

Coordination and focus particles (re?)united¹

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Abstract. The aim of this paper is to sketch a unified semantics for coordination markers and focus particles. The main empirical motivation is found in the existence of some ‘multipractic’ particles in Serbian, *ni* and *i*, which serve as coordination markers, additive focus particles and scalar focus particles. A disjunction-based analysis can capture the polarity-sensitive behavior of *ni*, whereas *i* relies on a conjunction semantics. An approach that involves the exhaustification of alternatives is a crucial ingredient. Nonetheless, two types of exhaustification should be allowed — one corresponding to ‘only’ and the other one to ‘even’.

Keywords: Negative Polarity Items, coordination, additive focus particles, scalar focus particles, exhaustification.

1. Introduction

Most research on coordination examines different aspects of conjunction and disjunction markers, focusing on the problems of their syntactic representation and the possibilities for interpretations based on the logical properties of corresponding connectives (Rooth and Partee (1982); Partee and Rooth (1983); Progovac (1998a, b); Szabolcsi and Haddican (2004); Zamparelli (2011)). Both conjunctions and disjunctions are scope-taking elements, and it is important to determine which constituents they have in their scope, as well as how they scopally interact with other functional expressions in a sentence. Special coordination markers that emerge in negative contexts, such as English ‘neither... nor’ (in (1), Wurmbrand (2008)) or French (*ni... ni*) (in (2), González and Demirdache (2015)), have sparked some interest (de Swart (2001); Doetjes (2005); Dagnac (2012); Paperno (2014)).

- (1) Leo ate neither the rice nor the carrots.
- (2) Zoé n’aime *(pas) le thé ni le café.
Zoé *NEG*.likes *NEG* the tea *ni* the coffee
‘Zoé doesn’t like tea nor coffee.’

At the center of attention of the research on this topic is what the logical nature of such connectives is, as well as their (scope) relations with negation. In a similar way, the issue of scope relations with negation and the source of polarity sensitivity are debated for different focus particles, as well:

- (3) (Ian cooked the food.) He washed the dishes too/*either.

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- (4) (Ian didn't cook the food.) He didn't wash the dishes either/?*too.

Among others, Rullmann (2003) and Ahn (2015) discuss the alternation between English 'too' and 'either'. An additive (existential) presupposition is identified as responsible for the contextual restrictions on the distribution of the focus particles in (3) and (4). In the case of scalar focus particles, such as English 'even' (in (5) and (6), Horn (1969)), there is an additional, scalar presupposition that the assertion is less likely than all of its alternatives (Karttunen and Peters (1979)).

- (5) Even Muriel voted for Hubert.

- (6) Not even Muriel voted for Hubert.

Are the three phenomena related in any way and do they have some features in common? What can be observed cross-linguistically is that, in certain cases, one item can perform all of these roles. Along with a 'plain' conjunction marker *i* (8), Serbian² disposes with a coordination marker that only surfaces in negative contexts — *ni* (7). Noting their apparent morphological kinship, a starting hypothesis could thus be that *ni* is the polarity sensitive counterpart of *i*.

- (7) Sofija *(ne) piše (ni) pesme ni priče.
Sofija_{NOM} NEG writes (ni) poems_{SACC} ni stories_{SACC}
'Sofija doesn't write poems or stories'

- (8) Sofija (ne) piše (i) pesme i priče.
Sofija_{NOM} NEG writes (and) poems_{SACC} and stories_{SACC}
'Sofija (doesn't) write(s) poems and/or stories'

As shown below, the same items can also serve as focus particles (FP), with both additive and scalar interpretations available, depending on the context.

- (9) I Lea je uradila domaći.
FP Lea_{NOM} AUX_{3SG} do_{PART} homework_{ACC}
a. 'Lea did the homework, **too**'
b. '**Even** Lea did the homework'

- (10) Ni Lea nije uradila domaći.
FP Lea_{NOM} didn't do_{PART} homework_{ACC}
a. 'Lea didn't do the homework, **either**'
b. 'Not **even** Lea did the homework'

This calls for an investigation of the possibility for a unified analysis of all these different uses of *ni* and *i*. The present paper outlines such a unified analysis, where *i* is treated as a conjunc-

²The language whose official name I use here, calling it Serbian, corresponds to what is (also) known as Bosnian-Croatian-Montenegrin-Serbian or Serbo-Croatian in the linguistic literature.

tion, but *ni* is a polarity sensitive disjunction, and it is only the nature of the individual members of coordination that differs in different uses — pronounced or silent. First the coordination role of *ni* and *i* will be examined, followed by a proposal of an analysis for *ni*. Next, the focus particle uses of *ni* and *i* will be presented, starting with the additive interpretation and followed by the scalar one, along with the corresponding accounts. Finally, some conclusions about a unified analysis will be laid out.

2. Coordination

The present section examines the particle *ni* as a coordination marker, comparing it to *i*.³

2.1. Distribution

In Serbian, sentential negation is indicated by the preverbal marker *ne* (turning into *ni*- when merging with certain auxiliaries). Being a strict Negative Concord language, the presence of multiple negatively marked expressions in one clause does not yield double negation readings in Serbian (11).

