

## The role of intonation and context in lack of necessity meanings in negated deontic necessity modals in child Romanian\*

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**Abstract** The current paper addresses experimentally the question of whether Romanian 5-year-olds interpret negated deontic necessity modals as interdiction initially, and to what extent intonation and situational context may act as cues for a more adult-like interpretation. We find that, in the absence of situational context, children initially interpret all negated deontic modals as interdiction. Prosodic cues are on their own not enough to lead to an adult interpretation. However, in the presence of situational context, children are able to tease lack of necessity and interdiction apart and even show sensitivity to prosodic differences among negated modals.

**Keywords:** Romanian, first language acquisition, deontic modals, necessity, intonation, situational context

### 1 Aims

In many languages of the world (English, French, Italian, a.o.), negated deontic necessity modals may have two different readings: (i) an interdiction reading, and (ii) a lack of necessity reading. In the current paper, we focus on Romanian, a Romance language which possesses a wide array of negated deontic necessity modals, and,

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consequently, represents an interesting testing ground for their interpretation: *trebuie să nu* (i.e., ‘must SBJVmarker not’) unambiguously expresses interdiction, *nu e nevoie să* (i.e., ‘not be.IND.PRS.3SG need SBJVmarker’) unambiguously expresses lack of necessity, and *nu trebuie să* (i.e., ‘not must SBJVmarker’) is ambiguous between interdiction and lack of necessity. For exemplification purposes, consider the sentence (1), containing *trebuie să nu*, which can only express an interdiction meaning, given that deontic necessity (obligation) scopes above negation (NECESSARY > NOT).

- (1) Trebuie să            nu te duci    la supermarket singur.  
       must    SĂ.SBJV not CL. go.2SG to supermarket alone  
       ‘You must not go to the supermarket on your own.’  
       Paraphrase: ‘It is necessary that you do not go to the supermarket on your own.’

Consider also sentence (2), which can only express a lack of necessity meaning, given that negation scopes above deontic necessity (NOT > NECESSARY):

- (2) Nu e                            nevoie să            pictezi    mâine.  
       not be.IND.PRS.3SG need    SĂ.SBJV paint.2SG tomorrow  
       ‘You need not paint tomorrow.’  
       Paraphrase: ‘It is not necessary that you paint tomorrow.’

Interestingly, in English, negation can only occur after the modal (e.g., *You need not do this*, *You must not do this*), with *not* instantiating either sentence or complement negation. In contrast, in Romanian, negation can occur either in front of the modal or between the modal and the verbal complement selected by it. In the case of *trebuie să nu* and *nu e nevoie să*, thus, the position of negation with respect to the modal represents a cue for its interpretation: linear NECESSITY MODAL-NEGATION orders are interpreted as expressing interdiction and not lack of necessity, while linear NEGATION-NECESSITY MODAL orders are interpreted as expressing lack of necessity and not interdiction. Importantly, Romanian children may rely on such cues when acquiring modals and negation.

In contrast, in the case of *nu trebuie să*, the position of negation with respect to the modal is not indicative of its interpretation: *nu trebuie să* may have two interpretations (interdiction, lack of necessity) although the negation always precedes the modal. Consider (3), which is ambiguous between lack of necessity, when negation scopes above deontic necessity (NOT > NECESSARY), and interdiction, when deontic necessity scopes above negation (NECESSARY > NOT).

- (3) Nu trebuie            să            plângi.  
       not must.IND.PRS SĂ.SBJV cry.IND.PRS.2SG

‘You need not cry/You must not cry.’

Paraphrase 1: ‘It is not necessary that you cry.’

Paraphrase 2: ‘It is necessary that you do not cry.’

This kind of ambiguity in interpretation characterizes other Romance languages as well. In Italian, for instance, *non devi* (i.e., ‘not must.IND.PRS.2SG’) can express either interdiction or lack of necessity depending on context and intonation. In French, *il ne faut pas* (i.e., ‘it not must PAS’) primarily expresses interdiction; however, in certain contexts, when selecting a verb expressing a negative state such as *s’inquiéter* (worrying), *il ne faut pas (s’inquiéter)* can also express lack of necessity. A similar claim has been made about English, where even *must not*, which typically expresses interdiction, seems to convey lack of necessity when combined with negative states as in *You mustn’t worry* (see [Horn 2017](#); [Bleotu, Benz & Pătrunjel 2022b](#)). While adults disambiguate the meaning of such ambiguous negated deontic modals by relying on context and intonation, it is unclear whether children can do the same (to the same extent).

Additionally, it should be noted that there is cross-linguistic variation regarding what kind of meanings negated modals express. Verbs which express one meaning in one language may express a different one in another language. For instance, while English *must not* (typically) expresses interdiction, and Romanian *nu trebuie* may express both interdiction and lack of necessity, *must nicht* in German expresses only lack of necessity.

In the current paper, we set out to determine (i) how Romanian children initially understand negated deontic necessity modals, whether their default interpretation is that of interdiction, and (ii) whether and to what extent children rely on cues such as intonation and/or situational context when interpreting sentences containing negated deontic necessity modals. Our study is novel in several respects. First of all, we target the interaction between negation and deontic necessity modals in child language, rather than the interaction between epistemic modality and negation, which has been the focus of previous research ([Koring, Meroni & Moscati 2018](#); [Gualmini & Moscati 2009](#); [Moscati & Crain 2014](#); see [Cournane 2020](#) for an overview). In contrast to epistemic modals, deontic modals conventionally trigger directive speech acts ([Searle 1976](#)). The lack-of-necessity reading exemplifies a permissive speech act, and the interdiction reading a prohibitive speech act. Our study therefore sheds light on the acquisition of speech acts, in particular on the question of whether strong readings are acquired before weak ones. Children’s scopal preferences for root necessity and negation have received little attention in the literature (see however [Moscati & Gualmini 2008](#)). Furthermore, the role of prosody and that of situational context for disambiguating scopal readings of negated deontic necessity modals

have not been investigated. Secondly, while previous studies have looked at English, Italian and Dutch, we are targeting Romanian, a language in which modals have only been investigated in a few studies on child language (see Avram & Gaidargi 2021; Bleotu 2019; Bleotu, Benz & Gotzner 2021a, 2022a; Gaidargi 2010) or adult language (see Avram 1999; Bleotu, Benz & Gotzner 2021b). The interaction between deontic necessity modals and negation in particular has never been probed into from an acquisition perspective.

Previewing the results, we find that, in the absence of situational context, children initially understand all negated deontic necessity modals as expressing interdiction, regardless of prosody. However, in the presence of situational context, children distinguish between negated modals expressing lack of necessity and negated modals expressing interdiction. Furthermore, they seem to be sensitive to prosodic cues.

## 2 Theoretical problem and contribution

Our investigation of how Romanian children interpret negated deontic necessity modals can be subdivided into three main questions, which we will discuss sequentially, laying down our main expectations about children's behaviour. Our first question (Q1) is which reading comes first: the weak (lack of necessity) reading or the strong (interdiction) reading? Our second question (Q2) is whether children's interpretation is sensitive to prosody. Our third question (Q3) is whether children's interpretation becomes more adult-like with situational context.

