Negative polarity additive particles

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Abstract. Many languages have pairs of additive markers that exhibit a common morphological core. This paper focuses on the Romanian pair *şi* and *nici* and offers an analysis that derives their distribution and interpretation. The crux of the analysis is the claim that *nici* spells out the negative marker N and the additive particle ADD; N is argued to contribute the negative polarity component while ADD is assumed to make the same contribution as the positive particle, *şi*.

Keywords: additive marker · polarity · exhaustification · alternatives · coordination · scalarity · presupposition.

1 Introduction

1.1 Data of interest

The goal of this paper is to present a novel account of additive particles like *too* and *either*, with a special focus on their Romanian counterparts *şi* and *nici*. We first begin with an overview of their distribution and interpretation when acting as additive particles. The positive additive marker *şi*, like English *too*, appears predominantly in positive contexts where it makes the additive contribution that the predication holds of at least one other alternative to its associate. In the second sentence in (1), the additive component is that Maria drinks something else besides beer, namely wine.[1]

(1) Maria bea vin. Bea şi bere.
Maria drinks wine. drinks ADD beer
'Maria drinks wine. She drinks beer too.'

⋆ I am indebted to Gennaro Chierchia, Luka Crnič, Anamaria Fălăuş, Uli Sauerland and Yasu Sudo for their time and knowledge shared while discussing these issues with me, as well as the many anonymous reviewers who have assessed this work in its various previous forms and the editors of TLLM2020. This research was supported by the German Science Foundation (DFG) via grant NI 1850/2-1.

[1] All Romanian data reported in this paper are the author's, a native speaker of Romanian, and have been checked with at least one other person for both grammaticality and acceptability judgements.

Note that the use of *şi* in the second sentence would not have been felicitous in the absence of an antecedent proposition such as the one provided by the first sentence specifying what else Maria drank.[2] For this reason, the additive component, which is generally argued to be a presupposition, is more specifically referred to as the antecedent requirement since the felicity conditions on the use of such additive particles is dependent on there being an antecedent in the discourse.

Şi can also occur with negation, but when it does, it is usually as a negative answer in response to a possibly implicit question such as (2). This is the case regardless of the locality of negation, as shown by the lack of contrast between the two sentences in (2a-b). Note that here too, as in the case in (1), the antecedent proposition must be positive, namely that Maria wants wine.

(2) Ştiu că vrea apă, dar vrea şi bere?
know that wants water, but want ADD beer?
'I know she wants water, but does want beer too?'

a. Nu vrea şi bere.
not wants ADD beer
'She doesn't want beer too.'

b. Nu cred că vrea şi bere.
not think that want ADD beer
'I don't think she wants beer too.'

Contrast this with the negative marker *nici*, which, like the English additive *either*, must co-occur with negation and requires a negative antecedent.[3] The use of *nici* in (3) conveys that Paul drank neither beer, nor another salient alternative to beer, wine in the case below.

(3) Paul *(nu) bea vin. *(Nu) bea nici bere.
Paul not drinks wine. Not drinks N-ADD beer.
'Paul doesn't drink wine. He doesn't drink beer either.'

1.2 The goal of this paper

In a recent analysis that aims to account for the distribution of English *too* and *either*, Ahn (2015) takes *too* to denote an anaphoric conjunction and *either* an anaphoric disjunction. By taking *either* to denote a disjunction, she argues that its restricted distribution can be explained by the same mechanism deriving the restricted distribution of other elements with disjunctive/existential semantics, e.g. the English negative polarity item (NPI) *any*. While this analysis

[2] At the same time, the use of *şi* seems obligatory, as has been pointed out to be the case with additive particles more generally. This issue has been investigated at length in Krifka 1998; Saebo 2004; Bade 2015 and we will return to it briefly in the analysis section.

[3] The antecedent proposition does not have to include the sentential negation, unlike the host proposition. It is enough if it's claimed that Paul dislikes wine.

captures the data, it is arguably not well suited for the Romanian data for the following reason. The morphology of the Romanian particles suggests a common core to the positive and negative particles, and this generalization persists cross-linguistically, with other examples including Italian *anche* and *neanche* and Serbian *i* and *ni*. Given that the positive additive marker is commonly also employed as a conjunctive marker cross-linguistically, offering an additive, and thus a conjunctive semantics to both the positive and negative markers is desirable.