- (11) Niko nikad ne jede ništa.
NEG-person NEG-time NEG eats NEG-thing
 ‘Nobody ever eats anything’

The hallmark of the distribution of *ni*-coordination is the requirement for the presence of overt negation in the same clause. Different kinds of phrases can be coordinated by *ni*: DPs⁴ (12), NPs (13), PPs (14), VPs (15). *Ni* can appear as a single marker, introducing only the last member of the coordination, but it can also be reiterated, thus one *ni* heading each member of the coordination. When coordinated constituents are preverbal, single *ni* is ungrammatical⁵. Even though single *ni* is acceptable post-verbally, reiterated *ni* is generally preferred in all positions.

- (12) a. *(Ni) Sofija ni Lea ne ide/idu u školu.
ni Sofija_{NOM} ni Lea_{NOM} NEG go_{Sg}/go_{Pl} to school_{ACC}
 ‘Neither Sofija nor Lea go to school’
 b. Sofija nije upoznala ?(ni) mog brata ni tvoju sestru.
Sofija_{NOM} didn’t meet_{PART} ni my_{ACC} brother_{TACC} ni your_{ACC} sister_{ACC}
 ‘Sofija didn’t meet my brother or your sister’
- (13) a. *(Ni) devojčice ni dečaci ne vole španać.
ni girls_{S_{NOM}} ni boys_{S_{NOM}} NEG like_{Pl} spinach_{ACC}
 ‘Neither girls nor boys like spinach’

³A detailed discussion of the conjunction marker *i* is outside of the scope of the present paper; the reader is referred to Arsenijević (2011).

⁴Both singular and plural agreement on the verb are possible.

⁵Nonetheless, even postverbal subjects coordinated by single *ni* yield strongly degraded sentences.

- b. Sofija ne voli ni španać ni šargarepu.
Sofija_{NOM} NEG likes ni spinach_{ACC} ni carrots_{ACC}
'Sofija doesn't like spinach or carrots'
- (14) Sofija ne čuva knjige ?(ni) na polici ni u fijoci.
Sofija_{NOM} NEG keep_{3SG} books_{ACC} ni on shelf_{LOC} ni in drawer_{LOC}
'Sofija doesn't keep books on the shelf or in the drawer'
- (15) a. Lea nije (ni) pojela sendvič ni popila jogurt.
Lea_{NOM} didn't ni eat_{PART} sandwich_{ACC} ni drink_{PART} yogurt_{ACC}
'Lea didn't eat a/the sandwich or drink (the) yogurt'
- b. Sofija neće (ni) sašiti ni kupiti haljinu.
Sofija_{NOM} won't ni sew_{INF} ni buy_{INF} dress_{ACC}
'Sofija will neither sew nor buy a/the dress'

The conjunction marker *i* can coordinate all of the above phrases, but also CPs (20, 21).

- (16) a. (I) Sofija i Lea (ne) ide/idu u školu.
and Sofija_{NOM} and Lea_{NOM} NEG go_{SG}/go_{PI} to school_{ACC}
'(Both) Sofija and Lea (don't) go to school'
- b. Sofija (ni)je upoznala (i) mog brata i tvoju sestru.
Sofija_{NOM} didn't meet_{PART} and my_{ACC} brother_{ACC} and your_{ACC} sister_{ACC}
'Sofija (didn't) m(e)et (both) my brother and your sister'
- (17) a. (I) devojčice i dečaci (ne) vole španać.
and girls_{NOM} and boys_{NOM} NEG like_{PI} spinach_{ACC}
'(Both) girls and boys (don't) like spinach'
- b. Sofija (ne) voli (i) španać i šargarepu.
Sofija_{NOM} NEG likes and spinach_{ACC} and carrot_{ACC}
'Sofija (doesn't) like (both) spinach and carrots'
- (18) Sofija (ne) čuva knjige (i) na polici i u fijoci.
Sofija_{NOM} NEG keep_{3SG} books_{ACC} and on shelf_{LOC} and in drawer_{LOC}
'Sofija (doesn't) keep(s) books (both) on the shelf and in the drawer'
- (19) a. Lea (ni)je (i) pojela sendvič i popila jogurt.
Lea_{NOM} didn't and eat_{PART} sandwich_{ACC} and drink_{PART} yogurt_{ACC}
'Lea (didn't) (both) eat/ate a/the sandwich and drink (the) yogurt'
- b. Sofija (ne)će (i) sašiti i kupiti haljinu.
Sofija_{NOM} won't and sew_{INF} and buy_{INF} dress_{ACC}
'Sofija will (both/neither) sew and/or buy a/the dress'

(20) (I) Sofija je pojela sendvič i Lea je popila jogurt.
 and Sofija_{NOM AUX3Sg} eat_{PART} sandwich_{ACC} and Lea_{NOM AUX3Sg} drink_{PART} yogurt_{ACC}
 ‘Sofija ate a/the sandwich and Lea drank (the) yogurt’

(21) Ko je došao i šta si video?
 who_{NOM AUX3Sg} come_{PART} and what_{ACC AUX2Sg} see_{PART}
 ‘Who came and what did you see?’

Unlike *ni*, *i* doesn’t have a restricted distribution — it is grammatical in both positive and negative environments, as shown in the examples above. Like *ni*, *i* can also appear as a single or reiterated marker. Nonetheless, single *i* is fully grammatical in all positions, especially when no contrastive focalisation is involved.

