Disjunction in negative contexts: a cross-linguistic experimental study

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This squib reports experimental findings from a study investigating the interpretation of simple disjunction in negative contexts in four languages: Italian, French, English, Romanian. We provide evidence that casts doubt on the robustness of the distinction between PPI disjunction languages and non-PPI disjunction languages. The difference turns out to be less clear-cut than assumed in the theoretical (e.g., Szabolcsi 2002, Spector 2014, Nicolae 2017) or experimental literature (e.g., Crain 2012, Guasti *et al* 2017). The results reported here inform current accounts of positive polarity and flesh out some methodological issues raised by the various tasks used in experimental investigations of the polarity sensitivity of disjunction.

1. Introduction

Sentences like (1), with the simple disjunction *or* in the immediate scope of negation, are typically ambiguous between a *narrow scope* interpretation of disjunction (1a), according to which none of the disjuncts[1] is true, and a *wide scope* interpretation (1b) compatible with the truth of one of the disjuncts.[2] The former reading corresponds to inverse scope of *or* with respect to negation, the latter corresponds to surface scope of *or* with respect to negation:

(1) Mary did**n't** invite John **or** Suzi to the party.
   a. It is not the case that Mary invited John and it is not the case that Mary invited Suzi to the party. NEG > OR
   b. It is either John or Suzi that Mary didn't invite to the party. OR > NEG

Languages have been claimed to differ with respect to the availability of these two readings (e.g., Szabolcsi 2002, 2004). According to this claim, certain languages, which we call Type A languages, allow both readings. These languages include English, Greek, Romanian, Korean. Other languages, which we call Type B languages, only allow the wide scope reading. These languages include Hungarian, Japanese, French, Italian, Russian. This has led to the characterization of simple disjunction in Type B languages as a Positive Polarity Item (PPI). PPIs do not form a uniform class cross-linguistically (see van der Wouden 1997, Israel 2011, a.o.), but an item is typically assumed to exhibit PPI-behavior if it cannot take immediate scope below—is "anti-licensed" by—a clausemate anti-additive (AA) operator (Szabolcsi 2002,

[1] By disjuncts in these examples we mean the affirmative propositions: *Mary invited John to the party* and *Mary invited Suzi to the party*.

[2] As standardly the case in the literature on Positive Polarity Items (PPIs), we assume that these are two distinct readings. However, strictly speaking, any proposition consistent with the truth of the narrow scope reading is also consistent with the truth of the wide scope reading. The reason for this is that the narrow scope reading ($\neg(p \vee q)$, i.e., $\neg p \wedge \neg q$) entails the wide scope one ($\neg p \vee \neg q$), i.e. the wide scope reading of (1) (i.e., either John or Suzi didn't get invited by Mary) is true in what we call below a "narrow scope scenario" (neither got invited). Incompatibility with a "narrow scope scenario" arises via an additional step, namely an implicature that the speaker does not believe both disjuncts to be true. I.e., an implicature that the speaker does not believe it to be true for both John and Suzi that Mary didn't invite them. In other words, the speaker believes that Mary invited one of them (for extensive discussion of implicatures, see e.g., Chierchia 2013, Sauerland and Nicolae *forthcoming* and references therein). We assume that this implicature is computed and the sentence has a genuine narrow scope reading.

2004), e.g., sentential negation, *without,* neg-words like *nobody*.[3] PPIs can, however, scope below extra-clausal negation or clausemate operators that are merely downward entailing (DE) and not AA, like *few NP, fewer than 3 NP, at most 4 NP*.[4]

Various language acquisition studies have provided experimental evidence that seems to substantiate the existence of a distinction between languages allowing both readings and languages allowing only the wide scope reading—a distinction often referred to as a PPI-disjunction parameter (e.g., Goro and Akiba 2004, Crain 2012, Guasti *et al* 2017). However, as far as adult language data is concerned, to date, the only experimental evidence for wide-scope-only behavior of simple disjunction comes from data from the adult control groups used in these acquisition studies. Not only is this kind of data insufficient, but it is also controversial, as there is evidence indicating the availability of narrow scope readings of disjunction in Type B languages, e.g., French (see the corpus example in (2a)) or Italian (see the Wikipedia example in (2b)):

(2) a. La crise de croissance de la science n'est **pas** une maladie **ou** une mort. (FRANTEXT)
the crisis of growth of the science is not an illness or a death
'The growing pains that science has do not constitute illness or death.'

b. Questa montagna non è molto frequentata dagli appassionati di trekking anche
this mountain not is much frequented from enthusiasts of trekking also
perché su di essa **non** ci sono rifugi **o** malghe.
because on of it not there are refuges or lodges
(source: https://it.wikipedia.org/wiki/Monte_Ozol)
'This mountain isn't much frequented by trekking enthusiasts because there are**n't** mountain refuges **or** lodges on it.'

This evidence suggests that a more thorough examination is needed of the behavior of disjunction in DE contexts across adult grammars. The goal of this squib is to substantiate and, if necessary, refine existing generalizations about the PPI-hood of disjunction across languages. This will inform current theoretical approaches to polarity sensitivity and flesh out some methodological issues raised by the experimental literature. It should however be made clear that at this stage of our investigation, we do not seek to account for the possible PPI-behavior of disjunction or to propose an explanation for cross-linguistic or speaker variation in this area.[5] Rather, we view our contribution as a basis for future theories of the polarity sensitivity of disjunction.

The remainder of the paper is organized as follows. Section 2 presents an experiment testing the interpretation of simple disjunction in DE contexts in four languages (French, Italian, English and Romanian). The results of the experimental study show that there is no qualitative difference between the four languages and raise questions about the existence of a binary PPI-disjunction parameter. At the same time, we observe that these languages vary considerably, and in interesting ways, with respect to what we could call the "degree of the PPI effect". Section 3 brings up some methodological issues and concludes.

[3] Though see e.g., Spector (2014) or Homer (2012) for possible issues with this characterization.

[4] A function f is downward entailing (DE) *iff* for all A, B in the domain of f such that A entails B (A⟹B), f(B)⟹f(A). A function f is anti-additive (AA) iff for any A and any B, f(A ∨ B)⟺f(A) ∧ f(B). All AA functions are DE, but not vice versa.

[5] For discussion of these issues, see e.g., Szabolcsi (2002) and Spector (2014), as well as Liu & Iordăchioaia (2018) for a recent overview on positive polarity.

2. Experimental study

The goal of this experiment is to assess the status of disjunction across languages. The question we want to address is whether languages differ with respect to the behavior of disjunction in DE contexts. More specifically, we want to determine whether it is really the case that simple disjunction behaves as a PPI in some languages but not in others. In order to address this question, we set up an experiment testing the interpretation of disjunction in negative contexts in four languages: two allegedly Type A languages—English and Romanian (Szabolcsi 2002, 2004)—and two allegedly Type B languages—Italian and French (Spector 2014, Nicolae 2017, Guasti *et al* 2017).

2.1 Participants

A total of 137 adults participated in the experiment: 30 French speakers, 43 Italian speakers, 27 Romanian speakers and 37 English speakers. Most French and Italian participants were students at the universities of Nantes (Nantes, France) and Milano-Bicocca (Milan, Italy). Half of the Romanian participants were students at the University of Bucharest (Bucharest, Romania) and the other half were recruited via the researchers' personal network. The English speakers were recruited via the Amazon Mechanical Turk (https://www.mturk.com); participants had a US Id and were paid 5$ for their participation in the study.

2.2 Procedure, materials and design

Participants were instructed to perform a Likert-scale acceptability judgment task hosted on the IbexFarm platform (Drummond 2013). A Likert-scale task was chosen because we think that tasks that do not make a binary distinction are more suitable for investigating polarity phenomena (see also Chemla, Homer and Rothschild 2012). The trials consisted in potentially ambiguous sentences involving simple disjunction (French *ou,* Italian *o*, Romanian *sau* and English *or*) and various DE operators. Each sentence was followed by a continuation that was either compatible with the narrow scope reading of disjunction (but not the wide scope reading) or compatible with the wide scope reading (but not the narrow scope reading). Participants had to read the sentences and judge the continuations based on their naturalness using a scale from 1 (very unnatural) to 7 (very natural).

There were four versions of the experiment (a French, an Italian, a Romanian and an English version, respectively). Below, we illustrate our experimental stimuli with an English example involving simple disjunction and negation. The complete list of experimental items is given in Appendix 1.

(3) If I remember correctly, Mary didn't invite John or Suzi to her birthday party.
   a. **narrow scope** continuation: She's upset with both of them and doesn't want to see them.
   b. **wide scope** continuation: I don't know which of them.