The goal of this paper is to present such an analysis, one which takes both markers to make the same additive contribution. I will propose that both *şi* and *nici* contribute additivity, with the negative marker furthermore carrying an additional component that delivers the negative restriction; in this way I will depart from Ahn's proposal which takes only the positive particle to contribute additivity. This analysis will be shown to parallel that of other duals in the QP domain, such as positive existential quantifiers and NPIs, like *some* and *any*.

The paper is organized as follows. Section 2 lays out the analysis of the positive additive marker, accounting for its distribution and interpretation in both positive and negative contexts, as well as the antecedent requirement. Section 3 presents the analysis of the negative additive marker and shows how this analysis can account for its interpretation and its restricted distribution. Section 4 concludes with a number of open questions and directions for future research.

2 The positive additive marker

2.1 Deriving the additive meaning

Szabolcsi (2017) claims that "*too* is a functional element whose only mission is to induce an additive presupposition." I follow her and previous authors Bade (2015); Mitrović and Sauerland (2014, 2016) and assume that the additive marker is semantically vacuous but signals that an alternative proposition where the additive *too* is replaced by the exclusive particle *only* is not true. I will implement this intuition within an exhaustification framework by arguing that additive markers trigger obligatory exhaustification with respect to an alternative proposition containing a silent exhaustification operator. Before turning to the details of this analysis, I provide a very quick overview of how exhaustification operators work.

The exhaustification framework takes certain inferences, in particular scalar implicatures, to be derived in the grammar via silent operators (Chierchia et al., 2012). Implicatures are claimed to arise as the result of a syntactic ambiguity resolution in favor of an LF which contains a covert exhaustivity operator EXH (building on work in Groenendijk and Stokhof 1984, Chierchia 2004, Spector 2006, Fox 2007, among others). Scalar elements (e.g. the disjunction and conjunction particles) activate alternatives and the grammar integrates these alternatives within the meaning of the utterance by means of this exhaustification operator which is similar to overt *only* in that it negates all stronger alternatives. There are two important differences however: (i) unlike *only*, this operator

also asserts its prejacent, and (ii) stronger alternatives are negated as long as no contradiction results when their negation is conjoined with the assertion.[4] These two points are encoded in its semantics below where IE(p, *Alt*(p)) is meant to pick out those alternatives which are innocently excludable, that is, whose negation does not lead to a contradiction:

(4) EXH(p) = p∧∀q[q∈IE(p, *Alt*(p))→ ¬q]
where IE(p, *Alt*(p)) = ∩ {C′ ⊂*Alt*(p): C' is a max subset of *Alt*(p) s.t. {¬q:q∈C'}∪{p} is consistent}

Let us consider how the scalar implicature associated with disjunction is generated. The first question to ask is what the alternatives to the disjunction are. Besides the conjunctive alternative, the individual disjuncts are also taken to be relevant, following Sauerland's 2004 proposal. Applying EXH delivers the strengthened exclusive interpretation that only one of the disjuncts is true by negating the one innocently excludable alternative, the conjunctive alternative. Note that negating either of the disjuncts would result in a contradiction.

(5) LF: EXH [p∨q]
a. *Alt*(p∨q) = {p∨q, p, q, p∧q}
b. ⟦EXH [p∨q]⟧ = (p∨q)∧¬(p∧q)

Returning to the case at hand, I will argue that the alternative to *şi p* is EXH *p*, as in (6a). I assume going forward that the additive particle spells out ADD. Since the alternative EXH *p*, which amounts to *p and nothing else*, is stronger than *p* itself, it gets negated, as in (6b). The result is the expected conjunctive meaning that both the host proposition *p* and an alternative are true: *p and not only p*.[5] The intuition should be clear: the use of the additive particle is meant to mark that an exclusive interpretation was not intended. This is also entirely consistent with the observation that the use of additive markers is obligatory when the additive presupposition is satisfied (Saebo, 2004; Bade, 2015).