Do the apparent morphological kinship between the two coordination markers and their similar distribution indicate that *ni* is to be analyzed as a conjunction? Arsenijević (2011) offers an analysis of Serbo-Croatian connectives (*i*, *a*, *ali*, *ili*, *ni*), focusing on their morphological make-up and the syntax and semantics that can be derived from it, as well as their information structural behavior. In his account, *ni* is described as a negative conjunction, but without weighing in on the possible consequences of such an analysis.

2.2. Conjunction or disjunction?

Out of these two coordination markers, *ni* is the one whose status is debatable. For a strict NC language, such as Serbian, two questions emerge:

- Is *ni* inherently negative or semantically non-negative?
- Is it a conjunction or a disjunction?

It has been proposed that *ni* is a negative conjunction (Arsenijević (2011)). Yet, this is only one of the four logical possibilities resulting from the combination of the two relevant questions:

1. If *ni* is an inherently negative disjunction, the presence of a negative operator in each disjunct would predict readings that are not attested for Serbian sentences with *ni* (such as: ‘Lea didn’t eat a sandwich or she didn’t drink yogurt’ for the example in (15a)).
2. If *ni* is a semantically non-negative conjunction, its dependence on the presence of a clausemate negative operator is problematic.
3. If *ni* is an inherently negative conjunction, each conjunct needs to introduce a negative operator of its own.
4. If *ni* is a non-negative disjunction, all disjuncts would have to be in the scope of one negative operator.

Maintaining only options (3.) and (4.), we establish that they are, in fact, predicted to yield logically equivalent interpretations, as stated by one of the de Morgan's equivalences (22):

$$(22) \quad [\neg p] \wedge [\neg q] = \neg[p \vee q]$$

This makes it impossible to tease apart an interpretation of the *ni*-coordination as a conjunction that has negative operators in its scope (23a) from the one where it is a disjunction in the scope of a negative operator (23b), in simple sentences like (23). At the same time, a reading available for negated 'plain' conjunction *i* (in (24)), but not for *ni* (in (23)), is the one where the conjunction is in the scope of sentential negation, as paraphrased in (24b),⁶ cf. Arsenijević (2011).

(23) Sofija ne piše (ni) pesme ni priče.

Sofija_{NOM} NEG writes (ni) poems_{ACC} ni stories_{ACC}

a. 'Sofija doesn't write poems and she doesn't write stories' $[\neg p] \wedge [\neg q]$

b. 'Sofija doesn't write poems or stories' $\neg[p \vee q]$

(24) Sofija ne piše (i) pesme i priče.

Sofija_{NOM} NEG writes (and) poems_{ACC} and stories_{ACC}

a. 'Sofija doesn't write poems and she doesn't write stories' $[\neg p] \wedge [\neg q]$

b. 'Sofija doesn't write (both) poems and stories (only one of the two)' $\neg[p \wedge q]$

Thus, not only have *ni* and *i* a similar morphological make-up, they also have one interpretation in common, in negative sentences. In the case of *i*, there is no reason to doubt the conjunction status of the connective, as it displays both scope orderings with respect to sentential negation. But is there a way to disentangle the two interpretations of *ni* ((23a) vs. (23b)) and determine whether it is a conjunction or a disjunction?

2.3. Determining the scope of *ni*

In order to create a more transparent LF, an additional scope-taking element can be inserted in the structure. One possible way is to pick a necessity modal as a 'scope-intervener'. This diagnostic would be parallel to the so-called split-scope readings in Germanic languages (Penka (2010); Zeijlstra (2011)). A necessity modal that is interpreted in the scope of sentential negation allows to test whether *ni* is unambiguously a narrow scope disjunction (25). However, if the modal is outscoped by both the sentential negation and the *ni*-coordination, two equivalent interpretations (26) are again possible.

$$(25) \quad \neg > \square > [p \vee q]$$

$$(26) \quad \text{a. } \neg [[\square p] \vee [\square q]] = \text{b. } [\neg \square p] \wedge [\neg \square q]$$

The corresponding readings available for the Serbian example in (27) are paraphrased below:

⁶When *i* is reiterated in the negated sentence in (24), only the reading (24b) is available.

- (27) (Sofija) ne mora ni da kuva ni da čisti.
 Sofija_{NOM} NEG has-to ni_{FIN} cook ni_{FIN} clean
- a. (25): ‘it is not necessary that Sofija cooks or cleans’
- b. i. (26a): ‘it is not the case that it is necessary for Sofija to cook or that it is necessary for Sofija to clean’
- ii. (26b): ‘it is not necessary for Sofija to cook and it is not necessary for Sofija to clean’

These readings don’t appear to be very distinct from each other, and this is because there is an entailment relation between them: the scopal configuration in (25) entails the ones in (26). It thus needs to be verified whether the only possible reading is the one paraphrased in (27a) or whether the readings in (27b) are independently available. A potential disambiguating scenario would be the following one:

- (28) Sofija’s aunt owns a restaurant and she needs some extra workforce, namely for cooking and cleaning, so Sofija’s mother sends her over to help out during summer holidays. The mother thus obliged Sofija to help her aunt out in the restaurant, but without designating either of the two chores as a particular requirement.

The scenario in (28) renders only (26/27b) true. Importantly, the sentence in (27) is not accepted by native speakers in this scenario, which discards the reading in (27b). This provides evidence for a narrow-scope disjunction account of *ni*, since the only available reading is the one (27a) where *ni* cannot be reanalyzed as a wide scope conjunction.