Previous experimental studies (Crain 2012, a.o.) typically use one AA operator— negation— to test the PPI-behavior of disjunction. In our study, we included two AA operators—negation and *without*. Looking only at negation is insufficient to decide whether disjunction is a PPI, as it is anti-additivity more generally that PPIs are claimed to be sensitive to. If disjunction is a PPI, then it should be "anti-licensed" in other AA environments as well. In addition, we included three merely DE operators (*few*, *doubt*, *rarely*). In what follows, we refer to these as *otherDE* operators/items.

We created 6 experimental conditions by crossing Scope (*wide*, *narrow*) and DE item (*negation*, *without, otherDE*). There were 6 items per condition distributed over two lists so that the same participant would not see both the narrow scope continuation and the wide scope continuation for the same sentence. The order of presentation of the stimuli and of the two continuations was randomized within each list. There were two practice items preceding the experimental items and 34 additional fillers randomly interspersed among the experimental items. Half of the fillers — the 'good' fillers — were fully grammatical sentences felicitous in context and the other half — the 'bad' fillers — were sentences that were clearly infelicitous in context (see the full list of fillers in Appendix 1). The experimental session lasted for approximately 25 minutes.

It is crucial to the conception of our experiment that we take the narrow scope continuations to be diagnostic of the narrow scope readings. In view of the entailment relation holding between the narrow and the wide scope readings (see footnote 2), this assumption might be controversial. However, we are convinced by Bhatt and Homer (2019), a.o., who argue that one can circumvent the entailment problem by resorting to a task in which speakers are not asked to assess the truth or falsity of a given sentence, but rather to judge whether a response to a certain assertion is natural. Our study, which tests the naturalness of continuations (rather than responses), is based on a similar premise: if speakers find a given continuation natural, it means they can access the corresponding reading. We included both kinds of continuations because we assumed that, with this kind of task, the PPI status of a disjunction should be visible from the relative rating of narrow scope and wide scope continuations, as we explain in the next section.[6]

2.3 Predictions

Our study targets what we call the "PPI Parameter Hypothesis" for simple disjunction. According to this hypothesis, languages differ with respect to whether disjunction behaves as a PPI. Specifically, it has been claimed that disjunction is a PPI—an item "anti-licensed" in the direct scope of local anti-additive operators—in French and Italian but not in English and Romanian (see e.g., Szabolcsi 2002, Crain 2012).

We consider that, in languages where disjunction is a PPI, the type of DE environment should affect the relative ratings of narrow *versus* wide scope continuations. In particular, all else being equal, the acceptability of narrow scope continuations relative to wide scope continuations – as indicated by the ratings for these continuations – should be lower with AA operators than with otherDE operators. This is because we consider it possible that, in cases of ambiguous sentences like ours, the unacceptability of one reading could have the effect of

[6] One of our reviewers worries about the fact that the narrow scope continuations we used in the experiment may not in fact be incompatible with a wide scope interpretation of disjunction. This seems supported by the coherence of the discourse in (i), where the narrow scope continuation follows a presumably unambiguous sentence, where the disjunction has obligatory wide scope:
(i) If I remember correctly, Mary didn't invite John or she didn't invite Suzi to her birthday party. Well, she's upset with both of them and doesn't want to see them.
We think that the compatibility of the "narrow scope continuations" in (i) (and possibly similar cases) is in fact due to the presence of particles such as "well" or "in any event". These particles serve a sort of corrective function and are necessary for the (relative) acceptability of these examples. Whenever such markers are absent (as is the case in our experiment), the continuations become significantly less natural, a fact which we take as indication that the continuations used in our experiment were not compatible with a wide scope reading. We do however agree with the reviewer that further experimental investigation is needed to differentiate the two readings. An interesting suggestion, which we plan to pursue in future work, is to run a follow-up study capitalizing on ignorance inferences, which are obligatory with wide scope readings and absent with narrow scope ones (see footnote 2).

increasing the rating related to the alternative reading rather than (or possibly in addition to) lowering the rating related to the unacceptable reading. Therefore, if the claim about cross-linguistic differences is correct, then we expect this to be reflected in acceptability judgments as follows. On the one hand, in French and Italian we expect that the acceptability of narrow scope continuations relative to wide scope continuations should be lower with AA operators than with otherDE operators. On the other hand, in English and Romanian, the acceptability of the narrow vs. wide continuations should not differ across DE environments.

Importantly, under the PPI Parameter Hypothesis, in the languages where disjunction is a PPI, anti-additive operators should behave alike in anti-licensing a narrow scope reading. Therefore, if the PPI hypothesis is correct, then in French and Italian the relative acceptability of narrow scope continuations as compared to wide scope continuations should be lower *both* with negation *and* with *without* than it is with otherDE items.

2.4 Results and discussion

Participants had to correctly answer at least 75% of the filler items in order to be included in the analysis. An answer to a 'good' filler was considered correct if it was greater or equal to 5 and an answer to a 'bad' filler was considered correct if it was less than 5. 10 participants were removed because they didn't meet this criterion or because they didn't understand the task. The data from the remaining 127 participants (27 French, 23 Romanian, 34 English and 43 Italian native speakers) were included in the analysis. In all languages, the average score to the 'bad' fillers was around 2 (min 1.92, max. 2.45) and the average score to the 'good' fillers was around 6 (min. 5.97, max. 6.5).

Figure 1 below represents, for each language, the score means for the narrow scope (red bars) and the wide scope (blue bars) continuations for each DE operator — *negation, without* and *otherDE*. We will return to this graph below. For now, notice that the four languages behave uniformly as far as the judgments given for otherDE items, where narrow scope continuations receive considerably higher scores than wide scope continuations.

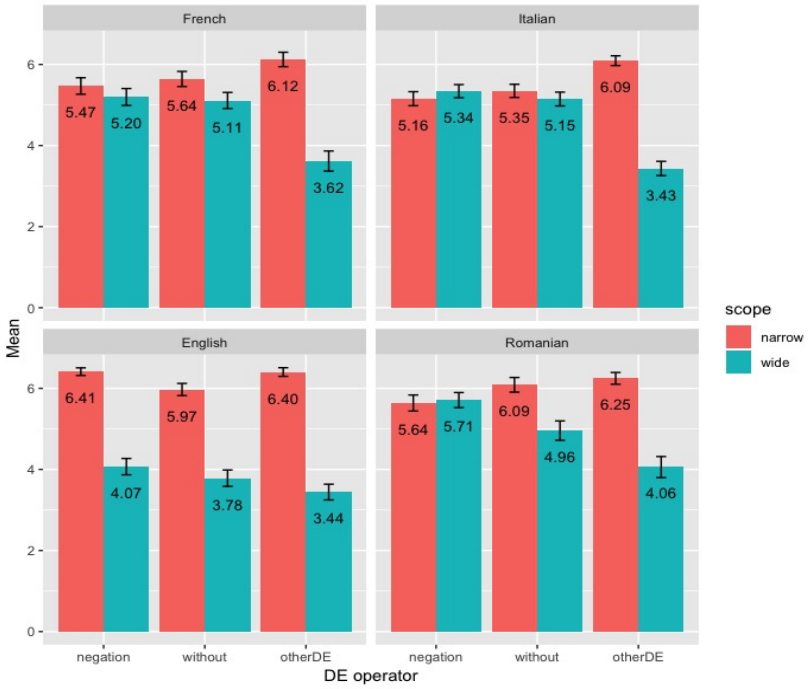

Figure 1. Score means per condition, for each language. The error bars correspond to standard error of the mean.

To evaluate the results statistically we fitted a Cumulative Link Mixed Model to the Likert-scale responses with the *clmm()* function from the ordinal package (Christensen, 2019) in R (R Core Team, 2019). The Cumulative Link Mixed Model is appropriate for Likert-scale data because it takes into account the possibility that each point in the scale could be of different size and distance from its neighbors. As fixed effects, we included *DE item* (negation, without, otherDE), *Scope* (narrow, wide), and *Language* (English, Romanian, French, Italian), as well as their interaction into the model. We had random intercepts for subjects and items and by-subject random slopes for the effect of DE item and scope. (This is the maximal structure that our design allows, cf. Barr *et al* 2013). We ran four models, one with each language as reference level for the factor *Language*. In each model, the reference level for *Scope* was 'narrow' and the reference level for *DE item* was 'otherDE'. Table 1 summarizes the significant effects and interactions in each of the four models. The complete results of the CLMM models are given in Appendix 2.