(6) LF: EXH [ADD p]
a. *Alt*(ADD p) = {ADD p, EXH p} = {p, p∧¬q}
b. ⟦EXH [ADD p]⟧ = p∧¬(p∧¬q) = p∧q

It's been noted that additive particles have an anaphoric component by Heim (1990) and Kripke (2009), which amounts to the requirement that the alternative of which the predication holds needs to have been mentioned recently or be part of the "active context." In other words, a sentence like *John is having dinner right now too.* is not acceptable out of the blue even though we all know that somebody other than John is surely having dinner right now as well. One way to

[4] There is interesting ongoing work discussing the differences between *only* and EXH, specifically as they relate to these two points (Alxatib, 2020, among others).

[5] This does not go against a structural view of alternative selection based on complexity considerations since we are considering alternatives to ADD *p* rather than to plain *p* Katzir (2007); Fox and Katzir (2011).

think of this requirement is in terms of what alternatives are relevant (or active, depending on your terminology) in the context. For the alternative proposition EXH p to be distinct from the prejacent, p, there needs to be an alternative proposition q relevant in the discourse. Assuming that only relevant alternatives are considered in the calculation of implicatures, this anaphoric component falls out naturally.

Why should additive markers induce obligatory exhaustification? While I cannot provide a fully satisfying answer to that question here, it is worth noting that additive particles involve association with focus (Rooth, 1985; Krifka, 1998; Saebo, 2004). Assuming focus activates alternatives and alternatives need to be integrated into the overall meaning, the fact that silent exhaustification is invoked is not that surprising since we see something similar at play in cases like (7a) and (7b) which appear to involve exhaustification by EXH and covert *even*, respectively, with respect to other relevant individuals.

(7) Who came to John's party?

a. Mary$_F$ came! *inference:* Only Mary came.
b. His ex$_F$ came! *inference:* Even his ex came.

In his work on the topic, Krifka (1998) that the prosodic stress pattern encountered with additive particles is more similar to contrastive topic association rather than to focus association. Along these lines, note that additive particles and the use of contrastive topic intonation impose a similar requirement on the context, namely that the predication hold of somebody else (taking the contribution of focused constituent in (8a) to be that of an existential quantifier).

(8) Who ate what?

a. Mary$_C$ ate beans$_F$ and Sue$_C$ ate carrots$_F$.
b. Mary$_C$ ate beans$_F$ and Sue$_C$ ate beans too.

To what extent this parallel plays a role in the nature of the alternative (pre-exhaustified versus distinct) is going to remain an open issue here but surely one that deserves further discussion (see Kamali and Krifka (2020) and Nicolae (2020) for some recent discussion on these parallels).

2.2 The positive antecedent requirement

As per the discussion in the introduction, the additive component is commonly referred to as the antecedent requirement, in light of the fact that it behaves more like a felicity condition. At first sight, this might seem to pose a problem for the current way of deriving the additive component since the semantics provided in (6) has the additivity be part of the entailed component. In her work on presupposition triggering, Abrusán (2011, 2016) has argued that any information conveyed by the sentence that is not about the main point of the sentence ends up being presupposed.[6] She uses this triggering mechanism in Abrusán 2014

[6] There are some caveats to this condition that are tangential to the point at hand.

to argue that the additive component becomes presupposed by virtue of not being about the main point described by the sentence. One way to identify the main point(s) is by looking at the sentence's entailments and whether they are about the event time of the matrix predicate. If they are not, or they are but only accidentally so, they must not be the main point of the sentence and thus can be presupposed. To tell if an entailment is only accidentally about the main event time, one can check whether the temporal-alternatives (T-alts below) are well-formed, with such an alternative being obtained by replacing the temporal arguments of the matrix and embedded predicates with different ones. She provides the nice minimal pair in (9) to illustrate the difference between *know* and *manage* with respect to their factivity: *know* presupposes its prejacent by virtue of the well-formedness of its T-alternative, while *manage* does not.

(9) a. John knows (at time t_1) that it was raining (at time t_1).
T-alt: John knows (at time t_1) that it was raining (at time t_2).
b. John managed (at time t_1) to solve the exercise (at time t_1).
T-alt: *John managed (at time t_1) to solve the exercise (at time t_2).

Returning to the additive component, Abrusán that the additive entailment is not necessarily about the main event time with the example below (her examples (20-21)). Observe that the temporal alternative where the tense in the matrix clause and the tense in the additive component differ is well-formed.

(10) Peter invited Mary for dinner too.
T-alt: Two days ago, John invited Mary for dinner, and yesterday Peter invited her for dinner, too.