Intervention with modals speaks in favor of analyzing *ni* as a disjunction in the scope of sentential negation. But is there any further evidence? A second test for teasing apart the two interpretations involves a quantificational adverb as the intervening element, inspired by Shimoyama (2011). An adverb that outscopes sentential negation allows to test whether *ni* is unambiguously a wide scope conjunction (29). Nonetheless, when the adverb outscopes both the sentential negation and the *ni*-coordination, two equivalent interpretations are possible (30).

$$(29) (Q_{adv} \neg p) \wedge (Q_{adv} \neg q)$$

$$(30) a. Q_{adv} > (\neg p \wedge \neg q) = b. Q_{adv} > \neg(p \vee q)$$

If *ni* is a conjunction that has the negative operators in its scope, the interpretation in (29) should be available for the sentence in (31). But the reading in (31b), which can be represented through two logically equivalent LFs, also seems to be available, at first glance.

- (31) Sofija obično nije (ni) kuvala ni čistila.
 Sofija_{NOM} usually didn’t ni_{FIN} COOK_{PART} ni_{FIN} CLEAN_{PART}
- a. (29): ‘It was usually not the case that Sofija cooked and it was usually not the case that Sofija cleaned’
- b. i. (30a): ‘It was usually the case that Sofija didn’t cook and that Sofija didn’t clean’

- ii. (30b): ‘It was usually not the case that Sofija cooked or cleaned’

Again, there is an entailment relation between these readings: the one in (31b) entails the one in (31a). In order to check whether the configuration in which *ni* can only be interpreted as a conjunction scoping over negation (31a) is available independently from the other one (31b), a context incompatible with the latter needs to be construed. Such a disambiguating scenario is given in the table in (32) — this state of affairs is compatible only with the interpretation in (31a). The reading in (31b) does not correspond to the distribution given in (32) because there were only two out of six days in which Sofija neither cooked nor cleaned (namely Tuesday and Friday), and this is not the majority of days, thus insufficient for employing ‘usually’. When native speakers are asked to judge, the sentence in (31) turns out to be unacceptable in the distribution depicted in (32). This provides evidence against an analysis of *ni* as a conjunction that outscopes sentential negation.

(32)	Mon	Tue	Wed	Thu	Fri	Sat
cooking	yes	no	no	no	no	yes
cleaning	no	no	yes	yes	no	no

Tests that rely on more complex quantificational configurations, with necessity modals or quantificational adverbs as potential interveners, show that Serbian *ni* behaves as a disjunction in the scope of a negative operator and not as a conjunction that scopes over negative operators.

An additional argument against a conjunction-based analysis comes from the observation that (*ni...*) *ni* is incompatible with collective predicates, as shown in the examples (33, 34). Furthermore, a predicate of a sentence whose subjects are coordinated by *ni* cannot be overtly modified with ‘together’ (35).

- (33) * Ni Sofija ni Lea (ni Marko) se nisu sreli u biblioteci.
 ni Sofija_{NOM} ni Lea_{NOM} ni Marko_{NOM} REFL didn’t meet_{PART} in library_{LOC}
 ‘Sofija, Lea and Marko didn’t meet (each other) in the library.’

- (34) * Ni Sofija ni Lea (ni Marko) nisu oformili tim.
 ni Sofija_{NOM} ni Lea_{NOM} ni Marko_{NOM} didn’t form_{PART} team_{ACC}
 ‘Sofija, Lea and Marko didn’t form a team (together).’

- (35) * Ni Sofija ni Lea (ni Marko) ne pišu projekte zajedno.
 ni Sofija_{NOM} ni Lea_{NOM} ni Marko_{NOM} NEG write_{PI} projects_{ACC} together
 ‘Sofija, Lea and Marko don’t write projects together’

This would be unexpected for a conjunction-based connective, as they normally exhibit non-Boolean interpretations with coordinated subject NPs/DPs (Champollion (2016)). However, Sofija and Lea (and Marko) cannot be interpreted as a semantic plurality in the examples above.

2.4. Strong NPI *ni*

The previous section revealed empirical evidence for a narrow scope disjunction analysis of Serbian *ni*, where it has been shown that this coordination marker must remain in the scope of sentential negation. This finding makes *ni* a good candidate for an NPI⁷ (Ladusaw (1979), Chierchia (2013), inter alia), as exemplified for English ‘anyone’ in (36). But NPIs are known to be grammatical in weaker, Downward Entailing (DE) environments,⁸ such as the scope of ‘few’ in (37).

(36) Lea didn’t see anyone.

(37) Few students saw anyone.

Ni-coordination is ungrammatical in DE contexts, as shown in (38). But this only means that *ni* cannot be analyzed as a weak NPI (Zwarts (1998)).

(38) *Malo dece voli (ni) španać ni šargarepu.
 few children_{GEN} likes ni spinach_{ACC} ni carrot_{ACC}
 ‘Few children like spinach or carrots’

In fact, *ni*-coordination is grammatical only in anti-additive (39) contexts.⁹ This makes it a suitable candidate for a strong NPI.

(39) Niko ne voli (ni) španać ni šargarepu.
 ni-who_{NOM} NEG likes ni spinach_{ACC} ni carrot_{ACC}
 ‘Nobody likes spinach or carrots’

What is the syntactic and semantic mechanism that is behind such polarity sensitivity of *ni*?