ENGLISH

Predictor	*Estimate*	*SE*	*Z-value*	*P-value*
SCOPE.WIDE	-3.744	0.372	-10.07	<0.001
DE_ITEM.NEGATION:SCOPE.WIDE	0.885	0.396	2.23	0.03
DE_ITEM.WITHOUT:SCOPE.WIDE	1.045	0.387	2.70	<0.01
DE_ITEM.NEGATION:LANGUAGE.FRENCH	-0.950	0.451	-2.11	0.04
DE_ITEM.NEGATION:LANGUAGE.ITALIAN	-1.004	0.392	-2.56	0.01
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.FRENCH	1.948	0.595	3.28	<0.01
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.FRENCH	1.553	0.589	2.64	0.01
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ITALIAN	2.331	0.521	4.48	<0.001
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ITALIAN	1.830	0.514	3.56	<0.001
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ROMANIAN	1.697	0.605	2.80	<0.01

ROMANIAN

Predictor	*Estimate*	*SE*	*Z-value*	*P-value*
DE_ITEM.NEGATION	-0.906	0.421	-2.15	0.03
SCOPE.WIDE	-2.659	0.442	-6.01	<0.001
DE_ITEM.NEGATION:SCOPE.WIDE	2.582	0.466	5.54	<0.001
DE_ITEM.WITHOUT:SCOPE.WIDE	0.973	0.478	2.04	0.04
DE_ITEM.WITHOUT:LANGUAGE.ITALIAN	-0.978	0.442	-2.21	0.03
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ITALIAN	1.902	0.586	3.25	<0.01
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.FRENCH	1.625	0.652	2.49	0.01
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ENGLISH	-1.697	0.605	-2.80	<0.01

FRENCH

Predictor	*Estimate*	*SE*	*Z-value*	*P-value*
DE_ITEM.NEGATION	-1.089	0.411	-2.65	<0.01
DE_ITEM.WITHOUT	-0.945	0.416	-2.27	0.02
SCOPE.WIDE	-3.341	0.418	-8.00	<0.001
DE_ITEM.NEGATION:SCOPE.WIDE	2.833	0.446	6.35	<0.001
DE_ITEM.WITHOUT:SCOPE.WIDE	2.599	0.445	5.84	<0.001
DE_ITEM.NEGATION:LANGUAGE.ENGLISH	0.950	0.451	2.11	0.04
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ENGLISH	-1.948	0.595	-3.28	<0.01
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ENGLISH	-1.553	0.589	-2.64	0.01
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ROMANIAN	-1.625	0.652	-2.49	0.01

ITALIAN

Predictor	*Estimate*	*SE*	*Z-value*	*P-value*
DE_ITEM.NEGATION	-1.143	0.346	-3.31	<0.001
DE_ITEM.WITHOUT	-1.030	0.349	-2.96	<0.01

SCOPE.WIDE	-3.106	0.320	-9.71	<0.001
DE_ITEM.NEGATION:SCOPE.WIDE	3.215	0.341	9.44	<0.001
DE_ITEM.WITHOUT:SCOPE.WIDE	2.875	0.340	8.46	<0.001
DE_ITEM.NEGATION:LANGUAGE.ENGLISH	1.003	0.392	2.56	0.01
DE_ITEM.WITHOUT:LANGUAGE.ROMANIAN	0.978	0.442	2.21	0.03
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ENGLISH	-2.331	0.521	-4.48	<0.001
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ENGLISH	-1.830	0.514	-3.56	<0.001
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ROMANIAN	-1.902	0.586	-3.25	<0.01

Table 1. Summary of the significant effects and interactions of the Cumulative Link Mixed Models with each language as reference level for the factor 'Language'.

With regard to the PPI Parameter Hypothesis, the crucial aspect of the analysis concerns the **DE item-by-Scope** interaction. This interaction is significant: *in each language*, we find that, in the context of **negation**, the relative acceptability of narrow scope continuations compared to wide scope continuations (narrow-wide) is lower than it is with **otherDE** items (p's <0.05); the same is true in the context of **without** (p's <0.05). This effect is clearly visible in Figure 1: in each language, as one goes from an otherDE context to an AA context, narrow scope tends to get worse and wide scope clearly gets better. This result conforms to the predictions of the PPI Parameter Hypothesis for French and Italian, but *not* for English and Romanian. Effectively, what we find is that *disjunction exhibits "PPI behavior" even in English and Romanian*. There thus appears to be no essential qualitative difference among languages as far as the way AA environments affect scope preferences for disjunction. The binary distinction posited by the PPI Parameter Hypothesis, dividing French and Italian on the one hand and English and Romanian on the other, seems to be on the wrong track.

At the same time, we do find differences between the languages we investigated. There is a significant **DE item-by-Language** interaction which distinguishes French and Italian from English, and which also distinguishes Italian from Romanian: specifically, the difference between **negation** and **otherDE** items in the **narrow scope** condition is significantly lower in **French** and **Italian** as compared to **English** (p's <0.05) and the difference between **without** and **otherDE** in the **narrow scope** condition is significantly lower in **Italian** than in **Romanian** ($p = 0.03$).

There is also a significant **DE item-by-Scope-by-Language** interaction, where what we find is the following: (a) when we compare the wide-narrow difference with **negation** to the wide-narrow difference with **otherDE** items, we find that the difference between the two is bigger in **French**, **Italian** and **Romanian** than it is in **English** (all p's <0.01); (b) when we compare the wide-narrow difference with **without** to the wide-narrow difference with **otherDE** items, we find that the difference between the two is bigger in **French** and **Italian** than it is in **English** and **Romanian** (all p's ≤0.01). Broadly speaking, this three-way interaction shows that there is a distinction between languages in terms of the "degree" to which disjunction exhibits PPI behavior – that is, the extent to which the relative acceptability of narrow scope decreases as one goes from an otherDE context to an AA context. This effect is stronger in certain languages than in others, as can be seen again by considering Figure 1: it is very clear from the graphs that the changes in AA environments are less dramatic in the case of English than they are in the other languages.

Beyond this, however, we find that the degree to which the relative acceptability of narrow scope decreases in AA contexts depends on the type of anti-additive operator, and that languages differ with respect to the way in which this happens. When the anti-additive operator is **negation**, we find a divide between French, Italian and Romanian, on the one hand and English, on the other hand, but when the anti-additive item is ***without***, we find a divide between French and Italian on the one hand and English and Romanian on the other hand. The fact that

different AA items affect the relative acceptability of narrow scope continuations to different degrees is surprising for a view on which disjunction is a PPI. A possible explanation may be that, contrary to our initial assumptions, there are other factors than the potential PPI status of disjunction that influence the relative acceptability of narrow scope readings in the contexts we considered, and that these factors differ across languages. This clearly deserves further investigation.[7]

3. General discussion and conclusion

Languages have been claimed to differ with respect to the availability of the narrow scope reading of disjunction in negative contexts, a difference described in terms of a PPI parameter. This view has inspired work on cross-linguistic variation in the semantics of connectives and has been used in language acquisition studies to address learnability issues across languages. However, the results of our cross-linguistic experimental study suggest that there is no qualitative difference between languages in this respect, calling into question the robustness of this parameter. In all the languages that we considered, disjunction seems to exhibit PPI behavior to a certain degree, though this degree differs across languages. We suggest that these results should be interpreted as follows: narrow scope of disjunction is never literally ruled out in AA environments, and languages differ with respect to the degree to which it is dispreferred. This fits with the fact that, when we look at corpora, narrow scope (as well as wide scope) readings are attested in the four languages included in our study (as illustrated in (2)). Other language-dependent preferences have been observed in the literature for ambiguous constructions, such as those involving high or low attachment of relative clauses (Grillo and Costa 2014, among many others). We think that the facts about the scope behavior of disjunction should be viewed in a similar way.

The findings reported here have implications for language acquisition. Previous work on language acquisition (Guasti *et al* 2017) using a truth value judgment methodology (TVJ) with a binary response option (i.e., true/false) (Crain and Thornton 1998) found that Italian and French adult controls consistently rejected sentences with simple disjunction under negation in a scenario where both disjuncts were false (the "narrow scope" scenario). This has been taken to confirm a body of acquisition literature that relies on the assumption that there are languages where the narrow scope reading of disjunction under negation is unavailable, languages where the PPI parameter has a positive value (see Crain 2012 for an overview). If we are right, then the reported performance on the binary response TVJ task does not in fact reveal unavailability of the narrow scope reading and should be explained in some other way.

We believe that a traditional TVJ task fails to reveal existing readings that are dispreferred (see also Meyer and Sauerland 2009). There are reasons why a task like ours, using graded scale responses in a discourse continuation set-up, should be able to bring to light readings that the TVJ task does not.[8] The acceptability judgment continuation task used in our study asked participants to evaluate a sentence (the continuation that disambiguates the readings) in the context of another sentence (i.e., a sentence containing disjunction and a DE operator). The

[7] We did not actually independently verify that the speakers gave an anti-additive semantics to the items that we characterized as anti-additive. If there is variation there, then that could be responsible for some of the variation that we found (cf. Chemla, Homer and Rothschild 2012).