Given the acceptability of the T-alternative, Abrusán concludes that the additive component is temporally insensitive and thus presupposed. We adopt her proposal throughout.

2.3 Positive additives under negation

Recall that when *şi* co-occurs with negation, as in (11), the salient interpretation is that Maria doesn't want to drink beer, and the fact that she wants something else becomes accommodated. As mentioned in the introduction, such a construction is usually employed as part of a negative answer in response to a (possibly implicit) question involving the additive particle itself.

(11) Q: Ştiu că vrea apă, dar vrea şi bere?
know that wants water, but want ADD beer?
'I know she wants water, but does she want beer too?'
A: (Nu,) nu vrea şi bere.
(No) not want ADD beer
'(No,) she doesn't want beer too.'

How is the additive component q = *Maria wants water* derived in this example? First observe that wide scope for the additive particle, per the LF in (12), would

yield the wrong interpretation, namely that Maria doesn't want either water or beer, so we can rule this out straight away. A discussion of why this LF should be ruled out is postponed to the penultimate section.

(12) LF: EXH [ADD¬p]

a. $Alt(\text{ADD}\neg p) = \{\text{ADD}\neg p, \text{EXH}\neg p\} = \{\neg p, \neg p \wedge q\}$

b. $[\![\text{EXH [ADD}\neg p]]\!] = \neg p \wedge \neg(\neg p \wedge q) = \neg p \wedge (p \vee \neg q) = \neg p \wedge \neg q$

Assuming then that the additive particle takes scope under the negation, since *şi* calls for obligatory exhaustification, it follows that the exhaustification must also scope under the negation, as in (13). Here we implicitly assume a mechanism of embedded exhaustivity operators as a means to derive embedded implicatures, a result which has received substantial empirical support (Chierchia, 2004; Sauerland, 2004; Chemla and Spector, 2011; Sauerland, 2014).

(13) LF: ¬ EXH [ADD p]

a. $Alt(\text{ADD p}) = \{\text{ADD p}, \text{EXH p}\} = \{p, p \wedge \neg q\}$

b. $[\![\neg \text{ EXH [ADD p]}]\!] = \neg[p \wedge \neg(p \wedge \neg q)] = \neg(p \wedge q) = \neg p \vee \neg q$

Note that the result in (13b) does not derive q as an entailment, so how does it end up being presupposed given the mechanism put forth by Abrusán? I propose that the additive implication, which is derived below the negation, can be turned into a presupposition at that embedded level, hence its projection out of the scope of negation. It is crucial and in fact necessary to allow this triggering mechanism to apply at embedded levels. I assume this obligatoriness is governed by a principle which calls for maximizing the amount of information presupposed.

The careful reader will have noticed that the use of EXH in (13) results in weakening at the matrix level; in other words, the use of *şi* under negation does not give rise to a stronger conjunctive meaning but rather to a weaker disjunctive one. General principles of economy argue that covert operators, such as EXH, should not be used if their insertion leads to a weaker or equivalent interpretation. A more recent discussion of such an economy condition governing the distribution of EXH, particularly as it pertains to its embeddability, can be found in Fox and Spector 2009, 2018. The basic idea behind the proposal is the following: an instance of EXH is considered vacuous if its overall contribution leads to weakening or an equivalent interpretation. Note that in the case above, however, the insertion of EXH is not weakening if we consider its contribution more broadly, i.e., in conjunction with the mechanism for presupposition derivation. Without the insertion of EXH no additive component would have been generated, and in turn no presupposition would have been triggered. So while the initial contribution of EXH may seem weakening, when we take the presupposition generated into account, a stronger meaning can be said to be derived.[7]

[7] Y. Sudo (pers. comm.) wonders whether this does not lead to overgenerating in the case of embedded implicatures, e.g. *Mary didn't complete some of the assignments.*

Finally, note that there is another context which would facilitate the use of *şi* under negation, namely one where *şi* contrasts with overt *only*.

(14) Nu beau ŞI bere, beau DOAR bere.
not drink ADD beer, drink only beer
'I don't drink beer too, I drink ONLY beer.'

This interpretation can be derived if we assume the LF representation in (15). If we assume the relevant alternative is one without the additive particle, (15a), we derive the intuitively correct interpretation that *only p* is the case. This is precisely the same derivation employed to derive the "metalinguistic" use of disjunction under negation: *I didn't eat cake OR ice cream, I ate both.* in Fox and Spector 2018.