3. Proposal

Building on the work of his predecessors (Kadmon and Landman (1993), Krifka (1995), Gajewski (2002)), Chierchia (2013) argues that the source of polarity sensitivity of NPIs is a logical contradiction that arises when they appear in an upward or non-monotone environment. What distinguishes NPIs from expressions that are not polarity sensitive are the obligatory alterna-

⁷The unclear status of the *ni*-coordination in fragment answers makes an analysis in terms of a pure neg-word (Negative Concord Item) less appealing.

(i) A: Koga si pozvao? B: ??? Ni Lea ni Sofiju.
 who_{ACC} AUX2SG invite_{PART} ni Lea_{ACC} ni Sofija_{ACC}
 A: Who did you invite? B: ??? Neither Lea nor Sofija.

⁸These environments allow for inferences from sets to subsets: ‘Few girls wore dresses’ → ‘Few girls wore blue dresses’.

⁹Such environments satisfy the equivalence: $f(X \cup Y) \Leftrightarrow f(X) \cap f(Y)$; for example — ‘No girls sang or danced’ is equivalent to ‘No girls sang and no girls danced’.

tives that NPIs introduce, as well as the presence of a covert exhaustifying operator. The null head that hosts this operator must be able to value the features present on the NPI, through a feature-checking operation under c-command. The role of the operator is then to negate all the alternatives activated by the NPI that are not entailed by the assertion. In a non-DE context such exhaustification will lead to a contradiction.

Understood through this framework, the polarity sensitive behavior of Serbian *ni* stems from the presence of two formal features $[\sigma, D]$ which need to be valued by matching features present on a c-commanding operator $O^S_{[+\sigma, +D]}$. Once the agreement between $ni_{[-\sigma, -D]}$ and $O^S_{[+\sigma, +D]}$ is established, the scalar (σ) and subdomain (D) alternatives are activated for the *ni*-coordination. The scalar (σ) alternative for a disjunction is a conjunction (its stronger scalemate), whereas subdomain (D) alternatives are drawn from the individual members of the *ni*-coordination. The role of the O^S operator is to perform the exhaustification of both scalar and domain alternatives associated with the *ni*-coordination.¹⁰ In other words, all alternatives that are not entailed by the assertion have to be negated. The O^S operator (40)¹¹ is thus similar in effect to the focus particle ‘only’.

$$(40) \quad \|\mathcal{O}_{(\sigma, D)\text{-ALT}} \phi\|^{g, w} = \|\phi\|^{g, w} \wedge \forall p \in \|\phi\|^{(\sigma, D)\text{-ALT}} [p \rightarrow \lambda w' \|\phi\|^{g, w'} \subseteq p]$$

When (*ni* . . .) *ni* is found in a positive sentence (41), the exhaustified alternatives end up being incompatible with the assertion (42a). Namely, the result of the exhaustification performed by O^S (42e) states that neither of the individual disjuncts (p, q) is true, but the assertion says that (at least) one of them must be true (due to the meaning of the disjunction). This yields a clear contradiction, as shown in (42e).

- (41) *Sofija piše (ni) pesme ni priče.
 Sofija_{NOM} writes (ni) poems_{SACC} ni stories_{SACC}
 ‘Sofija writes *ni* poems *ni* stories’

- (42) a. Assertion: $O^S(p \vee q)$
 b. where p = ‘Sofija writes poems’ and q = ‘Sofija writes stories’
 c. Scalar (σ) alternatives: $p \wedge q$
 d. Subdomain (D) alternatives: p, q
 e. After EXH: $(p \vee q) \wedge \neg(p \wedge q) \wedge \neg p \wedge \neg q$

Sets of scalar and subdomain alternatives are posited for the ‘plain’ disjunction (such as English ‘or’), as well (Sauerland (2004); Fox (2007)). What makes the difference in the case of NPIs, such as *ni*, is that these alternatives are always present and must invoke the presence of an exhaustifying operator. This is due to the agreement operation between the covert ONLY-operator and *ni*, which is required for the syntactic grammaticality of the sentence. But this restricts a *ni*-coordination to anti-additive contexts, such as the sentential negation in (43), since it is logically sustainable only in such scale-reversing environments. Plain disjunction

¹⁰ Arsenijević (2011) also mentions a ‘Domain-Broadening effect’, referring to Chierchia (2006), introduced by the combination of the negative marker component *n-* and the additive *i* in *ni*.

¹¹ Modified from Chierchia (2013), p.138.

‘or’, for example, does not have such a restricted distribution, since its sets of alternatives are not necessarily active.

- (43) Sofija ne piše (ni) pesme ni priče.
 Sofija_{NOM} NEG writes (ni) poems_{ACC} ni stories_{ACC}
 ‘Sofija doesn’t write poems or stories’

- (44) a. Assertion: $O^S \neg(p \vee q)$
 b. where $p =$ ‘Sofija writes poems’ and $q =$ ‘Sofija writes stories’
 c. Scalar (σ) alternatives: $\neg(p \wedge q)$
 d. Subdomain (D) alternatives: $\neg p, \neg q$
 e. After EXH: $\neg(p \vee q)$

In contrast, when a negative environment hosts *ni*-coordination (43), the exhaustification of alternatives turns out to be vacuous (44e). This time, the assertion (44a) is the strongest of all the alternatives, i.e. it entails all the other alternatives — scalar (44c), as well as subdomain (44d), so there is no alternative to be negated. Crucially, after the syntactic agreement is effectuated and the sets of alternatives activated, no logical contradiction arises.