### 2.1 Which reading comes first: lack of necessity or interdiction reading?

Regarding the question of how children start off interpreting negated deontic necessity modals, several proposals have been put forth. We here discuss a default interpretation in the absence of a well-developed situational context.

One possibility is that children start off with the weak (lack of necessity) interpretation, and then derive the strong (interdiction) reading from it via some pragmatic operation. This may involve negative strengthening in accounts which treat *must* as a Positive Polarity Item and *need* as a Negative Polarity Item, such as Israel 1996; Homer 2011; Homer 2015; Iatridou & Zeijlstra 2013, or generating an implicature from *It is not necessary that p* to *It is necessary that not p* in a scaleless implicature account (Jeretič 2021). If such accounts hold ground, we expect children to handle lack of necessity meanings with ease, since these are assumed to be primary. Moreover, since it is the interdiction meanings which are derived, we also expect children to experience more difficulty with interdiction meanings.

Another possibility is that children might simply assign an interpretation to negated deontic necessity modals on the basis of the *surface scope* of these items

in the language (Musolino 1998). If this is the case, then we expect children to interpret *nu e nevoie să* and *nu trebuie să* as lack of necessity, given that the negative marker *nu* precedes the necessity modal. While *nu e nevoie să* is interpreted as lack of necessity even by adults, *nu trebuie să* is ambiguous between lack of necessity and interdiction in adult Romanian. Importantly, *surface scope* would not predict the availability of the interdiction reading of *nu trebuie să* in Romanian child language but only that of the lack of necessity reading. As far as *trebuie să nu* is concerned, given that the deontic necessity modal precedes the negation marker in terms of linear order, we expect children to interpret it as interdiction, similarly to adults.

Another possibility is that children may start out with *strong scope* interpretive preferences. According to the Semantic Subset Principle (see Crain, Ni & Conway 1994), if a sentence is ambiguous between two interpretations in Universal Grammar, and one of the interpretations entails the other, learners will prefer the (strong) restrictive reading over the (weak) permissive reading. As argued by Crain et al. (1994), the postulation of the Semantic Subset Principle is motivated by learning considerations: if we do not assume it, then it is hard to see how a learner could unlearn the weak reading, given that it is also made true by situations that make the strong reading true. Additionally, negative evidence is very rare: parents rarely correct their children in the course of language acquisition. If children abide by the Semantic Subset Principle, and consequently prefer strong scope interpretations, then we expect them to interpret all negated deontic necessity modals as interdiction. This is because interdiction readings, where NECESSARY scopes above NEGATION ('It is necessary that not p'), logically entail lack of necessity readings, where NEGATION scopes above NECESSARY ('It is not necessary that p').

Interestingly, a similar tendency may also manifest itself lexically in adults: as argued by Horn (2017), there appears to be a strong general cross-linguistic preference for the expression and lexicalization of contrary over contradictory readings (MaxContrary). Contradiction and contrariety represent the two central species of opposition in the traditional (neo-)Aristotelian square of opposition: contradictories split the true and false between them, while contraries can be simultaneously false but not simultaneously true. In our particular case (negated deontic necessity modals), this manifests itself through the expression and lexicalization of interdiction over lack of necessity (e.g., *il ne faut pas* typically expressing interdiction). It is unclear whether this explanation carries over to Romanian adults, given that *nu trebuie* is ambiguous between interdiction and lack of necessity in adult Romanian, and no study so far has evaluated which reading is more frequent. However, it may be that Romanian children evince a MaxContrary tendency in their interpretation of negated deontic necessity modals.

Under another approach, children may show premature closure (Acredolo & Horobin 1987; Ozturk & Papafragou 2015; Leahy & Carey 2020; a.o.), i.e., a

cognitive tendency to commit to only one alternative out of several. Given a difficulty to keep multiple alternatives in their mind, children prefer to opt for only one. Since lack of necessity modals involve multiple alternatives (*You need not p* means that you could do p or you could not do p) but interdiction modals do not (*You must not p* clearly expresses that you have the obligation not to do p), we predict that, if children make use of premature closure, they should find lack of necessity more challenging than interdiction, sometimes taking interdiction as the meaning, and sometimes lack of necessity.

In order to get an idea of what we should expect, and which of these predictions is more likely, we take a look at previous research on negated modality in child language. Gualmini & Moscati (2009) have argued that the interaction with negation is a fundamental cue for the acquisition of the meaning of modal verbs. In English, for instance, while *must* and *need* are almost synonymous in the affirmative, their meanings are quite different in Downward entailing (DE) contexts where *mustn't* expresses interdiction (NECESSARY > NOT) and *needn't* lack of necessity (NOT > NECESSARY).

However, given that negation occurs after the modal for both *mustn't* and *needn't*, and the position of negation is not a reliable clue, it is hard for children to figure out the scope of negation with respect to deontic necessity in the absence of a clear situational context. Furthermore, since all the DE contexts satisfied by *mustn't* are also satisfied by *needn't*, distinguishing between interdiction and lack of necessity meanings may be a challenging undertaking, as learners would have to infer that certain actions are not forbidden but allowed.

In production, children seem to prefer using strong negated modals, i.e., modals which, when negated, give rise to strong semantic readings (as opposed to weak ones: *must not* instead of *do not have to*.) Support in favour of this comes from child corpora such as a corpus study on the spontaneous speech of French and Spanish children conducted by Jeretič (2018), and a corpus study on UK children conducted by Doreen et al. (2022). Interestingly, children use weak negated modals to a lesser extent than predicted by the input, i.e., although parents also make use of weak negated modals, not just strong negated modals, children produce such forms only very rarely.

Regarding comprehension, a variety of studies seem to support the idea that children prefer strong readings over weak ones, in line with the Semantic Subset Principle. For instance, Moscati & Gualmini (2008) investigated English children's understanding of negated deontic necessity modals by means of a story-based task, and found that children tend to interpret deontic *need not* as interdiction (see 4), while adults tend to interpret it as lack of necessity.

- (4) To be a good farmer, you need not feed the zebra.



- a. ADULTS: 'To be a good farmer, it is not necessary to feed the zebra.'  
(NOT > NECESSARY)
- b. CHILDREN: 'To be a good farmer, it is necessary not to feed the zebra.'  
(NECESSARY > NOT)

Gualmini & Moscati (2009) extended the investigation to epistemic possibility in Italian 4-year-olds (see 5).

- (5) Il contadino può non dare le carote all'elefante  
the farmer can not give the carrots to.the.elephant
  - a. ADULTS: 'It is possible that the farmer doesn't give carrots to the elephant.'  
(POSSIBILE > NOT)
  - b. CHILDREN: 'It is not possible that the farmer gives carrots to the elephant.'  
(NOT > POSSIBILE)

Moscati & Crain (2014) further showed a strong preference in 5-year-old Italian children's interpretation of epistemic modality and negation in a Hidden Box Paradigm (Noveck 2001). Participants were introduced to three boxes, they were presented the contents of Box 1 and Box 2, and they were then told that Box 3 has either the contents of Box 1 or Box 2. They then had to judge sentences such as (6).

