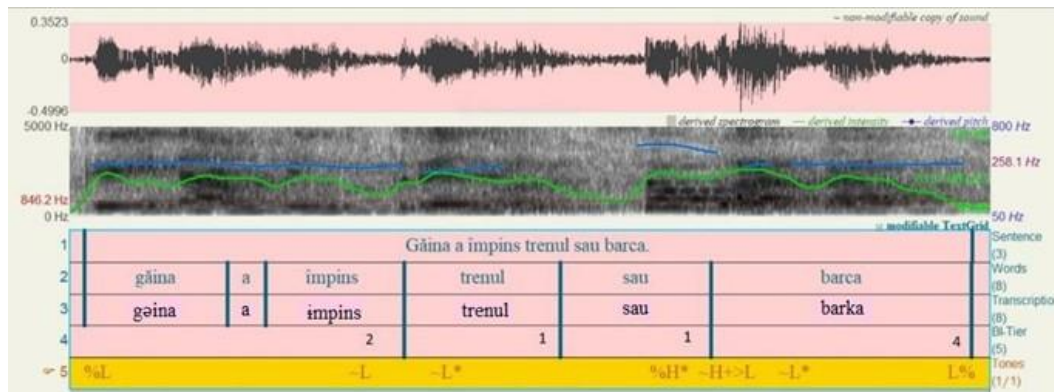
Figure 3. Prosodic description of the neutral *sau* (*Găina a împins trenul sau barca*)



The marked disjunctive construction, on the other hand, starts out with a low tone on the first prosodic unit and on *sau* it reaches H^* , a pitch accent with a high target tone pitch movement. Usually, H^* displays a tendency to keep the pitch

movement close to a high tonal level during a prosodic word. As can be seen in Figure 4, the H* pitch accent continues in a contour H+>L, which generates a prominent tonal contrast between the high target tone during the accented syllable.

Figure 4. Prosodic description of the marked *sau* (*Găina a împins trenul sau barca*)



In our previous experiments (see Bleotu et al. 2024), we also collected examples with disjunctive sentences with the complex disjunction *sau...sau*, and a qualitative comparison of examples with marked *sau* and examples with *sau...sau* confirms their resemblance at the prosodic level: in particular, a break “%” before *sau* and a H+>L on the last prosodic unit. This may explain the association of the marked pattern with the exclusive reading.³ We leave to future research a more developed investigation of this comparison.

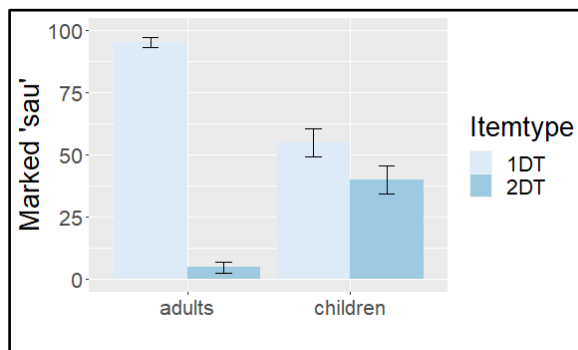
5.5. Results

5.5.1. Descriptive results

Accuracy for fillers was high for both adults and children (97.4% for adults, 90% for children). All participants were included in the planned analysis.

As can be seen in Figure 5, adults tended to associate the 2DT condition with sentences containing neutral *sau* and the 1DT condition with sentences containing marked *sau*. In contrast, children were less clear in their associations.

Figure 5. Percentage of marked *sau* selections in the 1DT and 2DT conditions



³ An anonymous reviewer suggests that the break could potentially indicate ellipsis occurring with sentence-level disjunction rather than nominal-level disjunction.

5.5.2. Analysis

The data were analyzed to compare the performance of the two groups (adults vs. children). Using R (R Development Core Team 2008), we employed a mixed-effect logistic regression model with Answer as a Dependent Variable, and Scenario (1DT vs. 2DT), Group (Adults vs. Children), and their interaction as fixed effects, and Participant and Item as random effects. The model revealed significant effects of Group ($\beta = -6.04$, $SE = 0.66$, $Z = -9.03$, $p < .001$) and Scenario ($\beta = -2.81$, $SE = 0.52$, $Z = -5.376$, $p < .001$), and a significant interaction between Group and Scenario ($\beta = 5.42$, $SE = 0.73$, $Z = 7.35$, $p < .001$), with adults demonstrating a greater contrast between the two scenarios compared to children.