3.1. Why ‘strong’?

If a scale-reversing context prevents the logical contradiction to arise due to the presence of an NPI, it is still unclear why *ni*-coordination needs an anti-additive environment and why it is not acceptable in a weaker DE context. Following Gajewski (2011), Chierchia (2013) argues that it is not the anti-additivity to be held responsible for this. He introduces a parametric switch manifested in the so-called strong exhaustification, performed by O^S . Instead of exhaustifying only subdomain alternatives,¹² O^S is sensitive to the scalar alternatives as well. But, once it is invoked, the O^S operator cannot remain blind to the potential alternatives of other scalar elements that can be found in the same sentence. As a result, when found in the scope of an alternative-sensitive operator at LF, even scalar items which do not obligatorily carry active sets of alternatives, such as the quantifier ‘few NP’, have their scalar alternatives activated, for example, ‘some NP’. For this reason, (*ni...*) *ni* is ungrammatical in DE contexts such as the scope of ‘few NP’ in (45) — ‘few children like x’ gives rise to an additional implicature that ‘some children like x’ and this positive implicature provokes a contradiction, as shown in (46e).¹³

- (45) *Malo dece voli (ni) španać ni šargarepu.
 few children_{GEN} likes ni spinach_{ACC} ni carrot_{ACC}
 ‘Few children like spinach or carrots’

¹²This would, in fact, be sufficient to account for weak NPIs, since negating their scalar alternative in a positive context wouldn’t lead to a contradiction — ‘It is not the case that Sofija writes poems and stories’ is not incompatible with ‘Sofija writes poems or stories’, it is merely an implicature that would arise obligatorily.

¹³Along with its scalar alternatives, subdomain alternatives are also triggered for FEW, however, this is not exemplified here, as scalar alternatives suffice to make the point.

- (46) a. Assertion: $O^S \text{ FEW}_{ch} (P \text{ OR } Q)$
 b. where $P =$ ‘like spinach’, $Q =$ ‘like carrots’, and $\text{FEW}_{ch} =$ ‘few children’
 c. Scalar (σ) alternatives: $\text{FEW}_{ch} (P \text{ AND } Q)$; $\text{NO}_{ch} (P \text{ OR } Q)$, $\text{NOT-ALL}_{ch}(P \text{ OR } Q)$,...
 d. Subdomain (D) alternatives: $\text{FEW}_{ch} P$, $\text{FEW}_{ch} Q$
 e. After EXH: $\text{FEW}_{ch} (P \text{ OR } Q) \wedge \text{FEW}_{ch} (P \text{ AND } Q) \wedge \neg \text{NO}_{ch} (P \text{ OR } Q) \wedge \text{NOT-ALL}_{ch}(P \text{ OR } Q) = \text{FEW}_{ch} (P \text{ OR } Q) \wedge \text{FEW}_{ch} (P \text{ AND } Q) \wedge \text{SOME}_{ch} (P \text{ OR } Q) \wedge \text{NOT-ALL}_{ch} (P \text{ OR } Q)$

Strong exhaustification thus takes into account not only the truth-conditional component of the meaning, but also the presuppositions and the implicatures. This is why strong NPIs are not acceptable in DE contexts, since additional scalar implicatures may arise and yield a contradiction after exhaustification. In contrast, weak NPIs are not coupled with an operator that performs strong exhaustification O^S , but with a ‘plain’ operator O , which looks only at the truth-conditional component of meaning and neglects presuppositions and implicatures.

3.2. What about *i*?

The conjunction *i* does not carry obligatory sets of scalar and subdomain alternatives (for whose activation the formal features $[\sigma]$ and $[D]$ are in charge). Therefore, as a coordination marker, *i* does not depend on the presence of an exhaustification operator, nor a scale-reversing environment for that matter. Activation of these alternatives is, nonetheless, possible, the difference with respect to *ni* being that it is not obligatory for *i*.

4. Focus particles

As exemplified in the introduction of this paper, both *i* and *ni* can serve as focus particles. Depending on whether the set of focal alternatives entailed by the previous context is ordered on a likelihood scale or a simple unordered set, the contribution to the interpretation is, respectively, that of a scalar or an additive focus particle. The present section argues that an ‘even’-based exhaustification is thus needed for both particles in their scalar focus particle incarnation.

4.1. Additive focus particles *i* and *ni*

As an additive focus particle, *i* can associate with constituents of different kinds and activate the corresponding unordered sets of focus alternatives ((47a) for the example in (47b)).¹⁴ Following Ahn (2015)’s analysis of English ‘too’, *i* is analyzed as a conjunction which, this time, takes as its arguments the host proposition p and a silent anaphor q (48), where q is a member of the focus value (Rooth (1992)) of p . This means that, when the conjunction *i* lacks overt multiple conjuncts, one of its members of coordination remains covert, and this is the null anaphor. Due to the presence of the anaphor, a salient antecedent must be available in the preceding context

¹⁴Serbian is a pro-drop language.

in order for the sentence with an additive *i* to be felicitous. The anaphor *q* thus must be entailed by a member of the set of alternatives in the focus value of *p* (Rullmann (2003)), and this alternative must be distinct from *p* (Kripke (2009)). No exhaustification takes place, since *i* does not carry any formal features in charge of activating scalar and subdomain alternatives.