- (6) Ci può non essere una mucca nella scatola.  
there might not be a cow in.the box.
  - a. ADULTS: 'There might not be a cow in the box.' (POSSIBLE > NOT)
  - b. CHILDREN: 'There cannot be a cow in the box.' (NOT > POSSIBLE)

Additionally, Koring et al. (2018) obtained similar results from Dutch. Based on such findings suggesting that children first assume the strongest interpretation possible, we expect similar results for negated deontic necessity modals in child Romanian.

## 2.2 What is the role of prosody?

As far as the role of prosody in the interpretation of negated deontic modals is concerned, it is unclear whether children will show sensitivity to it or not. It has been argued that prosody plays a role in the interpretation of negative sentences in adult Romanian. In particular, building on Giannakidou (1998), Ionescu (2022) argues that emphatic stress carried by negative quantifiers (such as *nimic* 'nothing') tends to express a negative concord meaning. It is unclear how children behave in this respect. Nevertheless, prosody has been shown to modulate the interpretation of

modals in both adults and children, in particular, in identifying epistemic stances such as disbelief (Armstrong 2014, 2020, a.o.). For instance, when hearing two twins react to a statement in two different ways (with a neutral echo or a disbelief echo), children were able to accurately identify the twin who distrusted the speaker to a great extent, though not fully adult-like.

Based on such findings, we might expect Romanian children to show sensitivity to the different intonations of *nu trebuie*.

### 2.3 What is the role of context?

Context has been shown to play a very important part in language acquisition. Overall, children tend to perform more adult-like in tasks that are story-based (e.g., Guasti et al. 2005; Bleotu & Roeper 2021a,b; Foucault et al. 2021). Moreover, Crain & Thornton (1998) recommend that, when designing Truth Value Judgment tasks, researchers should create plausible contexts for the sentences children have to evaluate.

Previous studies by Musolino & Lidz (2006) and Viau, Lidz & Musolino (2006) have shown that, in the absence of context, children tend to interpret a sentence containing the quantifier *every* and negation such as (7) as (7b), while adults interpret it as (7a). However, in the presence of context (Viau et al. 2006; Gualmini et al. 2008), creating expectations for successful jumps, children are able to interpret (7) in an adult-like manner.

- (7) Every horse didn't jump over the fence.  
 a. ADULTS: 'Not every horse jumped over the fence.' (NOT > EVERY)  
 b. CHILDREN: 'No horse jumped over the fence.' (EVERY > NOT)

The role of context has also recently been investigated in relation to the interpretation of modals and negated modals. For instance, Bleotu et al. (2022b) have shown that there is a sub-group of American English speakers who interpret *mustn't* as lack of necessity in contexts that favour this reading (8b), and in other contexts as indicating interdiction (8a), the semantic standard in English.

- (8) a. You mustn't worry. The woman will give you money.  
 (NOT > NECESSARY)  
 b. You mustn't worry. You will get sick otherwise. (NECESSARY > NOT)

Moreover, Dieuleveut, van Dooren, Cournane & Hacquard (2022) have found that context plays an important part in producing modal verbs. Based on these findings, we expect that Romanian children will also show sensitivity to situational



context, becoming more adult-like in their handling of negated deontic necessity modals.

However, caution is needed given that, unlike in the case of quantifiers and negation, children have been shown to assign a strong NOT > POSSIBLE interpretation to sentences with negated possibility modals such as (9b), even when these sentences represent answers to questions which have been carefully introduced in the context, as in (9a) (see Moscati et al. 2016). Nevertheless, the examples tested involve possibility modals, not necessity modals, children may behave differently with the latter in the presence of context.

- (9) a. QUD: Fred *può non guidare la moto*?

QUD: Can Fred not drive the motorcycle?

- b. Answer: Fred *può non guidare la moto*.

Answer: Fred can not ride the motorcycle

### 3 Experiments

We conducted two experiments (an Intonation Task and an Intonation and Context task) through which we investigated how Romanian children interpret negated deontic necessity modals. More specifically, in the Intonation Task, we looked at children's default interpretation in the absence of (a well-developed) situational context, while in the Intonation and Context Task, we looked at children's interpretation in the presence of a well-developed situational context. In both tasks, children could rely on the intonational patterns associated with the negated deontic modals they were exposed to, and make inferences related to their meaning (interdiction/lack of necessity).

#### 3.1 Research questions

The Intonation Task aims to investigate whether, in the absence of situational context, Romanian children default to interdiction in their interpretation of all negated deontic necessity modals or whether they are adult-like. Furthermore, it probes into children's sensitivity to prosodic cues: when exposed to an ambiguous form *nu trebuie să*, are they able to disambiguate it by relying on prosody? The Intonation and Context Task aims to investigate whether situational context makes children more adult-like in their interpretation of negated deontic necessity modals, i.e., whether children can pragmatically bootstrap meaning from context.

### 3.2 General expectations (arising from previous experiments)

Based on previous findings in the literature on negated modals (see Gualmini & Moscati 2009; Moscati & Gualmini 2008; Moscati & Crain 2014; a.o.), we expect that, in the Intonation Task, children should interpret the ambiguous form *nu trebuie să* and the lack of necessity form as interdiction. However, the ambiguous form is presented with two different prosodic contours- if children show sensitivity to prosody, their interpretations may be more adult-like. Based on previous studies investigating the role of context in acquisition (Viau et al. 2006; Gualmini et al. 2008; a.o.), we expect that, in the Intonation and Context Task, children will perform more adult-like if supported by the contextual relevance of readings.

### 3.3 Participants

The Intonation Task was administered to 25 native Romanian-speaking typically developed (TD) monolingual children (Mean age: 5;27, Age range: 5-5;11, 12 Male, 13 Female) and to 37 native Romanian-speaking adult controls. The Intonation and Context Task was administered to 23 native Romanian-speaking TD monolingual children (Mean age: 5;29, Age range: 5-6, 8 Male, 15 Female) and to 38 native Romanian-speaking adult controls.

### 3.4 Materials

In both tasks, we employed 32 sentences addressed by a (grand)parent to the child character of the type *You must not/need not X* (see Figure 1). There were (a) 16 sentences with the ambiguous negated deontic modal *nu trebuie să*, allowing two readings (lack of necessity and interdiction), and (b) 16 sentences with unambiguous negated deontic modals (*trebuie să nu*, which can only express interdiction, and *nu e nevoie să*, which can only express lack of necessity). In half of the sentences, the child performed the forbidden/unnecessary action X, while, in the other half, he/she performed the alternative action Y not mentioned under the modal.