(15) LF: EXH [¬ [EXH [ADD p]]]

a. $Alt(\neg \text{ EXH ADD p}) = \{\neg \text{ EXH ADD p}, \neg p\}$

b. $[\![\text{EXH } [\neg \text{ [EXH [ADD p]]}]]\!] = \neg(p \wedge q) \wedge \neg\neg p = (\neg p \vee \neg q) \wedge p = p \wedge \neg q$

We now turn our attention to the negative additive particle *nici* which, unlike *şi*, is restricted to negative environments.

3 The negative additive marker

Observe that the NPI/neg-word prefix in Romanian is *ni*, (16). We see it in *nimeni* 'nobody,' *nimic* 'nothing,' and *nicăieri* 'nowhere.'[8]

(16) a. Nu am vorbit cu nimeni la petrecere.
not have talked with nobody at party
'I didn't talk to anyone at the party.'

b. Nu am adus nimic la petrecere.
not have brought nothing to party
'I didn't bring anything to the party.'

c. Nu mergem nicăieri în weekend.
not going nowhere in weekend
'We're not going anywhere this weekend.'

Similarly to the negative additive particle *nici*, the neg-words in (16) are restricted to strictly negative environments, such as sentential negation and the scope of *fără* 'without,' suggesting that their restricted distribution has the same

In other words, if vacuous embedded exhaustification can be made available by the mechanism proposed above, what prevents it from applying to this case? I want to argue that these cases are different since in the case of scalar implicatures, the entailed negated component is necessarily about the same event time, so it does not end up being presupposed under Abrusán's system.

[8] Other neg-words in Romanian are created from *nici* and a *wh*-phrase (*niciunde* 'nowhere' and *nicidecum* 'no way') or from *nici* and an indefinite NP (*nicio fată 'no girl'*). A detailed discussion of these elements is beyond the scope of this paper.

source. I propose the following analysis for *nici*:

Decompositional analysis of *nici*

- *Nici* spells out the negative marker and the additive particle: N-ADD.
- Each particle (N and ADD) carries an inherent focal feature indicating active alternatives which must be used up by a corresponding operator: EXH^{N} & EXH^{ADD}.
- EXH^{N} & EXH^{ADD} differ in terms of what alternatives they operate on.

The analysis I present in this section will take the distribution and interpretation of the negative additive *nici* to be the result of the types of alternatives EXH^{N} and EXH^{ADD} act on and the interaction of these two exhaustification operators with other elements in the clause.

Before turning to the analysis, I will offer a brief overview of the current approaches to deriving polarity restrictions within the exhaustification framework, as proposed in Chierchia 2013, Crnič 2014, 2019, Fălăuş 2014, Spector 2014, Fălăuş and Nicolae 2016, and Nicolae 2016, 2017a,b among many other works.

3.1 Polarity restrictions as constraints on obligatory exhaustification

There are three main lines of approaches to deriving the restriction on the distribution of negative polarity items. One line, first presented by Chierchia (2004, 2006), argues that the analyses of polarity phenomena and scalar implicatures should converge in light of the fact that NPIs are acceptable in precisely those contexts where an existential quantifier does not give rise to a scalar implicature, namely under negation and other logical operators which reverse the direction of entailment. To this end, he takes negative polarity items like *any* to be existential quantifiers with active sub-domain alternatives which require obligatory exhaustification. This exhaustification is performed by a covert operator **O**, which conjoins the assertion with the negation of all logically non-weaker alternatives. The meaning of **O** is similar to that of the exclusive particle *only*, and is crucially distinct from the operator EXH presented earlier in that it allows contradictions to arise. It is precisely this possibility that Chierchia (2006) builds on to explain why NPIs like *any* are unacceptable in upward entailing environments. Analyzing *any* as an existential quantifier means that the alternative propositions obtained by replacing the domain with each of its sub-domains are stronger than the assertion since entailments hold from subsets to supersets. Since the alternatives entail the assertion in upward entailing environments, the application of **O** will result in the negation of each of the alternatives, which will amount to a contradiction since it will express that something holds of a set but it does not hold of any of its subsets. Assuming that logical contradictions of this type always lead to ungrammaticality, following Gajewski (2002), the unacceptability of NPIs in upward entailing contexts falls out. As for their acceptability in downward entailing environments, Chierchia (2006) argues that

this falls out straight away because the application of **O** is vacuous in the presence of entailment-reversing operators since the alternatives are all weaker and thus **O** has nothing to negate. Note that **O**, in the context of NPI licensing, must furthermore be immune to the restriction against vacuous exhaustification.