[8] We do not mean to imply that we do not see a TVJ task as revealing preferences. Our view is in fact that it does. However, the two tasks being different, the preference for one reading over another would not surface in the same way: in a TVJ task, a preference for one reading over another might lead to a "false" judgment in cases where the scenario only supports the other reading, whereas in a graded task, this preference might simply result in a decrease in the relative rating of continuations related to the other reading. For an interesting discussion on the issue of access *versus* preference of a given reading see Lohiniva and Panizza (2016).

guiding idea is that, when speakers read (or hear) two sentences together in a discourse, they try to make them coherent with each other. If the continuation is compatible with the preferred interpretation of the first sentence, it will be rated as natural. If it is not, the search for coherence could well make some speakers revise their initial hypothesis, and access the other interpretation. With a traditional TVJ task, on the other hand, there is no such pressure to look for coherence. TVJ tasks merely ask speakers to judge whether a potentially ambiguous sentence is true or false in a scenario that makes only one reading true. If speakers have a preference for one reading over another, discourse coherence considerations would not lead them to change their initial hypothesis.[9]

It is important to ask what determines the preferences observed across languages. Recent experimental work on scopally ambiguous structures involving universal quantifiers and negation invokes several factors, such as processing limitations and prosody (Lohiniva and Panizza 2016; Syrett, Simon and Nisula 2014, a.o.). In the case of sentences with negated disjunction, prosody might play a role in determining speakers' preference for one reading over the other.[10] According to Jing (2008), in English, intonation can help disambiguate the two readings: neutral intonation on the disjunctive phrase has been claimed to favor a narrow scope interpretation, whereas focus stress on each of the disjuncts has been claimed to favor a wide scope reading. It is conceivable that in our study the judgments that speakers gave might have been influenced by a prosody that they implicitly assigned to the sentences they read. For instance, prosody might be responsible for the low ratings of wide scope continuations with AA operators in English: although both readings are available, the neutral intonation associated with narrow scope readings could have biased the English speakers towards narrow scope, resulting in higher relative ratings for narrow scope continuations than those found in the other languages. Given that our experiment did not control for prosody, the extent to which speakers in general may have relied on prosodic information in their responses is unclear. Further research is necessary to determine the way speakers recruit prosodic information for the interpretation of sentences with disjunction and negative operators.

The results reported in this paper are relevant to current theories of PPIs, which typically rely on a strong form of "anti-licensing", i.e., the assumption that languages with PPI-disjunction disallow narrow scope readings in the immediate scope of negation (and other AA operators). Our study suggests that a more nuanced picture might be called for — with cross-linguistic differences less clear-cut than standardly assumed. Our study should be taken together with other recent work on the factors that may affect the preferred scope of disjunction, and in particular on the influence of monotonicity (see Denić *et al* 2019 for recent discussion on the relation between acceptability of polarity sensitive items and monotonicity of the environment). Similarly complex patterns, which current theories are unable to fully capture, have been recently reported with respect to the positive polarity behavior of modified numerals (Mihoc and Davidson 2019), showing the need for further investigation in this area.

To conclude, more empirical investigation is needed to settle the existence of PPI phenomena, assess the extent of cross-speaker and cross-linguistic variation, and ultimately develop a comprehensive explanation. This means developing experimental paradigms and methods that can be fruitfully put to use to investigate various types of expressions that have

[9] It might very well be that the use of a graded scale plays a role in revealing dispreferred readings. As a reviewer points out, the use of graded scales has been shown to make a difference even in tasks that can be seen as TVJ tasks – tasks where the subject judges the degree of accuracy with which a sentence describes a scenario (Marty, Chemla and Spector 2015, Chemla and Spector 2011). Future studies (e.g. involving TVJ tasks with graded scales) will have to determine whether, in the case of disjunction in negative contexts, the relevant factor is the type of task (TVJ task vs. discourse continuation task), the number of response options (binary vs. graded) or a combination of the two.

[10] We are grateful to an anonymous reviewer for raising this issue.

been claimed to have a PPI-status (e.g., connectives, indefinites, modified numerals, modals). This squib aimed to contribute to this enterprise. In future work, we plan to investigate further differences between wide scope and narrow scope readings (e.g. associated ignorance inferences, see footnote 6), as well as extend the study to disjunction in other languages and test more complex patterns involving PPIs and additional operators (e.g., shielding or rescuing configurations, see Szabolcsi 2004, Spector 2014, Nicolae 2017).

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Appendix 1

Experimental items

1) French

Negation:

1. Jean ne boit pas de vin ou de bière.
a. Je ne me rappelle pas lequel des deux.
b. Son médecin lui a complètement interdit l'alcool.

2. Il fait froid dans cette maison. Je parie que Jean n'a pas fermé la fenêtre ou la porte.
a. Je me demande laquelle des deux on va trouver ouverte.
b. Eh bah, voilà, c'est exactement ce que j'ai dit, elles sont toutes les deux ouvertes !

3. Marie n'a pas invité Jeanne ou Suzanne à sa fête d'anniversaire.
a. Je ne sais plus laquelle des deux.
b. Elle est fâchée contre les deux et ne veut plus les voir.

4. Jean est fâché. Il n'a clairement pas réussi l'examen de sémantique ou de syntaxe.
a. Je me demande lequel c'était.
b. Et ce ne serait pas la première fois qu'il échoue à ses examens.

5. Je me rappelle qu'il y avait un conflit familial. Marie ne parlait pas avec sa mère ou sa soeur.
a. Je ne sais plus laquelle des deux.
b. Après ça, elle ne parlait qu'avec son père.

6. Hélène n'aime pas les chats ou les chiens.
a. Je ne me rappelle plus lesquels.
b. Elle a eu des expériences traumatisantes avec les deux.

Without:

1. Jeanne est inquiète. Elle est arrivée à l'aéroport sans sa pièce d'identité ou sa carte bleue.
a. Je ne sais plus laquelle des deux.
b. Elle a oublié toutes ses affaires personnelles dans le taxi vers l'aéroport.
2. Jean semble avoir vécu ici pendant des années sans une assurance maladie ou une assurance habitation.
a. Je ne me rappelle plus laquelle.
b. Il s'est rendu compte récemment qu'il a besoin des deux.

3. Ma grand-mère faisait ces gâteaux sans rhum ou cannelle.
a. Je ne me rappelle plus.
b. Elle mettait plutôt de la liqueur faite maison.

4. Jean est parti en vacances sans sa maman ou son papa.
a. Je ne me rappelle plus lequel des deux.
b. C'est la première fois qu'il voyage tout seul.

5. Philippe m'a dit qu'il ne pouvait pas emmener beaucoup d'affaires. A en juger par sa petite valise, il a dû voyager sans son ordinateur ou son iPad.
a. Je me demande lequel des deux il n'a pas pris.
b. Je suis sûr qu'il a été plus heureux sans écrans.

6. Catherine pouvait vivre sans café ou chocolat.
a. Je ne me rappelle plus lequel des deux.
b. Maintenant elle ne peut plus imaginer sa vie sans eux.

Other downward entailing items:

Few

1. Peu de gens ont pris un apéritif ou un dessert.
a. Je ne me rappelle plus lequel.
b. Le plat principal était déjà très cher.

2. Apparemment, peu de gens sont capables de réciter à l'envers une séquence de 12 chiffres ou 12 lettres.
a. Je ne sais plus quelle séquence c'était.
b. En général, la moyenne est de 10.

Doubt

1. Jean doute que Sophie pratique le football ou le tennis.
a. Selon lui, Sophie n'a pas le temps de faire les deux.
b. Selon lui, Sophie n'a jamais fait du sport.

2. Marie doute que Paul ait lu Les Frères Karamazov ou Anna Karénine.
a. Selon elle, Paul a eu le temps de lire seulement un des deux.
b. Selon elle, Paul n'a jamais lu des romans russes.

Rarely

1. Quand il était petit, Paul dormait rarement avec sa mère ou son père.
a. Je ne sais plus avec lequel.
b. Il préférait dormir tout seul.

2. Paul voit rarement sa soeur ou sa mère.
a. Je ne me rappelle plus laquelle des deux.
b. Il dit qu'elles le mettent mal à l'aise.