Importantly, the ambiguous form *nu trebuie să* was presented in two prosodic variants: for one variant (henceforth *interdiction intonation*), F0 goes from 230 Hz to 370 Hz (*nu*) and then to 230 Hz (*trebuie*), and for the other variant (henceforth *Not-necessary intonation*), F0 stays around 400 Hz for *nu* and the first syllable of *trebuie* and then drops to 250 Hz (see [https://osf.io/tas6k/?view\\_only=941c5bc7ec664e159434fbe9ce0dcb5b](https://osf.io/tas6k/?view_only=941c5bc7ec664e159434fbe9ce0dcb5b)). The negation *nu* has a contrastive L+>H\* accent in the interdiction variant of *nu trebuie să*, and an L accent in the lack of necessity variant of the negated modal (Estebas & Prieto 2010). Both intonation contours are marked but distinct from each other. The association of the two contours

with interdiction and lack of necessity was based on the authors' own (introspective) judgement.<sup>1</sup> The materials were recorded and analyzed beforehand in Praat (Boersma & Weenink 2021) to control for intonational contours.

### 3.5 Procedure




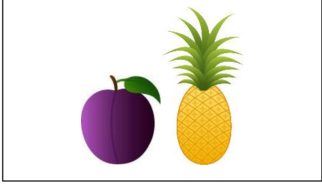
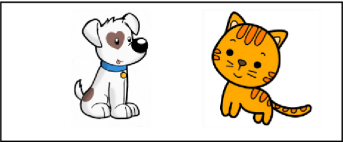
Both experiments use a ternary reward task, taking inspiration from Katsos & Bishop (2011). Participants are familiarized with contexts where a (grand)parent and their child are looking at two different fruits/drinks/toys/pieces of clothing together. In both tasks, the (grand)parent tells the child that he/she must not/need not do a certain action X (e.g., *Nu trebuie să mănânci pruna* 'not must-you eat the plum' (Not-Necessary Intonation)', meaning "You need not eat the plum"). However, while in the Intonation Task, the modal statement occurs on its own, with very little story context, in the Intonation and Context Task, the modal statement is preceded by another sentence, which makes the context clear, e.g., it lets the child know that the rule until yesterday was not to do X, but now the rule has changed, and the child can do X or Y. The child then performs action X or Y (e.g., the child eats the plum). Participants have to reward the child with a sad face if he/she did something forbidden by the (grand)parent, a blue star if what he/she did was so-so but it was allowed by the (grand)parent, and two blue stars if what he/she did was the best thing, exactly what the (grand)parent said (see Figure 1). Importantly, to support the idea that both the intermediate and maximum rewards could be given for actions allowed by authority figures, we represented both the intermediate and maximum rewards using blue stars. In this representation, the intermediate reward was symbolized by one blue star, while the maximum reward was symbolized by two blue stars.

### 3.6 Expectations

#### 3.6.1 Expectations for adults

First, we discuss situations where the character performs action X. In such situations, in the Intonation Task, we expect adults to give more one blue star rewards for *nu e nevoie să* and for *nu trebuie să* with a Not-Necessary intonation than for *trebuie să nu* and for *nu trebuie să* with a Necessary-Not intonation, where the expected reward is clearly a sad face. In the Intonation and Context Task, we expect to see an overall increase in the accuracy (of expected rewards), given that participants can now rely on situational context as well. In particular, this effect should be fairly noticeable for ambiguous forms such as *nu trebuie să*, whose meaning even adults may struggle with when relying exclusively on intonation. Secondly, if the character performs

<sup>1</sup> The experimental results for adults confirm this judgement.

Instructions for the Ternary Reward Tasks	
Give the child a sad face if he/she does something forbidden, a blue star if what he/she does is so-so, but it is allowed by the (grand)parents, and two blue stars if what he/she does is the best thing, that is, exactly what the (grand)parents asked him/her to do.	
  	
Example of an experimental item employing <i>nu trebuie să X</i> 'not must X' with a <i>Not-Necessary</i> Intonation	
Intonation Task	Intonation & Context Task
Mama și fata se uită la două fructe: o prună și un ananas. Mother and daughter are looking at two fruits: a plum and a pineapple.	
	
No Context	<b>Context:</b> Fata merge la masa de dimineață unde regula până ieri era să nu mănânce prune. Dar azi regula s-a schimbat. De azi poate să mănânce orice fruct. <b>Context:</b> The daughter is getting ready for breakfast, where the rule until yesterday was not to eat plums. But today the rule has changed. Starting with today she can eat any fruit.
Mama îi spune fetei: Mother tells the daughter:  "Nu trebuie să mănânci pruna." ( <i>Not-Necessary</i> Intonation). not must.IND.PRS SĂ.SBJV eat. IND.PRS.2SG plum-the 'You need not eat the plum.'  Fata mănâncă pruna. The girl eats the plum.	
Example of an experimental item employing <i>trebuie să nu X</i> 'must not X'	
Intonation Task	Intonation & Context Task
Băiatul și tatăl se uită la două jucării: un câțel și o pisică. The boy and the dad are looking at two toys: a dog and a cat.	
	
No Context	<b>Context:</b> Băiatul se pregătește să meargă la locul de joacă, unde regula este să nu se joace cu câinele. <b>Context:</b> The boy is ready to go to the playground, where the rule is not to play with the dog.
Tatăl îi spune băiatului: Dad tells the boy:  "Trebuie să nu te joci cu câțelul." must.IND.PRS SĂ.SBJV not CL.2SG play. IND.PRS.2SG with dog-the 'You must not play with the dog.'  Băiatul se joacă cu pisica. The boy plays with the cat.	

**Figure 1** Examples of instructions and experimental items for the Intonation Task and the Intonation and Context Task

action Y, we expect one blue star rewards for lack of necessity modals and two blue stars rewards for interdiction modals in both the Intonation Task and the Intonation and Context Task. Additionally, participants may be more accurate in the Intonation and Context Task, given that they can rely on both intonation and context.

### 3.6.2 Expectations for children

We again start by discussing situations where the character performs action X. If this is the case, then, if, in the Intonation Task, children interpret lack of necessity as interdiction, as previous research seems to suggest (see Gualmini & Moscati 2009), we generally expect them to give fewer one blue star rewards than adults in the same contexts, for all negated modals.

If, on the other hand, the character performs action Y, in the Intonation Task, we expect children to give fewer one blue star rewards than adults. Instead, they should give two blue star rewards.

In the Intonation and Context Task, regardless of whether the character performs action X/Y, children's performance should be more adult-like given that they can rely on contextual cues to determine the semantics of negated deontic necessity, and situational context has been shown to help acquisition.