Another exhaustification-based account of NPIs builds on the analyses proposed by Krifka (1995) and Lahiri (1998). Based on the morphological make-up of Hindi NPIs, which are built out of the scalar particle *bhii* 'even' and an indefinite NP, Lahiri (1998) argues that the distribution of such NPIs falls out straightforwardly once we assume that the contribution of *bhii*, as with *even*, is to impose on its prejacent that it be less likely than any relevant alternative. Assuming that the indefinite NP activates scalar alternatives that differ only in terms of what integer is used, the requirement imposed by *even* will only be satisfied in the presence of entailment-reversing operators since only there will the alternatives be weaker, and thus more likely (e.g., *not a/one boy came to the party* is entailed by *not two boys came to the party*). Crnič (2014, 2019) has extended this analysis even to NPIs which lack an overt *even* counterpart by proposing that all NPIs involve association with a covert *even*-like operator. Note that within this family of proposals, the derivation of scalar and free choice implicatures is still achieved via exhaustification via EXH.

Lastly, we turn to positive polarity elements, whose restricted distribution has been explained within the exhaustification framework as well.[9] Spector (2014) and Nicolae (2016, 2017a,b), have argued that the positive polarity character of disjunction should be analyzed as an interplay between a lexical requirement for obligatory exhaustification imposed by the polarity item and an economy condition which prevents vacuous exhaustification, following work by Fox and Spector (2009, 2018). Crucially, the relevant exhaustification operator in this case is EXH, as presented earlier in the paper, which only pays attention to innocently excludable alternatives and cannot lead to contradictions. As an example, consider the complex disjunction *soit soit* in French. Spector (2014) takes this disjunction to require obligatory exhaustification with respect to an alternative proposition where the disjunction is replaced with the conjunction. In upward entailing contexts, the result of exhaustification is the strengthened exclusive interpretation. In downward entailing environments, however, the contribution of EXH is vacuous since the conjunctive alternative is weaker when negated. Since vacuous exhaustification is ruled out, the PPI-like behavior of the disjunction *soit soit* falls out. Observe that this restriction against vacuous instances of EXH is crucial to the account and in this way, stands in stark contrast with the first family of analyses proposed above, which deliver the acceptability of NPIs in downward entailing contexts precisely because the exhaustification is vacuous. A simple way to reconcile these proposals is to assume that there are indeed a number of covert exhaustification operators which perform similar tasks but are subject to different constraints, **O** and EXH.

[9] There are also accounts of PPIs that align better with the two analyses presented above (Nicolae, 2012; Iatridou and Zeijlstra, 2013; Zeijlstra, 2017).

In the following sections I will provide an analysis of the NPI status of *nici* by taking it to associate not with **O** or EVEN, but with EXH, a novel approach as far as NPI licensing is concerned.

3.2 *Nici* in upward entailing contexts

As already mentioned, I propose a decompositional analysis of *nici*:

- *Nici* spells out the negative marker and the additive particle: N-ADD.
- Each particle carries an inherent focal feature indicating active alternatives which must be used up by a corresponding operator: EXH^{N} & EXH^{ADD}.
- EXH^{N} & EXH^{ADD} differ in terms of what alternatives they operate on.

We already know what alternative EXH^{ADD} acts on, namely one where the additive particle is replaced by the exclusive particle EXH, which in turn is evaluated with respect to an alternative obtained via lexical item replacement (of p with q), repeated in (17a)[10]. The alternatives considered by EXH^{N} are derived via (i) lexical item replacement of p with q, and (ii) deletion, whereby constituents are replaced with their sub-constituents, e.g. *nici p* with *p*, as shown in (17c). Going through the composition step by step, we see that the first level of exhaustification will result in the additive meaning, (17b), while the application of EXH^{N} in (17d) will be vacuous since there are no stronger alternatives to negate. Assuming EXH is subject to a constraint against vacuous occurrences, the unacceptability of *nici* in UE contexts falls out.