Fillers (in italics, the continuation that the participants had to judge in the context of the preceding sentence/part of the sentence)

"Good" fillers

1. Certains de nos étudiants parlent très bien anglais, *mais pas tous.*
2. Hier on a arrêté deux suspects dans l'affaire de crime organisé, *mais les autorités n'ont pas encore divulgué leur identité.*
3. Certains musées ont été fermés après les attentats. *Je ne me rappelle plus lesquels.*
4. Jeanne a vu cet artiste deux fois en spectacle. *Elle pense qu'il est le meilleur ténor qu'elle a écouté.*
5. Certains pays ont une politique très stricte contre l'immigration. *C'est une situation qui ne va pas changer de sitôt.*
6. Marie n'a pas aimé le restaurant ou on est allé hier soir. *Selon elle, le menu était trop cher.*
7. Paul ne supporte pas ses collègues, *mais je ne comprends pas pourquoi.*
8. Le train est arrivé très en retard, *mais personne ne nous a dit ce qui s'était passé.*
9. La pause-déjeuner est très courte. *Les enfants ont rarement le temps de finir leur repas.*

10. Marie était très contente ce matin. *Elle a fait une super présentation à la conférence de lundi.*
11. Deux thèses ont été sélectionnées pour le prix de la meilleure thèse. *Aucune n'a décroché la première place.*
12. Julie a essayé de séduire Marc pendant toute la soirée. *Marie a fait la même chose avec Paul.*
13. Marie a commandé des huîtres au dîner d'hier soir. *Paul ne ferait jamais ça.*
14. Maintenant je me rappelle très bien le contenu de la présentation que je viens de faire. *Mais dans un an, je serai incapable de me rappeler quoi que ce soit.*
15. Je me demande comment elle fait pour avoir l'air si jeune à 62 ans. *Je suppose qu'elle doit avoir un régime alimentaire très équilibré.*
16. Je me demande pourquoi Jean n'est pas resté jusqu'à la fin de la réunion hier. *A ma connaissance, il a dû partir tôt car il devait aller chercher son fils à l'aéroport.*
17. Qu'est-ce que tu penses de nos deux nouveaux étudiants Lina et Leo? *Lina a une bonne formation et semble très motivée; quant à Leo c'est trop tôt pour dire quoi que ce soit.*

"Bad" fillers

1. Suzanne m'a recommandé deux livres à lire pendant les vacances*, mais je les ai cherchés dans les librairies.*
2. Il y avait plusieurs pays à recevoir des menaces terroristes*, mais je ne me rappellerai pas lesquels.*
3. Certains bâtiments dans notre quartier ont été touchés par le tremblement de terre. *Heureusement aucun bâtiment n'a été touché.*
4. Quelques solutions ont été discutées pendant la réunion, *mais je vais me rappeler laquelle a été retenue.*
5. J'ai bien aimé le concert. *Le violoniste devrait jouer magnifiquement bien.*
6. On ne connaît toujours pas les résultats des élections. *Mais je ne me rappelle pas qui a gagné.*
7. Jean n'est pas parti en vacances cette année. *Je ne me rappelle pas où.*
8. Marie ne nous a encore pas communiqué sa décision, *mais elle l'aura déjà fait.*
9. Dan était fâché à cause de sa note. *Je n'aurais pas dû être le problème.*
10. Je ne connaissais pas les voisins avant d'emménager ici, *même si je le trouve très généreux.*
11. Je ne comprends pas ce qui s'est passé. Il semble que cette fille a encore poussé Paul. *Lucas le sera aussi.*
12. Si je comprends bien, Jean a été engueulé par son père hier. *Aujourd'hui, sa mère a essayé d'y mettre fin.*
13. Le client a apprécié uniquement le dessert. *Le client satisfait a apprécié l'apéro.*
14. Si je me souviens bien la guerre a commencé il y a trois ans. *Une année auparavant l'ONU a essayé d'y mettre fin.*
15. Elle disait que la biographie d'un des présidents de la République allait sortir cette année, *mais je ne m'en rappelle aucune.*
16. Marie préfère que Lisa fasse son discours. *Paul préfère celui de Matthieu.*
17. La Chine ne fait pas confiance au dictateur nord-coréen. *Mais elle fait encore plus confiance à Donald Trump.*

2) Italian

Negation:

1. Se mi ricordo bene, Gianni non beve vino o birra.

a. Non so quale dei due.
b. Il medico gli ha proibito l'alcool.

2. Fa freddo in questa casa. Ci scommetto, Gianni non ha chiuso la finestra o la porta di casa.
a. Chissà quale delle due troveremo aperta.
b. Guarda, sono effettivamente entrambe spalancate!

3. Se mi ricordo bene, Maria non ha invitato Gianni o Susanna alla sua festa di compleanno.
a. Non so quale dei due.
b. È arrabbiata con entrambi e non li vuole vedere.

4. Gianni è arrabbiato. Chiaramente non ha superato l'esame di Informatica o di Statistica.
a. Mi chiedo quale dei due.
b. E non sarebbe la prima volta che lo bocciano a questi corsi.

5. Mi ricordo che c'è stato un litigio familiare. Maria non aveva rapporti con sua madre o con sua sorella.
a. Non so quale delle due.
b. Da quella volta, ha parlato solo con suo padre.

6. Maria non ama i cani o i gatti.
a. Non mi ricordo quali.
b. Ha avuto esperienze traumatiche con entrambi.

Without:

1. Giulia è preoccupata. È andata all'aeroporto senza il passaporto o la carta di credito.
a. Non mi ricordo quale dei due.
b. Ha dimenticato tutti i suoi oggetti personali nel taxi per l'aeroporto!

2. Sembra che Gianni abbia vissuto qui per anni senza assicurazione medica o sulla casa.
a. Non mi ricordo quale delle due.
b. Solo adesso si è reso conto che ha bisogno di entrambe.

3. Mia nonna ha fatto questi biscotti senza rum o cannella.
a. Non mi ricordo quale dei due.
b. Al posto di questi ingredienti ha aggiunto del brandy fatto in casa.

4. Gianni è andato in vacanza senza sua madre o suo padre.
a. Non mi ricordo quale dei due.
b. È la prima volta che viaggia da solo.

5. Pietro mi ha detto che aveva bisogno di viaggiare leggero. Da come è piccolo il suo bagaglio, sta viaggiando senza computer o telecamera.
a. Mi chiedo quale dei due abbia deciso di lasciare a casa.
b. Sono sicuro che è molto più contento senza dispositivi elettronici.

6. Caterina prima viveva senza caffè o cioccolato.
a. Non mi ricordo quale dei due.
b. Adesso non riesce a immaginare la sua vita senza.

Other downward entailing items:

Few

1. Poche persone hanno preso l'antipasto o il dessert.
a. Non mi ricordo quale dei due.
b. Era già costoso il piatto principale.

2. Pare che poche persone riescono a ripetere una sequenza di otto lettere o otto numeri.
a. Non mi ricordo quale delle due.
b. Il limite di solito è sette.

Doubt

1. Gianni dubita che Susanna giocasse a calcio o tennis.
a. Pensa che lei si fosse concentrata su uno dei due.
b. Pensa che lei non abbia mai fatto sport con la palla.

2. Maria dubita che Paolo abbia letto I fratelli Karamazov o Anna Karenina.
a. Pensa che lui abbia avuto tempo solo per uno dei due.
b. Pensa che lui non abbia mai letto letteratura russa.

Rarely

1. Quando era piccolo, Gianni solo raramente baciava sua madre o suo padre.
a. Non mi ricordo quale dei due.
b. Ha sempre odiato il contatto fisico.

2. Gianni va a trovare raramente sua sorella o sua madre.
a. Non mi ricordo quale delle due.
b. Dice che lo mettono a disagio.

Fillers

"Good" fillers

1. Alcuni studenti parlano bene inglese, *ma non tutti.*
2. Due dei sospettati sono stati catturati ieri *ma non hanno ancora diffuso alcun nome.*
3. Dopo gli attacchi, hanno chiuso alcuni dei musei *ma non so quali.*
4. Gianni ha visto due spettacoli di questo artista. *Pensa che sia il migliore cantante d'opera che abbia mai ascoltato.*
5. Alcune nazioni hanno politiche molto restrittive contro l'immigrazione. *Questa situazione non cambierà molto presto.*
6. A Maria non è piaciuto il ristorante in cui siamo andati ieri sera. *Pensava fosse troppo costoso.*
7. Paolo non sopporta i suoi colleghi. *Ma non so perché.*
8. A scuola la pausa pranzo è molto breve. *Raramente i ragazzi finiscono il loro pranzo.*
9. Il treno non è arrivato in orario, *ma nessuno ci ha detto perché.*