## 3.7 Results

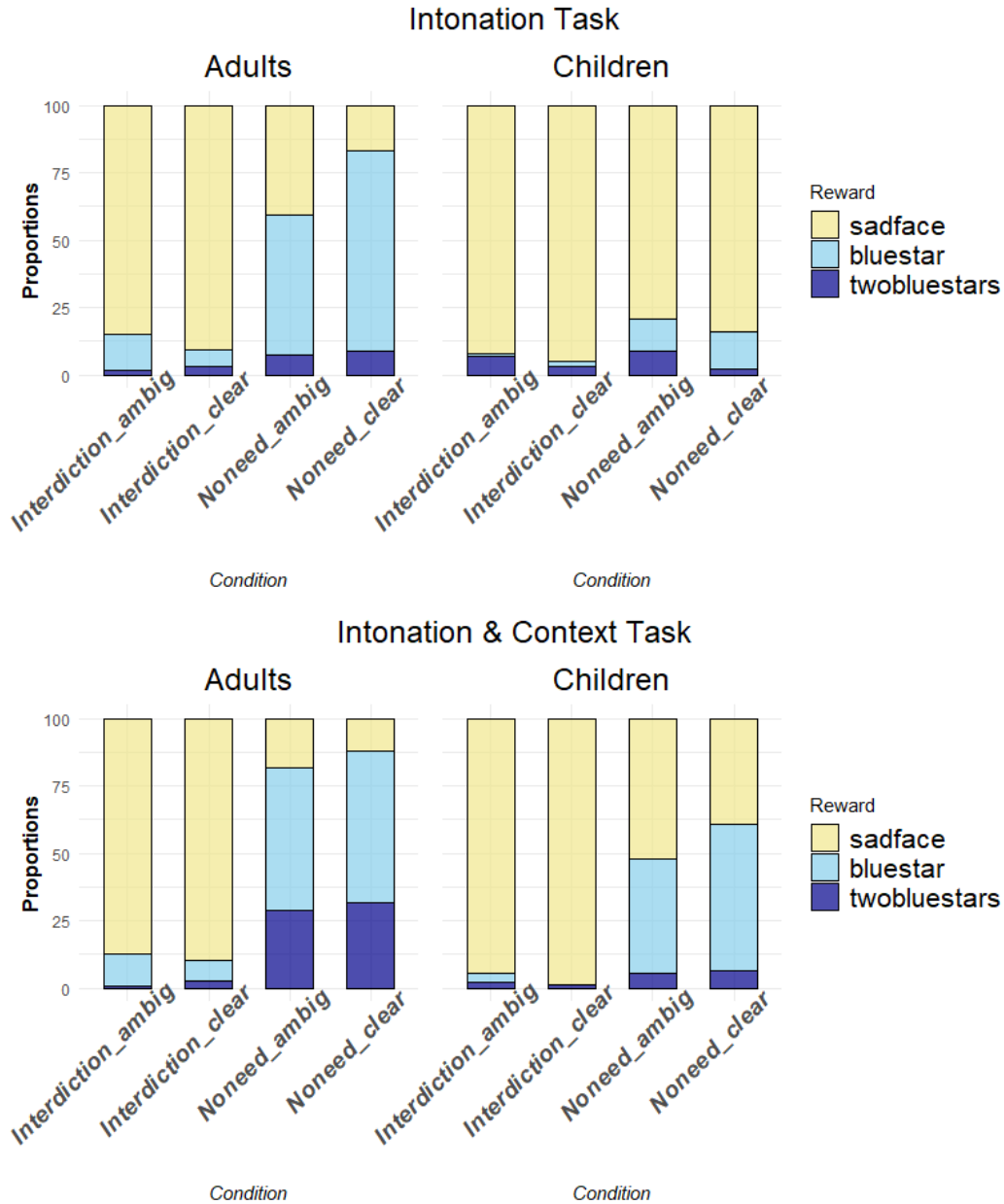
We performed analyses both at the group and individual level.

### 3.7.1 Group analysis

We looked at the child and adult data in each of the two tasks. Children and adults mostly differ when an authority figure tells the character *You must not/need not do X*, and the character performs action X (see Figure 2).

Adults reward the character with more one blue star rewards (63.15%) and fewer sad face rewards (28.75%) after lack of necessity statements (with *nu e nevoie să* or *nu trebuie să* with a Not-Necessary intonation) than after interdiction statements with *trebuie să nu* and *nu trebuie să* with a Necessary-Not intonation (9.675% blue star rewards, 87.8% sad face rewards). For lack of necessity, children give fewer one blue star rewards (13%) and more sad face rewards (87.8%) than adults. In the Intonation and Context Task, children perform in a more adult-like manner: they give more one blue star rewards for lack of necessity than in the Intonation Task if the character performs action X. We conducted a mixed effects logistic regression with the one blue star reward as the Dependent Variable (DV), Modal type (interdiction/lack of necessity), Group (Adults/Children), and Task (Intonation Task/ Intonation and

**Legend:** Interdiction\_ambig = *nu trebuie să* ‘not must SĂ’ with an interdiction intonation  
 Interdiction\_clear = *trebuie să nu* ‘must SĂ not’ with an interdiction intonation  
 Noneed\_ambig = *nu trebuie să* ‘not must SĂ’ with a lack of necessity intonation  
 Noneed\_clear = *nu e nevoie să* ‘not is need SĂ’ with a lack of necessity intonation



**Figure 2** Rewards given by children and adults in the Intonation Task and Intonation & Context Task when the character performs action X



Context Task) as fixed effects, and random slopes per Item and Participant. We found a significant three-way-interaction between Group, Modal type and Task ( $p < .05$ ). We then looked at each negated modal separately, running multiple mixed effects logistic regressions with different rewards as the DV (either sad face/ one blue stars / two blue stars), Group (Adults/Children) and Task (Intonation Task/ Intonation and Context Task) as fixed effects, and random slopes per Item and Participant. For *trebuie să nu*, no significant differences can be found between children and adults or between tasks. For *nu trebuie să* with a Necessary-Not intonation, children give fewer one blue star rewards than adults in both tasks ( $\beta = -1.309$ ,  $SE = 0.542$ ,  $Z = -2.415$ ,  $p < .05$ ). For *nu e nevoie să*, adults give more one blue star rewards than children in both tasks ( $\beta = -2.225$ ,  $SE = 0.449$ ,  $Z = -4.951$ ,  $p < .01$ ). Moreover, children give more one blue star rewards in the Intonation and Context Task than in the Intonation Task ( $\beta = 1.398$ ,  $SE = 0.581$ ,  $Z = 2.406$ ,  $p < .01$ ). Children give more sad face rewards than adults in both tasks ( $\beta = 4.630$ ,  $SE = 0.721$ ,  $Z = 6.421$ ,  $p < .01$ ), and they give a similar number of two blue stars, while adults give more in the Intonation and Context Task ( $\beta = -1.349$ ,  $SE = 0.656$ ,  $Z = -2.056$ ,  $p < .05$ ). For *nu trebuie să* with a Not-Necessary intonation, we notice that adults tend to give more one blue star rewards than children in both tasks ( $\beta = -2.1601$ ,  $SE = 0.494$ ,  $Z = -4.352$ ,  $p < .01$ ). However, while adults give a similar proportion of one blue star rewards in both tasks, children give significantly more one blue star rewards in the Intonation and Context Task than in the Intonation Task ( $\beta = 1.569$ ,  $SE = 0.6215$ ,  $Z = 2.525$ ,  $p < .01$ ). Children tend to give more sad face rewards than adults in both experiments ( $\beta = 2.112$ ,  $SE = 0.47$ ,  $Z = 4.48$ ,  $p < .01$ ). However, they give a similar proportion of two blue stars, while adults tend to give more two blue star rewards ( $\beta = -1.349$ ,  $SE = 0.656$ ,  $Z = -2.056$ ,  $p < .01$ ) in the Intonation and Context Task.