(17) LF: EXH^{N} [EXH^{ADD} [N-ADD p]]

a. $Alt(\text{ADD p}) = \{\text{ADD p}, \text{EXH p}\} = \{\text{p}, \text{p}\wedge\neg\text{q}\}$

b. $[\![\text{EXH}^{\text{ADD}}\ [\text{N-ADD p}]]\!] = [\![\text{EXH}^{\text{ADD}}\ [\text{ADD p}]]\!] = \text{p}\wedge\text{q}$

c. $$Alt(\text{EXH}^{\text{ADD}}\ \text{N-ADD p}) = \left\{\begin{array}{c}\text{EXH}^{\text{ADD}}\ \text{N-ADD p}\\ \text{EXH}^{\text{ADD}}\ \text{N-ADD q}\\ \text{p}\\ \text{q}\end{array}\right\} = \left\{\begin{array}{c}\text{p}\wedge\text{q}\\ \text{p}\wedge\text{q}\\ \text{p}\\ \text{q}\end{array}\right\}$$

d. $[\![\text{EXH}^{\text{N}}\ [\text{EXH}^{\text{ADD}}\ [\text{N-ADD p}]]]\!] = [\![\text{EXH}^{\text{ADD}}\ [\text{N-ADD p}]]\!] = \text{p}\wedge\text{q}$

3.3 *Nici* in downward entailing contexts

For ease of presentation, I repeat the relevant example below:

(18) Paul nu bea vin. Nu bea nici bere.
Paul not drinks wine. Not drinks N-ADD beer.
'Paul doesn't drink wine. He doesn't drink beer either.'

[10] In fact, nothing prevents us from claiming that the alternative derived via deletion of ADD, namely *p*, is also an alternative. Given the interpretation of ADD, however, including this alternative will not add anything.

We need to explain the following two facts:

- The interpretation of the sentence hosting *nici* is that of a conjunction of two negated propositions (¬p∧¬q).
- The use of *nici* carries a negative presupposition, which amounts to the second conjunct (¬q).

Given the presence of an additional operator, namely the negation, EXH^{N} has two possible adjunction positions. If it adjoins below the negation, the contribution of EXH^{N} will be vacuous as before given the nature of the alternatives.

(19) $[\![\neg\ [\text{EXH}^{N}\ [\text{EXH}^{ADD}\ [\text{N-ADD}\ p]]]]\!] = [\![\neg\ [\text{EXH}^{ADD}\ [\text{N-ADD}\ p]]]\!] = \neg(p\wedge q)$

If EXH^{N} adjoins above the negation, its prejacent will denote the disjunction of two negated propositions, so the result should be similar to what happens when EXH applies to a disjunction. Let's begin by reviewing how free choice inferences with disjunctive sentences come about within the exhaustification framework as proposed by Fox (2007). The basic idea is that the relevant alternatives are not the disjuncts themselves, but rather their pre-exhaustified variants. One way to implement this is by assuming exhaustification can happen recursively, via two instances of the EXH operator, as in (20).[11] The first instance of EXH will be vacuous, (20b), since the alternatives are stronger but not innocently excludable, (20a). The second level of EXH will look at the pre-exhaustified alternatives in (20c) and the result will be the conjunctive interpretation in (20d). This conjunctive interpretation comes about as follows: the disjunction of A and B is possible, but it's not possible that only A is true and it's not possible that only B is true, so the conjunction itself must be possible.[12]

(20) Jenny can invite A or B. → Jenny can invite A and she can invite B.
LF: EXH [EXH[◇[A∨B]]

a. $\mathit{Alt}(\Diamond[A\vee B]) = \{\Diamond[A\vee B], \Diamond A, \Diamond B\}$

b. $[\![\text{EXH}[\Diamond[A\vee B]]]\!] = \Diamond[A\vee B]$

c. $\mathit{Alt}(\text{EXH}[\Diamond[A\vee B]]) = \left\{\begin{array}{c}\text{EXH}[\Diamond[A\vee B]]\\ \text{EXH}[\Diamond A]\\ \text{EXH}[\Diamond B]\end{array}\right\} = \left\{\begin{array}{c}\Diamond[A\vee B]\\ \Diamond A\wedge\neg\Diamond B\\ \Diamond B\wedge\neg\Diamond A\end{array}\right\}$

d. $\begin{aligned}[\![\text{EXH}\ [\text{EXH}[\Diamond[A\vee B]]]]\!] &= \Diamond[A\vee B]\wedge\neg[\Diamond A\wedge\neg\Diamond B]\wedge\neg[\Diamond B\wedge\neg\Diamond A]\\ &= \Diamond[A\vee B]\wedge[\Diamond A\rightarrow\Diamond B]\wedge[\Diamond B\rightarrow\Diamond A]\\ &= \Diamond[A\wedge B]\end{aligned}$