10. Maria era molto contenta questa mattina. *Ha fatto un bell'intervento alla conferenza lunedì.*
11. Due tesi del nostro dipartimento hanno partecipato alla gara per la migliore tesi di dottorato, *ma nessuna delle due ha vinto.*
12. Giulia ha cercato di sedurre Giacomo alla festa. *E Maria ha fatto la stessa cosa con Paolo.*
13. Ieri sera, alla cena ufficiale, Maria ha ordinato ostriche, *ma Gianni non avrebbe mai potuto farlo: lui odia le ostriche.*
14. Adesso conosco molto bene l'argomento del discorso che ho appena fatto *ma tra un anno non sarò capace di ricordarmelo.*
15. Mi chiedo come faccia Giulia a sembrare così giovane a 62 anni. *Immagino che segua una dieta sana.*
16. Mi chiedo perché Gianni non sia rimasto fino alla fine della riunione ieri. *Mi aveva detto che per lui era molto importante restare.*
17. Oggi ho incontrato i nuovi studenti di dottorato Lina e Leo. *Lina sembra molto motivata e con un'ottima preparazione in statistica ma Leo non saprei dire com'è.*

"Bad" fillers

1. Susanna ha suggerito due libri da leggere durante le vacanze. *Ma io li ho cercati nelle librerie.*
2. C'erano alcuni paesi che erano l'obiettivo dell'attacco, *ma non mi ricorderò quali.*
3. Il terremoto ha lesionato alcuni edifici nella nostra zona. *Fortunatamente nessun edificio è stato coinvolto.*
4. Durante l'incontro sono state discusse alcune soluzioni. *Ma ho potuto ricordare quale è stata mantenuta.*
5. Mi è davvero piaciuto il concerto. *Il violoncellista dovrebbe suonare molto bene.*
6. I risultati della elezione non sono ancora stati resi noti. *Ma non mi ricordo chi ha vinto.*
7. Gianni non è andato in vacanza quest'anno. *Non riesco a ricordarmi dove.*
8. Maria non ci ha ancora fatto sapere la sua decisione**.** *Lo avrà già fatto.*
9. Daniele era arrabbiato per il suo voto. *Non avrei dovuto essere il problema.*
10. Non conoscevo i vicini prima di trasferirmi qui, *anche se lo trovo davvero generoso.*
11. Non so cosa sia successo esattamente. Sembra che la ragazza abbia di nuovo spinto Guglielmo. *E così sarà Gianni.*
12. Se ho capito bene, Gianni è stato sgridato da suo padre ieri. *Oggi sua madre ha cercato di porvi fine.*
13. Il cliente ha elogiato solo il dessert. *Il cliente contento ha elogiato l'antipasto.*
14. Se mi ricordo bene, la guerra è iniziata tre anni fa. *Un anno prima le Nazioni Unite hanno cercato di porvi fine.*
15. Ha detto che quest'anno uscirà una biografia di uno dei presidenti americani, *ma non riesco a ricordare nulla di ciò.*
16. Maria preferisce che sia Giacomo a pronunciare il loro discorso. *E Gianni preferisce quello di Michele.*
17. La Cina non ha fiducia nel dittatore coreano, *ma si fidano ancora di più del presidente Trump.*

3) English

Negation:

1. If I remember correctly, John doesn't drink wine or beer.

a. I don’t know which.
b. The doctor has forbidden him alcohol.

2. It’s cold in this house. I bet you, John didn’t close the window or the back door.
a. I wonder which one of those two we’ll find open.
b. Look, just as I said, both of them are wide open!
3. If I remember correctly, Mary didn’t invite John or Suzi to her birthday party.
a. I don’t know which of them.
b. She’s upset with both of them and doesn’t want to see them.

4. John is upset. Clearly, he didn’t pass the semantics or the syntax exam.
a. I wonder which it was.
b. And it wouldn’t be the first time he failed those classes.

5. I remember there was a family conflict. Mary didn’t speak with her mother or her sister.
a. I don’t know which.
b. She was only talking with her father after that.

6. Mary doesn’t like cats or dogs.
a. I don’t remember which.
b. She had traumatizing experiences with both.

Without:

1. Jane is worried. She got to the airport without her passport or her credit card.
a. I don't remember which.
b. She forgot all her personal stuff in the cab to the airport!

2. It seems John has lived here for years without medical or house insurance.
a. I don’t remember which one.
b. Only now has it occurred to him that he needs both of them.

3. My grandmother made these cookies without rum or cinnamon.
a. I can’t remember which.
b. Instead of those ingredients she added homemade brandy.

4. John went on holiday without his mother or his father.
a. I don’t remember which.
b. It's the first time he travels by himself.

5. Peter told me he needed to travel light. To judge by the small size of his bag, he was travelling without his computer or his movie camera.
a. I wonder which of the two he decided to give up.
b. I am sure he was a lot happier without electronic devices.

6. Kate used to live without coffee or chocolate.
a. I don't remember which.
b. Now she cannot imagine her life without them.

Other downward entailing items:

Few

1. Few people took the appetizer or the dessert.
 a. I don't remember which.
 b. The main dish was already expensive.

2. Apparently, few people are able to recite back a sequence of twelve letters or twelve numbers.
a. I don't remember which.
b. The limit is usually ten.

Doubt

1. John doubts that Sue played football or tennis.
a. He thinks she focused on one of the two.
b. He thinks she never did any ball sports.

2. Mary doubts that Paul read The Brothers Karamazov or Anna Karenina.
a. She thinks he had time for only one of them.
b. She thinks he never reads Russian literature.

Rarely

1. When he was little, John would rarely sleep with his mother or his father.
a. I don't remember which.
b. He always preferred to sleep alone.

2. John rarely visits his sister or his mother.
a. I don't remember which.
b. He says that they make him uncomfortable.

Fillers

"Good" Fillers

1. Some of the students speak English well, *but not all of them*.
2. Two of the suspects were caught yesterday, *but no names have been released yet*.
3. They shut down some museums after the attacks. *But I don't know which ones.*
4. John saw two performances by this artist. *He thinks he is the best opera singer he ever listened to.*
5. Some countries have very strict politics against immigration. *This situation is not going to change anytime soon.*
6. Mary didn't like the restaurant we went to last night. *She thought it was too expensive.*
7. Paul can't stand his colleagues, *but I don't know why.*
8. The lunch break at school is very short. *The kids rarely finish their lunch.*
9. The train didn't get here on time, *but nobody told us why.*
10. Mary was very happy this morning. *She gave a good talk at the conference on Monday.*
11. Two theses from our department participated in the Best Doctoral Dissertation Award Competition, *but neither of them won.*
12. Julie tried to seduce Jim at the party. *And Mary did the same thing with Paul.*

13. Mary ordered oysters at the official dinner last night, *but John could never have done that; he hates oysters.*
14. Right now, I know the content of the talk I just gave very well, *but in a year I will be incapable of remembering anything at all.*
15. I wonder how Jane manages to look so young at 62. *I guess she must have a healthy diet.*
16. I wonder why John didn't stay until the end of the meeting yesterday. *As far as I know, he had to leave early because he had to pick up his kid from the airport.*
17. What is your impression after meeting our two new PhD students, Lina and Leo, today? *Lina seems very motivated and with a strong background in syntax, but Leo, I cannot really tell.*

"Bad" fillers

1. Sue recommended two books to read during holidays, *but I looked for them in libraries.*
2. There were some countries targeted for the attack, *but I will not remember which.*
3. The earthquake affected some buildings in our area. *Luckily no building was affected.*
4. Some solutions were discussed during the meeting, *but I could remember which one was retained.*
5. I really liked the concert. *The cellist should be playing brilliantly.*
6. The results of the election are not out yet, *but I don't remember who won.*
7. John didn't go on holidays this year. *I can't remember where.*
8. Mary didn't let us know her decision yet. *She will have done that already.*
9. Dan was upset with his grade. *I shouldn't have been the problem.*
10. I didn't know the neighbors before moving here, *even if I find it really generous.*
11.I don't understand what really happened. It seems that the girl pushed Bill again. *And so will be John.*
12. If I understood correctly, John was scolded by his father yesterday. *Today his mother tried to put an end to it.*
13. The customer praised only the dessert. *The happy customer praised the appetizer.*
14. If I remember correctly, the war started three years ago. *A year earlier, the United Nations tried to put an end to it.*
15. She said that a biography of one of the US presidents will be out this year, *but I can't remember any of it.*
16. Mary prefers Jesse to deliver their speech. *And John prefers Michael's.*
17. China doesn't trust the Korean dictator, *but they trust President Trump even more.*

4) Romanian

Negation:

1. Ion nu bea vin sau bere.
a. Nu mai știu care din ele nu-i place.
b. Doctorul i-a zis că nu are voie deloc alcool.

2. E frig în casa asta. Parcă văd că Ion nu a închis ușa de la balcon sau fereastra.
a. Mă întreb pe care o s-o găsim deschisă.
b. Uite, exact ce-ţi spuneam, ambele sunt larg deschise!

3. Ionuţ nu a invitat-o pe Maria sau pe Anca la ziua lui.
a. Nu mai știu pe care din ele.

b. E supărat pe amândouă și nu vrea să le mai vadă.