We also conducted parallel analyses for cases where an authority figure says the character must/need not do X, and the child performs action Y. In the overall regression, we also found a three-way-interaction between Group, Modal type and Task ( $p < .05$ ). In the regressions we performed separately for each negated modal, we saw no differences for *trebuie să nu*, *nu trebuie să* with a Necessary Not intonation or *nu e nevoie să* in terms of two blue stars but we saw a significant Task effect for *nu trebuie să* with a Not Necessary intonation ( $\beta = 0.842$ ,  $SE = 0.4217$ ,  $Z = 1.999$ ,  $p < .05$ ). In terms of one blue stars, we find that, overall, children give fewer one blue star rewards than adults in both tasks (for *nu trebuie să* with a Not Necessary intonation:  $\beta = -2.16$ ,  $SE = 0.496$ ,  $Z = -4.352$ ,  $p < .01$ ; for *nu e nevoie să*:  $\beta = -2.225$ ,  $SE = 0.449$ ,  $Z = -4.951$ ,  $p < .01$ ; for *nu trebuie să* with a Necessary Not intonation:  $\beta = -1.3098$ ,  $SE = 0.5423$ ,  $Z = -2.415$ ,  $p < .01$ ) but more one blue star rewards in the Intonation and Context Task than in the Intonation Task (for *nu trebuie să* with a Not Necessary intonation:  $\beta = 1.569$ ,  $SE = 0.621$ ,  $Z = 2.525$ ,  $p < .05$ ; for *nu e nevoie să*:  $\beta = 1.398$ ,  $SE = 0.581$ ,  $Z = 2.406$ ,  $p < .05$ ).

### 3.7.2 Individual analysis

Additionally, we conducted an individual analysis of children's interpretation of negated deontic necessity modals in situations where the character performs action X. We consider a child's response *adult-like* when more than half of the given answers correspond to the expected adult-like answer. In the Intonation Task, only 2 children interpreted ambiguous lack of necessity in an adult-like manner, and 5 children were adult-like half of the time. The rest of the children had an interdiction interpretive preference. In the Intonation and Context Task, 12 children interpreted both unambiguous lack of necessity and ambiguous lack of necessity modals in an adult-like manner. 10 children interpreted lack of necessity as interdiction (5 children interpreted both unambiguous and ambiguous lack of necessity modals as interdiction, 4 children interpreted only ambiguous lack of necessity as interdiction, 1 child interpreted only unambiguous lack of necessity as interdiction). 1 child interpreted unambiguous lack of necessity and ambiguous lack of necessity modals as interdiction half of the time. Overall, we see that, while there is a considerable number of children who interpret lack of necessity modals as interdiction in both tasks (18 in the Intonation Task, 10 in the Intonation and Context Task), there is an increase in the number of children who are able to interpret lack of necessity modals in an adult-like manner, as lack of necessity in the Intonation and Context Task. Our individual analysis findings thus support our group analysis findings. Importantly, the individual data shed light on the fact that the variation noticed in our group analysis is not due to each participant varying between two readings but due to the existence of two main groups of responders: interdiction responders (defaulting to interpreting lack of necessity modals as interdiction) and adult-like responders (interpreting lack of necessity modals as lack of necessity).

## 4 Discussion

We discuss our findings in light of our main theoretical questions: (i) Which reading comes first in the acquisition of negated deontic modals in child Romanian (interdiction/lack of necessity)? (Q1) (ii) What is the role of prosody? (Q2) and (iii) What is the role of situational context in how children handle negated deontic necessity modals in Romanian? (Q3).

With regard to Q1, the Intonation Task shows that children interpret all negated deontic necessity modals as expressing interdiction by default. Additionally, we see that, unlike adults, children cannot distinguish between the two meanings of *nu trebuie* by relying purely on intonation. Instead, they simply default to interdiction for both *nu trebuie* with an interdiction intonation and *nu trebuie* with a lack of necessity intonation. An important observation regarding children's behaviour is that,

while they interpret weak lack of necessity modals as expressing interdiction, they never interpret interdiction modals as lack of necessity. This asymmetry suggests that children start off with a strong bias towards the interdiction reading. Interestingly, this bias is so strong that it even overrides situational context for some children: when exposed to utterances containing negated deontic necessity modals in context, a number of 10 out of 23 children in the Intonation and Context Task interpret (un)ambiguous lack of necessity modals as interdiction.

In what follows, we try to provide an account for children's initial preference to interpret lack of necessity modals as interdiction. We evaluate the compatibility between our data and each of the possible accounts we discussed in Section 2, where we laid our theoretical problem and contribution, in particular, in Subsection 2.1.

Our results are not compatible with accounts which assume that the lack of necessity meaning is primary, and the interdiction reading is derived from it. Given that children's initial preference seems to be interdiction, it remains unexplained under such accounts why children would default to the derived reading rather than to the primary one. Consequently, negative strengthening is not a good match for our findings. On the contrary, negative strengthening would predict that, if lack of necessity is primary, and interdiction is derived, then children should have more ease with lack of necessity. A scaleless implicature account would also not fare well with our findings. To explain how children come to interpret lack of necessity as interdiction, we would have to assume that, unlike adults, children obligatorily strengthen lack of necessity modals to interdiction, i.e., they derive scaleless implicatures from NOT NECESSARY to NECESSARY NOT at a very early age. However, such an assumption would go contrary to the generalization that children do not automatically derive implicatures, in fact, they derive implicatures to a lower extent than adults (starting with the seminal work of [Noveck 2001](#)). To save the account, one would have to assume that children compute certain implicatures (scaleless implicatures) obligatorily and rather early but they compute others optionally and later. Since it is unclear on what grounds one could embrace this assumption, a scaleless implicature account proves challenging.

Our results are also not fully captured by a surface scope account ([Lidz & Musolino 2002](#)). As already mentioned, if children interpret negated deontic modals based on the linear position of negation with respect to the modal, then surface scope would predict lack of necessity readings for negated necessity modals where negation precedes the modal (such as *nu e nevoie să, nu trebuie să*), and interdiction readings for negated necessity modals where the modal precedes negation (*trebuie să nu*). However, instead, we find that children interpret all negated necessity modals as interdiction regardless of the position of the modal with respect to negation.