Adults generally behaved uniformly as a group, selecting marked *sau* in 1DT contexts and neutral *sau* in 2DT contexts. Children showed more variation, so we next considered their individual performance.

We observed that only four children out of 20 were fully adult-like in their responses, preferring marked *sau* in 1DT contexts and neutral *sau* in 2DT contexts. The remaining children varied in their responses, as can be seen in Table 4.

Table 4. Counts of children according to preferences in 1DT and 2DT conditions

1DT	2DT	Number of children
marked <i>sau</i>	neutral <i>sau</i>	4
neutral <i>sau</i>	neutral <i>sau</i>	4
marked <i>sau</i>	marked <i>sau</i>	2
mixed	mixed	3
mixed	neutral <i>sau</i>	3
mixed	marked <i>sau</i>	2
neutral <i>sau</i>	mixed	1
marked <i>sau</i>	mixed	1

6. Discussion

The results from the experiment presented in this paper show that adults associate the different prosodic variants of *sau* (neutral *sau*, marked *sau*) with different contexts (1DT, 2DT) in a forced-choice task. This suggests that, in such a task highlighting the contrast between disjunctions, adults rely on markedness, associating marked forms with marked meanings. Our findings go against the idea of a general exclusivity bias for adults, according to which both neutral *sau* and marked *sau* should have been chosen to an equal extent in the 1DT condition. Interestingly, adults seem to perform differently in the forced-choice task compared to their behaviour on the truth-value judgment task in Bleotu et al. (2023a). This can be explained by the different nature of the two tasks: the truth-value judgment task is an acceptability task, whereas the felicity judgment task is a preference task. Adults' preferences reveal that they rely more on markedness than on exclusivity.

As far as children are concerned, the results from the felicity judgment task suggest that, unlike adults, children do not yet associate different prosodic variants of *sau* with different contexts, failing to resort to markedness as a means of conveying exclusivity. On the whole, the children's data are more consistent with an Inclusivity Bias than with a Markedness principle. Markedness would have predicted a preference for neutral *sau* in 2DT contexts and a preference for marked *sau* in 1DT contexts.

However, only four children out of 20 associated the different prosodic variants of *sau* with the 1DT and 2DT contexts in an adult-like manner, preferring marked *sau* in 1DT contexts and neutral *sau* in 2DT contexts. The remaining children showed rather mixed patterns of association between disjunctions and contexts.

While some studies may suggest that children are sensitive to prosodic contrast, the present results show that in the case of disjunction, children do not yet map the prosodic contrast onto an interpretive/semantic contrast. This could be explained by the fragile nature of the prosody/semantics interface in child language. The findings are also compatible with the idea that children interpret disjunctions logically, as ‘*or*, *possibly and*’ and face difficulties in deriving implicatures (Noveck 2001). The child data are also compatible with the results of Bleotu et al. (2023a) in that they suggest that Romanian children tend to be inclusive with both neutral *sau* and marked *sau*, accepting both forms in 1DT and 2DT contexts to a similar extent.

7. Conclusion

The findings of the present study suggest that, unlike adults, most children do not associate the different prosodic variants of *sau* with different contexts of use (a context where only one disjunct is true vs. a context where both disjuncts are true). While adults incorporate markedness in their mapping from form to meaning, children do not, relying solely on their inclusive understanding of disjunction, and thus treating neutral *sau* and marked *sau* alike. In other words, 5-year-old Romanian children are at a stage in their development where the use of prosodically different disjunctions is indifferent to the Markedness Principle. The current study motivates further research into the role of prosody in the interpretation of disjunction by children and adults within and across languages. Future studies could involve both younger and older children in order to track the developmental path involved in associating prosodic patterns with different contexts of use in an adult-like manner. Future studies could also investigate the interpretation of disjunctive questions alongside disjunctive assertions.

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