4. Marius e supărat. Nu a luat examenul de semantică sau de sintaxă.
a. Nu mai știu care din ele a fost foarte dificil.
b. Și n-ar fi prima dată când nu-și ia examenele.

5. Îmi amintesc că într-un timp Maria avea ceva probleme în familie. Nu vorbea cu mama sau cu sora ei.
a. Nu mai știu cu care dintre ele.
b. Prin urmare, singurul cu care ţinea legătura era tatăl ei.

6. Elenei nu-i plac câinii sau pisicile.
a. Nu mai știu care din ei.
b. A avut experienţe traumatizante cu ambele tipuri de animale.

Without:

1. Ioana este îngrijorată. A ajuns la aeroport fără pașaport sau carte de credit.
a. Nu mai știu care dintre ele.
b. Și-a uitat toate obiectele personale în taxiul spre aeroport.

2. Se pare ca Ion a trăit aici mai mulți ani fără asigurare medicală sau asigurare de locuinţă.
a. Nu-mi mai amintesc despre care din ele e vorba.
b. Abia acum și-a dat seama că are nevoie de ambele.

3. Bunica mea făcea prăjiturile astea fără rom sau scorțișoară.
a. Nu mai știu care din astea două.
b. Punea mai degrabă lichior făcut în casă.

4. Ion a plecat în vacanţă fără mama sau tatăl lui.
a. Nu mai știu care din ei.
b. E prima dată când călătorește singur.

5. Paul mi-a zis că nu putea să ia multe lucruri cu el. Dacă e să ne luăm după mărimea valizei, trebuie că a călătorit fără calculator sau iPad.
a. Mă întreb la care din ele a renunţat.
b. Sunt sigur că a fost mai relaxat fără aparate electronice.

6. Cătălina putea să trăiască înainte fără cafea sau ciocolată,
a. nu mai știu care dintre ele.
b. Acum nu-și mai poate imagina viaţa fără ele.

Other downward entailing items:

Few

1. Puţini oameni au comandat un aperitiv sau un desert.
a. Nu mai știu care din ele.
b. Felul principal era oricum foarte scump.

2. Se pare că puţini oameni sunt capabili să reproducă în ordine inversă o serie de 12 numere sau 12 litere.
a. Nu-mi mai amintesc despre care dintre seriile astea e vorba.
b. În general, media este de 10 caractere.

Doubt

1. Ion se îndoiește că Diana face fotbal sau tenis.
a. Crede că nu are timp decât pentru unul din sporturile astea.
b. Crede că Diana n-a practicat niciodată vreo activitate sportivă.

2. Maria se îndoiește că Paul a citit Frații Karamazov sau Ana Karenina.
a. Crede că n-a avut timp decât pentru unul din romanele astea.
b. Crede că Paul n-a citit niciodată romane rusești.

Rarely

1. Când era mic, Paul dormea rar cu mama sau cu tatăl lui.
a. Nu mai știu cu care din ei.
b. Prefera să doarmă singur.

2. Paul își vede foarte rar mama sau sora.
a. Nu mai știu pe care din ele.
b. Zice că nu se simte deloc bine în prezenţa lor.

Fillers:

"Good" fillers

1. Unii din studenții noștri vorbesc foarte bine engleza, *dar nu toți.*
2. Ieri au arestat doi suspecți în cazul de crimă organizată, *dar autoritățile nu au divulgat încă identitatea acestora.*
3. Unele muzee au fost închise în urma atentatelor. *Nu-mi mai amintesc care exact.*
4. Ioana a văzut acest artist de două ori în concert. *După ea, e cel mai bun tenor pe care l-a ascultat vreodată.*
5. Unele țări au o politică foarte strictă împotriva imigrației, *o situație care nu se va schimba curând.*
6. Mariei nu i-a plăcut restaurantul la care am fost ieri seară. *Zice că era prea scump.*
7. Paul nu-și suportă colegii, *însă nu înțeleg de ce.*
8. În școala asta pauza de prânz e foarte scurtă. *Elevii au rar timp să termine tot de mâncat.*
9. Trenul a ajuns cu foarte mare întârziere, *dar nimeni nu ne-a zis din ce cauză.*
10. Maria era foarte bucuroasă în dimineața asta. *A făcut o prezentare excelentă la conferința de luni.*
11. Două din tezele susținute la noi în laborator au fost selecționate pentru premiul de cea mai bună dizertație în fizică. *Din păcate niciuna nu a ieșit pe locul întâi.*
12. Iulia a încercat toată seara să-l seducă pe Mihai. *Maria a făcut acelaşi lucru cu Paul.*
13. Maria a comandat midii aseară la cină. *Paul n-ar face în veci asta.*
14. Acum îmi amintesc foarte bine conținutul prelegerii pe care tocmai am ținut-o. *Dar într-un an voi fi incapabilă să-mi mai amintesc ceva.*

15. Mă întreb cum face să arate așa tânără la 62 de ani. *Bănuiesc că are un regim alimentar foarte echilibrat.*
16. Mă întreb de ce Ion n-a rămas până la sfârșitul ședinței ieri. *Din câte știu a trebuit să plece mai devreme pentru că trebuia să-l aștepte pe fiul său la aeroport.*
17. Ce părere ai de noii noștri studenți Alina și Victor? *Alina vine de la un liceu bun și pare foarte serioasă; în ceea ce-l privește pe Victor, prefer să nu mă pronunț deocamdată.*

"Bad" fillers

1. Suzana mi-a recomandat două cărți să citesc în timpul vacanței, *dar le-am căutat în librării.*
2. Mai multe țări au primit amenințări teroriste, *dar nu-mi voi aminti lista exactă.*
3. Unele clădiri din cartierul nostru au fost grav afectate de cutremur. *Din fericire nicio clădire n-a fost afectată.*
4. S-au discutat mai multe soluții la ședința de ieri, *dar îmi voi aminti care a fost reținută.*
5. Mi-a plăcut concertul foarte mult. *Violonistul va fi trebuit să cânte foarte bine.*
6. Nu se cunosc încă rezultatele alegerilor. *Dar nu-mi mai amintesc cine a câștigat.*
7. Ion nu a plecat în vacanță anul ăsta. *Nu-mi mai amintesc unde.*
8. Maria nu ne-a comunicat încă decizia ei, *dar o va fi făcut-o.*
9. Dan era supărat din cauza unei note. *Nu ar fi trebuit sa fiu o problemă.*
10. Nu-mi cunoșteam vecinii înainte să mă mut aici. *Chiar dacă mi se pare un lucru generos.*
11. Nu înțeleg ce s-a întâmplat. Se pare că fetița asta iar l-a îmbrâncit pe Paul. *Luca va fi și el.*
12. Dacă înțeleg bine ce s-a întâmplat ieri, Ion a fost certat de tatăl său. *Azi mama lui a încercat să pună capăt conflictului.*
13. Clientul a apreciat doar desertul. *Clientul mulțumit a apreciat aperitivul.*
14. Dacă îmi aduc bine aminte, războiul a început acum trei ani. *Cu un an înainte, ONU a încercat să-i pună capăt.*
15. Maria zicea că biografia unuia dintre președinți va ieși anul ăsta, *dar nu-mi aduc aminte de niciuna.*
16. Maria preferă ca Lidia să țină prelegerea. *Paul o preferă pe cea a lui Mihai.*
17. China nu are încredere în dictatorul Coreei de Nord. *Dar are și mai multă încredere în Donald Trump.*

Appendix 2

Outputs of the Cumulative Link Mixed models with each language as reference category for the factor 'Language'

ENGLISH				
Predictor	*Estimate*	*SE*	*Z-value*	*P-value*
DE_ITEM.NEGATION	-0.139	0.394	-0.35	0.72
DE_ITEM.WITHOUT	-0.692	0.388	-1.79	0.07
SCOPE.WIDE	-3.744	0.372	**-10.07**	**<0.001**
LANGUAGE.FRENCH	-0.267	0.401	-0.67	0.51
LANGUAGE.ITALIAN	-0.656	0.347	-1.89	0.06
LANGUAGE.ROMANIAN	-0.362	0.409	-0.89	0.38
DE_ITEM.NEGATION:SCOPE.WIDE	0.885	0.396	**2.23**	**0.03**
DE_ITEM.WITHOUT:SCOPE.WIDE	1.045	0.387	**2.70**	**<0.01**
DE_ITEM.NEGATION:LANGUAGE.FRENCH	-0.950	0.451	**-2.11**	**0.04**
DE_ITEM.WITHOUT:LANGUAGE.FRENCH	-0.253	0.451	-0.56	0.57