Regarding premature closure, the cognitive tendency to reduce multiple alternatives to a single alternative ([Acredolo & Horobin 1987](#); [Ozturk & Papafragou](#)

2015; Leahy & Carey 2020), it can only partly account for our findings. Utterances employing lack of necessity modals involve multiple alternatives. When exposed to an utterance containing a lack of necessity modal (*You need not do X*), the hearer could choose either to do X or not to do X (and do Y instead). Interestingly, children seem to consider that the best course of action in this case would be not to do X. Children's choices are consistent with premature closure. However, it remains a mystery why they always choose the alternative in line with the interdiction interpretation. To explain this preference, one would need to make additional assumptions, for instance, that interdiction targets the mentioned object, which is more salient than the unmentioned object. A premature closure account on its own would not be enough to explain children's interdiction bias.

Instead, children's default interdiction bias can best be captured by a strong scope account, according to which children initially prefer to assign unique strong scope, as dictated by the Semantic Subset Principle. This would be in line with similar findings for ambiguous sentences with negation and modality/quantifiers for other languages (Moscati & Gualmini 2008; Musolino & Lidz 2006).

Regarding the role of prosody (Q2), the Intonation Task seems to show that children are not sensitive to prosodic cues when interpreting negated deontic necessity modals. Interestingly, prosodic sensitivity seems to show up, however, in the presence of situational context. Whether children are more adult-like due to situational context exclusively or due to the interaction between intonation and situational context remains to be further explored.

Regarding the role of situational context (Q3), children's adult-like performance in the Intonation and Context Task shows that situational context is an essential cue in acquisition. Children pragmatically bootstrap meaning from context. In contrast, adults mostly interpret lack of necessity modals as lack of necessity regardless of context. Situational context also boosts children's sensitivity to the different intonations of the ambiguous *nu trebuie*, which did not show up in the absence of context. Children's acquisition of negated deontic modal meanings is thus primarily helped by context. This finding aligns with previous research showing that situational context plays a fundamental role in acquisition (Musolino & Lidz 2006).

## 5 Conclusion

To conclude, in the current paper, we have brought experimental evidence in favour of the hypothesis that children start off with interpreting lack of necessity modals as expressing interdiction, in virtue of a strong scope preference. Moreover, we have shown that the acquisition of lack of necessity meanings is largely determined by situational context through pragmatic bootstrapping. Interestingly, in the presence of situational context, children also seem able to prosodically disambiguate negated

deontic necessity modals. Importantly, our findings are based on Romanian, a language where the interaction between negation and deontic necessity modals had never been investigated experimentally in child language.

### **Ethics and consent**

Data collection received approval from the Research Ethics Committee in Bucharest (20/17.02.2022).

### **References**

- Acredolo, Curt & Karen Horobin. 1987. Development of relational reasoning and avoidance of premature closure. *Developmental Psychology* 1(23). 13–21. doi:[10.1037/0012-1649.23.1.13](https://doi.org/10.1037/0012-1649.23.1.13).
- Armstrong, Meghan. 2014. Child comprehension of intonationally-encoded disbelief. In *The 38th Annual Boston University Conference on Language Development (BUCLD38)*, 25–38. Somerville, MA.
- Armstrong, Meghan E. 2020. Children’s epistemic inferences through modal verbs and prosody. *Journal of Child Language* 6(47). 1132–1169. doi:[10.1017/S0305000919000916](https://doi.org/10.1017/S0305000919000916).
- Avram, Larisa. 1999. *Auxiliaries and the Structure of Language*. Bucharest: University of Bucharest.
- Avram, Larisa & Andreea Gaidargi. 2021. On the acquisition of dynamic, deontic and epistemic uses of modal verbs in Romanian. In Ursula Stephany & Ayhan Aksu-Koç (eds.), *Development of Modality in First Language Acquisition. A Cross-Linguistic Perspectives. Studies on Language Acquisition [SOLA 54]*, 235–254. Berlin, Boston: Mouton de Gruyter.
- Bleotu, Adina Camelia. 2019. On the acquisition of scalar epistemic adverbs in child Romanian from a colouring perspective (poster). *Experimental Pragmatics Conference 2019 (XPrag 2019)*.
- Bleotu, Adina Camelia, Anton Benz & Nicole Gotzner. 2021a. Shadow-playing with Romanian 5-year-olds. epistemic adverbs are a kind of magic! *Experiments in Linguistic Meaning 1 (ELM1)* 59–70.
- Bleotu, Adina Camelia, Anton Benz & Nicole Gotzner. 2021b. Where truth and optimality part. experiments on implicatures with epistemic adverbs. *Experiments in Linguistic Meaning 1 (ELM1)* 47–58.
- Bleotu, Adina Camelia, Anton Benz & Nicole Gotzner. 2022a. Romanian 5-year-olds derive global but not local implicatures with quantifiers embedded under

- epistemic adverbs: Evidence from a shadow play paradigm. *Sinn und Bedeutung* 26 (*SuB26*) 149–164. doi:[10.18148/sub/2022.v26i0.993](https://doi.org/10.18148/sub/2022.v26i0.993).
- Bleotu, Adina Camelia, Anton Benz & Roxana Pătrunjel. 2022b. *You must worry!* the interpretation of *mustn't* varies with context and verb complement. *Experiments in Linguistic Meaning 2 (ELM2)* 24–35.
- Bleotu, Adina Camelia & Tom Roeper. 2021a. *Small big flowers or small and big flowers?* simple is better and roll-up is too complex for Romanian 5-year-olds. *The 45th Annual Boston University Conference on Language Development (BUCLD45)* 1. 66–79.
- Bleotu, Adina Camelia & Tom Roeper. 2021b. Roll-up is too complex for Romanian 5-year-olds. evidence from recursive adjectives. *The Linguistic Society of America (LSA)* 6(1). 133–143.
- Boersma, Paul & David Weenink. 2021. Praat: doing phonetics by computer [computer program]. version 6.1.45 <http://www.praat.org/>.
- Cournane, Ailís. 2020. Learning modals: A grammatical perspective. *Language and Linguistics Compass* 10(14). 1–22. doi:[10.1111/lnc3.12399](https://doi.org/10.1111/lnc3.12399).
- Crain, Stephen, Weijia Ni & Laura Conway. 1994. Learning, parsing and modularity. In Charles Jr. Clifton, Lyn Frazier & Keith Rayner (eds.), *Perspectives on sentence processing*, 443–467. Hillsdale, NJ: Lawrence Erlbaum.
- Crain, Stephen & Rosalind Thornton. 1998. *Investigations in Universal Grammar: A Guide to Experiments on Syntax and Semantics*. Cambridge, MA: MIT Press.
- Dieuleveut, Anouk, Annemarie van Dooren, Ailís Cournane & Valentine Hacquard. 2022. Finding the force: How children discern possibility and necessity modals. *Natural Language Semantics* 30(3). 269–310. doi:[10.1007/s11050-022-09196-4](https://doi.org/10.1007/s11050-022-09196-4).
- Doreen, Annemarie van, Anouk Dieuleveut, Ailís Cournane & Valentine Hacquard. 2022. Figuring out root and epistemic uses of modals: The role of the input. *Journal of Semantics* 4(39). 581–616. doi:[10.1093/jos/ffac010](https://doi.org/10.1093/jos/ffac010).
- Estebas, Eva & Pilar Prieto. 2010. Castilian Spanish intonation. In Pilar Prieto & Paolo Roseano (eds.), *Transcription of intonation*, 17–48. Munich: Lincom Europa.
- Foucault, Deborah, Adina Camelia Bleotu, Usha Lakshmanan, Emma Merritt & Tom Roeper. 2021. Relative gradable adjective recursion is more challenging for acquisition than possessive recursion. *The Linguistic Society of America (LSA)* 7(1). 5294.
- Gaidargi, Andreea. 2010. On the comprehension of modal flavours by Romanian monolinguals. In Larisa Avram, Anca Sevcenco & Veronica Tomescu (eds.), *New Insights into Old Issues in L1 Acquisition and L2 and L3 Learning*, 57–72. Newcastle upon Tyne, UK: Cambridge Scholars Publishing.
- Giannakidou, Anastasia. 1998. *Polarity Sensitivity as (Non)veridical Dependency*. Amsterdam and Philadelphia: John Benjamins.