- (47) a. ‘She washed the dishes’, ‘She fed the dog’, ‘She practised the piano’ . . .
 b. I domaći je uradila.
 also homework_{ACC} AUX3Sg dOPART.F
 ‘She also did the homework’

- (48) Assertion: $p \wedge q$

Ni also serves as an additive focus particle, but one that only appears in anti-additive contexts, similar to English ‘either’. In this use, single *ni* attaches to a focalized constituent and activates the corresponding unordered set of alternatives ((49a) for (49b)). Additive focus particle *ni* is infelicitous in the absence of a negative contextual antecedent.

- (49) a. ‘She didn’t wash the dishes’, ‘She didn’t feed the dog’, ‘She didn’t practise the piano’ . . .
 b. Ni domaći nije uradila.
 (n)either homework_{ACC} didn’t dOPART.F
 ‘She didn’t do the homework, either’

This is due to the presence of a silent anaphor in the semantics of focus particle *ni*, which must be entailed by a member of the set of focus alternatives of the host proposition. *Ni* is analyzed as a disjunction which takes as its arguments the host proposition *p* and the silent anaphor *q* (following Ahn (2015)’s proposal for ‘either’ in English). The difference between *ni*-coordination and *ni* additive particle is that in the latter case one disjunct is covert.

The polarity sensitivity of the additive focus particle *ni* is predicted by its disjunctive nature. Even in the absence of overt multiple members of the coordination, *ni* carries the formal features $[\sigma, D]$ in charge of activating scalar and subdomain alternatives. The same exhaustification mechanism is at work and it applies vacuously in a negative environment (50), such as in the example in (49b). This is due to the fact that the assertion (50a) is the strongest alternative (50e).

- (50) a. Assertion: $O^S \neg(p \vee q)$
 b. where $p =$ ‘She did the homework’ and $q \in [[p]]^F$
 c. Scalar (σ) alternatives: $\neg(p \wedge q)$
 d. Subdomain (D) alternatives: $\neg p, \neg q$
 e. After EXH: $\neg(p \vee q)$

Additive focus particle *ni* is unacceptable in a positive sentence (51) for the same reason as the coordination marker *ni* — a contradiction arises between the assertion and the exhaustified

alternatives (52e).

- (51) * Ni domaći je uradila.
 (n)either homework_{ACC} AUX3Sg do_{PART.F}
 ‘*She did the homework, either’
- (52) a. Assertion: $O^S(p \vee q)$
 b. where p = ‘She did the homework’ and $q \in [[p]]^F$
 c. Scalar (σ) alternatives: $p \wedge q$
 d. Subdomain (D) alternatives: p, q
 e. After EXH: $(p \vee q) \wedge \neg(p \wedge q) \wedge \neg p \wedge \neg q$

It turns out that the coordination and the additive focus particle use of *(n)i* can be treated on a par, if the status of the arguments that they take as a conjunction or a disjunction is allowed to be different — either an overt member of the coordination or a silent anaphor.

4.2. Scalar focus particles *i* and *ni*

When used as focus particles, *ni* and *i* can have either an additive or a scalar contribution to the meaning of the sentence. The flip from the former to the latter is made once the set of focus alternatives becomes ordered on a likelihood scale, as exemplified for *i* in (53) and for *ni* in (54).

- (53) a. ‘She did the homework’ < ‘She washed the dishes’ < ‘She fed the dog’ ...
 b. (Čak) i domaći je uradila.
 even even homework_{ACC} AUX3Sg do_{PART.F}
 ‘She even did the homework’
- (54) a. ‘She didn’t do the homework’ < ‘She didn’t wash the dishes’ < ‘She didn’t feed the dog’ ...
 b. (Čak) ni domaći nije uradila.
 even even homework_{ACC} didn’t do_{PART.F}
 ‘She didn’t even do the homework’

The importance of the context is essential — the distinction between an additive and a scalar use of these particles depends solely on whether the alternatives are ordered or not, and this information can be retrieved from the context. The interpretation of *ni* and *i* as scalar focus particles requires emphasis and heavy stress is needed on the associate of the particle. Some other circumstances that can enforce this are information structural effects and the addition of an ‘even’-like particle in Serbian — *čak*.¹⁵ As for the latter, the presence of *čak* is possible, but

¹⁵In the case of the scalar focus particle *i*, the universal quantifier *sve* (= ‘everything’) can marginally be used instead of *čak*.

not necessary. As a rough generalization, this additional particle is needed when the constituent that (ni) is attached to is topicalized.¹⁶

Is there an account for the scalar uses of i and ni that would be parallel to the one proposed in the previous section for the additive uses? Recall that we made use of conjunctions and disjunctions of the assertions and some propositional anaphors, respectively. ONLY-exhaustification was then used to explain the restricted distribution of ni . The difference that exists between the additive and the scalar use of these focus particles requires a different operator, one that can capture the scalar ordering of alternatives. An operator modelled after ‘even’ has been proposed by Chierchia (2013):

- (55) $E_{ALT}(p) = p \wedge \forall q \in ALT [p <_{\mu} q]$
 where ‘ $p <_{\mu} q$ ’ says that p is less likely than q with respect to some contextually relevant probability measure μ

When applied to the examples above ((53) and (54)), such EVEN-exhaustification looks like (56) and (57), respectively.