DE_ITEM.NEGATION:LANGUAGE.ITALIAN	-1.004	0.392	**-2.56**	**0.01**
DE_ITEM.WITHOUT:LANGUAGE.ITALIAN	-0.338	0.389	-0.87	0.39
DE_ITEM.NEGATION:LANGUAGE.ROMANIAN	-0.767	0.457	-1.68	0.09
DE_ITEM.WITHOUT:LANGUAGE.ROMANIAN	0.640	0.470	1.36	0.17
SCOPE.WIDE:LANGUAGE.FRENCH	0.403	0.550	0.73	0.46
SCOPE.WIDE:LANGUAGE.ITALIAN	0.638	0.481	1.33	0.18
SCOPE.WIDE:LANGUAGE.ROMANIAN	1.085	0.567	1.92	0.06
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.FRENCH	1.948	0.595	**3.28**	**<0.01**
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.FRENCH	1.553	0.589	**2.64**	**0.01**
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ITALIAN	2.331	0.521	**4.48**	**<0.001**
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ITALIAN	1.830	0.514	**3.56**	**<0.001**
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ROMANIAN	1.697	0.605	**2.80**	**<0.01**
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ROMANIAN	-0.072	0.609	-0.12	0.91

Table 2. Summary of the fixed effects of the Cumulative Link Model with English as reference level for 'Language'. Significant values (p<.05) are in bold.

ROMANIAN				
Predictor	*Estimate*	*SE*	*Z-value*	*P-value*
DE_ITEM.NEGATION	-0.906	0.421	**-2.15**	**0.03**
DE_ITEM.WITHOUT	-0.053	0.440	-0.12	0.90
SCOPE.WIDE	-2.659	0.442	**-6.01**	**<0.001**
LANGUAGE.ITALIAN	-0.294	0.384	-0.77	0.44
LANGUAGE.FRENCH	0.095	0.433	0.22	0.83
LANGUAGE.ENGLISH	0.362	0.409	0.89	0.38
DE_ITEM.NEGATION:SCOPE.WIDE	2.582	0.466	**5.54**	**<0.001**
DE_ITEM.WITHOUT:SCOPE.WIDE	0.973	0.478	**2.04**	**0.04**
DE_ITEM.NEGATION:LANGUAGE.ITALIAN	-0.237	0.419	-0.57	0.57
DE_ITEM.WITHOUT:LANGUAGE.ITALIAN	-0.978	0.442	**-2.21**	**0.03**
DE_ITEM.NEGATION:LANGUAGE.FRENCH	-0.184	0.474	-0.39	0.70
DE_ITEM.WITHOUT:LANGUAGE.FRENCH	-0.893	0.497	-1.80	0.07
DE_ITEM.NEGATION:LANGUAGE.ENGLISH	0.767	0.457	1.68	0.09
DE_ITEM.WITHOUT:LANGUAGE.ENGLISH	-0.640	0.470	-1.36	0.17
SCOPE.WIDE:LANGUAGE.ITALIAN	-0.447	0.540	-0.83	0.41
SCOPE.WIDE:LANGUAGE.FRENCH	-0.682	0.602	-1.13	0.26
SCOPE.WIDE:LANGUAGE.ENGLISH	-1.085	0.567	-1.92	0.06
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ITALIAN	0.634	0.572	1.11	0.27
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ITALIAN	1.902	0.586	**3.25**	**<0.01**
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.FRENCH	0.251	0.641	0.39	0.69
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.FRENCH	1.625	0.652	**2.49**	**0.01**
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ENGLISH	-1.697	0.605	**-2.80**	**<0.01**
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ENGLISH	0.072	0.609	0.12	0.91

Table 3. Summary of the fixed effects of the Cumulative Link Model with 'Romanian' as reference level for 'Language'. Significant values (p<.05) are in bold.

FRENCH				
Predictor	*Estimate*	*SE*	*Z-value*	*P-value*
DE_ITEM.NEGATION	-1.089	0.411	**-2.65**	**<0.01**

DE_ITEM.WITHOUT	-0.945	0.416	**-2.27**	**0.02**
SCOPE.WIDE	-3.341	0.418	**-8.00**	**<0.001**
LANGUAGE.ENGLISH	0.267	0.401	0.67	0.51
LANGUAGE.ITALIAN	-0.389	0.373	-1.04	0.30
LANGUAGE.ROMANIAN	-0.095	0.433	-0.22	0.83
DE_ITEM.NEGATION:SCOPE.WIDE	2.833	0.446	**6.35**	**<0.001**
DE_ITEM.WITHOUT:SCOPE.WIDE	2.599	0.445	**5.84**	**<0.001**
DE_ITEM.NEGATION:LANGUAGE.ENGLISH	0.950	0.451	**2.11**	**0.04**
DE_ITEM.WITHOUT:LANGUAGE.ENGLISH	0.253	0.451	0.56	0.57
DE_ITEM.NEGATION:LANGUAGE.ITALIAN	-0.053	0.409	-0.13	0.90
DE_ITEM.WITHOUT:LANGUAGE.ITALIAN	-0.085	0.418	-0.20	0.84
DE_ITEM.NEGATION:LANGUAGE.ROMANIAN	0.184	0.474	0.39	0.70
DE_ITEM.WITHOUT:LANGUAGE.ROMANIAN	0.893	0.497	1.80	0.07
SCOPE.WIDE:LANGUAGE.ENGLISH	-0.403	0.550	-0.73	0.46
SCOPE.WIDE:LANGUAGE.ITALIAN	0.235	0.517	0.46	0.65
SCOPE.WIDE:LANGUAGE.ROMANIAN	0.682	0.602	1.13	0.26
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ENGLISH	-1.948	0.595	**-3.28**	**<0.01**
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ENGLISH	-1.553	0.589	**-2.64**	**0.01**
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ITALIAN	0.382	0.553	0.69	0.49
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ITALIAN	0.277	0.554	0.50	0.62
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ROMANIAN	-0.251	0.641	-0.39	0.69
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ROMANIAN	-1.625	0.652	**-2.49**	**0.01**

Table 4. Summary of the fixed effects of the Cumulative Link Model with 'French' as reference level for 'Language'. Significant values (p<.05) are in bold.

ITALIAN				
Predictor	*Estimate*	*SE*	*Z-value*	*P-value*
DE_ITEM.NEGATION	-1.143	0.346	**-3.31**	**<0.001**
DE_ITEM.WITHOUT	-1.030	0.349	**-2.96**	**<0.01**
SCOPE.WIDE	-3.106	0.320	**-9.71**	**<0.001**
LANGUAGE.FRENCH	0.389	0.373	1.04	0.30
LANGUAGE.ENGLISH	0.656	0.347	1.89	0.06
LANGUAGE.ROMANIAN	0.294	0.384	0.77	0.44
DE_ITEM.NEGATION:SCOPE.WIDE	3.215	0.341	**9.44**	**<0.001**
DE_ITEM.WITHOUT:SCOPE.WIDE	2.875	0.340	**8.46**	**<0.001**
DE_ITEM.NEGATION:LANGUAGE.FRENCH	0.053	0.409	0.13	0.90
DE_ITEM.WITHOUT:LANGUAGE.FRENCH	0.085	0.418	0.20	0.84
DE_ITEM.NEGATION:LANGUAGE.ENGLISH	1.003	0.392	**2.56**	**0.01**
DE_ITEM.WITHOUT:LANGUAGE.ENGLISH	0.338	0.389	0.87	0.39
DE_ITEM.NEGATION:LANGUAGE.ROMANIAN	0.237	0.419	0.57	0.57
DE_ITEM.WITHOUT:LANGUAGE.ROMANIAN	0.978	0.442	**2.21**	**0.03**
SCOPE.WIDE:LANGUAGE.FRENCH	-0.235	0.517	-0.46	0.65
SCOPE.WIDE:LANGUAGE.ENGLISH	-0.638	0.481	-1.33	0.18
SCOPE.WIDE:LANGUAGE.ROMANIAN	0.447	0.540	0.83	0.41
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.FRENCH	-0.382	0.553	-0.69	0.49
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.FRENCH	-0.277	0.554	-0.50	0.62

DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ENGLISH	-2.331	0.521	**-4.48**	**<0.001**
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ENGLISH	-1.830	0.514	**-3.56**	**<0.001**
DE_ITEM.NEGATION:SCOPE.WIDE:LANGUAGE.ROMANIAN	-0.634	0.572	-1.11	0.27
DE_ITEM.WITHOUT:SCOPE.WIDE:LANGUAGE.ROMANIAN	-1.902	0.586	**-3.25**	**<0.01**

Table 5. Summary of the fixed effects of the Cumulative Link Model with 'Italian' as reference level for 'Language'. Significant values ($p<.05$) are in bold.