- Gualmini, Andrea, Sarah Hulsey, Valentine Hacquard & Danny Fox. 2008. The question–answer requirement for scope assignment. *Natural Language Semantics* 16. 205–237. doi:[10.1007/s11050-008-9029-z](https://doi.org/10.1007/s11050-008-9029-z).
- Gualmini, Andrea & Vincenzo Moscati. 2009. The early steps of modal and negation interactions: Evidence from child Italian. In Enoch Aboch, Elisabeth van der Linden, Josep Quer & Petra Sleeman (eds.), *Romance Languages and Linguistic Theory 2007*, 131–144. Amsterdam: John Benjamins.
- Guasti, Maria Teresa, Gennaro Chierchia, Stephen Crain, Francesca Foppolo, Andrea Gualmini & Luisa Meroni. 2005. Why children and adults sometimes (but not always) compute implicatures. *Language and Cognitive Processes* 5(20). 667–696. doi:[10.1080/01690960444000250](https://doi.org/10.1080/01690960444000250).
- Homer, Vincent. 2011. *Polarity and Modality*. Los Angeles, CA: University of California dissertation PhD dissertation.
- Homer, Vincent. 2015. Neg-raising and positive polarity: The view from modals. *Semantics and Pragmatics* 8. doi:[10.3765/sp.8.4](https://doi.org/10.3765/sp.8.4).
- Horn, Laurence R. 2017. The singular square: Contrariety and double negation from Aristotle to Homer. In Joanna Blochowiak, Cristina Grisot, Stephanie Durrleman & Cristopher Laenzlinger (eds.), *Formal Models in the Study of Language*, 143–179. Cham: Springer. doi:[10.1007/978-3-319-48832-5\\_9](https://doi.org/10.1007/978-3-319-48832-5_9).
- Iatridou, Sabine & Hedde Zeijlstra. 2013. Negation, polarity, and deontic modals. *Linguistic Inquiry* 4(44). doi:[10.1162/LING\\_a\\_00138](https://doi.org/10.1162/LING_a_00138).
- Ionescu, Emil. 2022. N-words: In defense of the wide scope (talk). *Societas Linguistica Europae 2022 (SLE2022)*, Bucharest .
- Israel, Michael. 1996. Polarity sensitivity as lexical semantics. *Linguistics and Philosophy* 4(19). 619–666. doi:[10.1007/BF00632710](https://doi.org/10.1007/BF00632710).
- Jeretič, Paloma. 2018. Evidence for children’s dispreference for weakness: a corpus study. second qualifying paper. Available at: <https://s18798.pcdn.co/paloma/wp-content/uploads/sites/12430/2021/03/Final-draft.pdf> .
- Jeretič, Paloma. 2021. *Neg-raising modals and scaleless implicatures*. New York, New York State: New York University PhD dissertation.
- Katsos, Napoleon & Dorothy Bishop. 2011. Pragmatic tolerance: implications for the acquisition of informativeness and implicature. *Cognition* 1(120). 67–81. doi:[10.1016/j.cognition.2011.02.015](https://doi.org/10.1016/j.cognition.2011.02.015).
- Koring, Loes, Luisa Meroni & Vincenzo Moscati. 2018. Strong and weak readings in the domain of worlds: A negative polar modal and children’s scope assignment. *Journal of Psycholinguistic Research* 6(47). 1193–1217. doi:[10.1007/s10936-018-9573-8](https://doi.org/10.1007/s10936-018-9573-8).
- Leahy, Brian P. & Susan. E. Carey. 2020. The acquisition of modal concepts. *Trends in Cognitive Sciences* 1(24). 65–78. doi:[10.1016/j.tics.2019.11.004](https://doi.org/10.1016/j.tics.2019.11.004).
- Lidz, Jeffrey & Julien Musolino. 2002. Children’s command of quantification.

- Cognition* 2(84). 113–154. doi:[10.1016/S0010-0277\(02\)00013-6](https://doi.org/10.1016/S0010-0277(02)00013-6).
- Moscato, Vincenzo & Stephen Crain. 2014. When negation and epistemic modality combine: The role of information strength in child language. *Language Learning and Development* 4(10). 345–380. doi:[10.1080/15475441.2014.880640](https://doi.org/10.1080/15475441.2014.880640).
- Moscato, Vincenzo & Andrea Gualmini. 2008. Negation and modality in child language (talk). *Incontro di Grammatica Generativa, Padova*.
- Moscato, Vincenzo, Jacopo Romoli, Tomaso Federico Demarie & Stephen Crain. 2016. Born in the USA: A comparison of modals and nominal quantifiers in child language. *Natural Language Semantics* 24. 79–115. doi:[10.1007/s11050-015-9120-1](https://doi.org/10.1007/s11050-015-9120-1).
- Musolino, Julien. 1998. *Universal Grammar and the acquisition of semantic knowledge*. College Park, Maryland: University of Maryland PhD dissertation.
- Musolino, Julien & Jeffrey Lidz. 2006. Why children aren't universally successful with quantification. *Linguistics* 4(44). 817–852. doi:[10.1515/LING.2006.026](https://doi.org/10.1515/LING.2006.026).
- Noveck, Ira. 2001. When children are more logical than adults. *Cognition* 2(78). 165–188. doi:[10.1016/S0010-0277\(00\)00114-1](https://doi.org/10.1016/S0010-0277(00)00114-1).
- Ozturk, Ozge & Anna Papafragou. 2015. The acquisition of epistemic modality: From semantic meaning to pragmatic interpretation. *Language Learning and Development* 3(11). 191–214. doi:[10.1080/15475441.2014.905169](https://doi.org/10.1080/15475441.2014.905169).
- Searle, John R. 1976. The classification of illocutionary acts. *Language and Society* 5. 1–23.
- Viau, Joshua, Jeffrey Lidz & Julien Musolino. 2006. Priming of abstract logical representations in 4-year-olds. *Language Acquisition* 1-2(17). 26–50. doi:[10.1080/10489221003620946](https://doi.org/10.1080/10489221003620946).

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