- (56) Scalar focus particle i
- a. Assertion: $E(p \wedge q)$
 - b. where $p =$ ‘She did the homework’ and $q \in [[p]]^F$
 - c. After EXH: $p \wedge q \wedge p <_{\mu} q$
- (57) Scalar focus particle ni
- a. Assertion: $\neg E^S(p \vee q)$
 - b. where $p =$ ‘She did the homework’ and $q \in [[p]]^F$
 - c. Scalar (σ) alternatives: $\neg(p \wedge q)$
 - d. Subdomain (D) alternatives: $\neg p, \neg q$
 - e. After EXH: $\neg(p \vee q \vee p <_{\mu} q) = \neg p \wedge \neg q \wedge \neg p <_{\mu} \neg q$

The E operator is invoked to signal that the assertion is the least likely among the relevant alternatives. Such a mechanism is needed both for the scalar focus particle i (56) and for the scalar focus particle ni (57). This is the first time that some sort of exhaustification is needed for both the polarity sensitive (ni) and the ‘plain’ item (i). Note that, distributionally, these two expressions obey the same restrictions when they are scalar focus particles, as when they are additive focus particles — that is, ni is only grammatical in anti-additive contexts.

As a disjunction bearing $[-\sigma, -D]$ features, ni gets checked and valued by a c-commanding $E_{[-\sigma, -D]}$ operator. E^S activates a set of parallel, focus alternatives, ordered with respect to some contextually salient probability measure μ . In the case of the scalar use of i , the result of the exhaustification (56c) assures not just that both the assertion and the propositional anaphor hold (as with the additive use), but also that the former is less likely than the latter. As for the

¹⁶It feels more natural to have the word order used in the examples (53b) and (54b) when scalarity is invoked without the help of the ‘even’-like particle *čak*, although other word orders are also seem to be possible.

scalar use of *ni*, after exhaustification we get that not only the assertion and the propositional anaphor do not hold, but also the assertion not holding is less likely than any focus alternative not holding.

This proposal would capture one of the two possible interpretations of (53b), namely the scalar one, where Lea did the homework, she did something else as well, and Lea doing the homework was the least likely thing she could do. As for (54b), its scalar interpretation corresponds to: it is not the case that Lea did the homework, it is not the case that she did something else, and Lea not doing the homework was the least expected thing.

What is the link between the ONLY and the EVEN-exhaustification? In other words, why are these two mechanisms united in different interpretations of the same expressions? At first glance, there is nothing connecting the two types of exhaustification or the natural language expressions they are modelled after ('only' and 'even'). But notice that 'only' can acquire emphasis and receive a richer meaning than the one that is canonically attributed to it:

(58) I can only imagine what it looked like!

(59) He managed to read only one book (out of 50 that were on the list)!

In the above examples we see that the focus particle 'only' can, in addition to its regular expective meaning, implicate that the alternative that constitutes the assertion is the most likely. It means that this focus particle is also capable of expressing scalar ordering between different alternatives, under heavy emphasis, although it represents the mirror image of 'even' in positive contexts ('least likely' vs. 'most likely'). However, in the case of additive focus particles *ni* ('either') and *i* ('also'), we are not dealing with an overt 'only' particle, but with an 'only'-like exhaustification whose mechanism is fixed (40). It is thus still unclear how the switch from ONLY to EVEN exhaustification happens in one and the same item, if their mechanisms are fixed and essentially different from each other (with or without a probability measure).

5. Conclusions

This paper tried to provide a unified analysis for *ni* as a coordination marker and *ni* as a focus particle, since the source of their polarity sensitivity is identified as the same — their disjunctive nature in combination with the sets of alternatives they obligatorily introduce. Serbian particle *ni* is analyzed as a strong NPI disjunction that is always found in the scope of a negative operator and whose alternatives must be exhaustified. Scope diagnostics with necessity modals and quantificational adverbs provide additional evidence for the disjunction-based analysis of *ni*. Its polarity sensitive behavior results from its lexical specification — the particle must agree with a *c*-commanding silent operator, which makes the subdomain and scalar alternatives active and subject to exhaustification. The present account of different roles in grammar performed by *ni* is related to the distributionally non-restricted conjunction *i*, which also acts as an additive and a scalar focus particle.

The paper shows, on the case of *ni*, that an alternatives and exhaustification approach can also

be useful for analyzing polarity sensitive coordination markers. Crucially, it fits with the rest of the framework, since the lowest scalar elements exhibit negative polarity in all described cases (indefinites, modals, and now a disjunction).

Diachronic studies in the field of coordination strategies cross-linguistically report a common additive origin for a number of Indo-European conjunctions and additive particles (Goldstein (2016)), Old Church Slavonic *i* being among them. The reasoning is the following: if the additive particle is indeed a binary operator, as soon as the antecedent of the silent anaphor is immediately preceding the host in the discourse, the additive particle is easily reanalyzed as a conjunction. However, the opposite reasoning could also hold — such particles are used as coordinators at first (as advanced by Szabolcsi (2016)), and once the structure is left with only one member of the coordination, another one must be understood as silent, in order to rescue the meaning of the sentence.

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