[11] More recent work does away with recursive exhaustification and instead adopts a notion of innocent inclusion of alternatives as a way to derive the conjunctive inference (Bar-Lev and Fox, 2017). I believe that this new approach will be equally suitable in the case at hand but I leave it to future work to probe it further.

[12] I simplified the presentation by ignoring the conjunctive alternative since its inclusion is orthogonal to the derivation of the free choice implicature.

Carrying this over to the case at hand, invoking recursive exhaustification on the disjunction of two negated propositions will deliver precisely the right interpretation, namely the conjunction of two negated propositions. Below I go through each step of the derivation. In (21c) I list the alternatives considered by EXH^{N}. The first application of EXH^{N} will be vacuous, (21d), as the alternatives are symmetric and neither can be negated innocently. By the second application of EXH^{N}, the result will no longer be vacuous as the alternatives in (21e) are no longer symmetric – they can both be negated without contradiction, as shown in (21f). The resulting meaning will be stronger, taking us from the disjunction of two negated propositions to their conjunction.[13,14]

(21) $[_{④}\ \text{EXH}^{\text{N}}\ [_{③}\ \text{EXH}^{\text{N}}\ [_{②}\ \neg\ [_{①}\ \text{EXH}^{\text{ADD}}\ [\text{N-ADD}\ \text{p}]]]]]$

a. $[\![①]\!] = \text{p}\wedge\text{q}$

b. $[\![②]\!] = \neg(\text{p}\wedge\text{q}) = \neg\text{p}\vee\neg\text{q}$

c. $Alt(②) = \left\{\begin{matrix}\neg\text{EXH}^{\text{ADD}}\ \text{N-ADD}\ \text{p}\\ \neg\text{EXH}^{\text{ADD}}\ \text{N-ADD}\ \text{q}\\ \neg\text{p}\\ \neg\text{q}\end{matrix}\right\} = \left\{\begin{matrix}\neg(\text{p}\wedge\text{q})\\ \neg(\text{p}\wedge\text{q})\\ \neg\text{p}\\ \neg\text{q}\end{matrix}\right\}$

d. $[\![③]\!] = [\![\text{EXH}]\!]^{\text{N}}([\![②]\!]) = [\![②]\!]$

e. $Alt(③) = \left\{\begin{matrix}\text{EXH}^{\text{N}}\neg\text{EXH}^{\text{ADD}}\ \text{N-ADD}\ \text{p}\\ \text{EXH}^{\text{N}}\neg\text{EXH}^{\text{ADD}}\ \text{N-ADD}\ \text{q}\\ \text{EXH}^{\text{N}}\ \neg\text{p}\\ \text{EXH}^{\text{N}}\ \neg\text{q}\end{matrix}\right\} = \left\{\begin{matrix}\neg(\text{p}\wedge\text{q})\\ \neg(\text{p}\wedge\text{q})\\ \neg\text{p}\wedge\neg\neg\text{q}\\ \neg\text{q}\wedge\neg\neg\text{p}\end{matrix}\right\} = \left\{\begin{matrix}\neg(\text{p}\wedge\text{q})\\ \neg(\text{p}\wedge\text{q})\\ \neg\text{p}\wedge\text{q}\\ \neg\text{q}\wedge\text{p}\end{matrix}\right\}$

f. $[\![④]\!] = [\![\text{EXH}^{\text{N}}]\!]([\![②]\!])$
$= \neg(\text{p}\wedge\text{q})\wedge\neg(\neg\text{p}\wedge\text{q})\wedge\neg(\text{p}\wedge\neg\text{q})$
$= (\neg\text{p}\vee\neg\text{q})\wedge(\neg\text{p}\rightarrow\neg\text{q})\wedge(\neg\text{q}\rightarrow\neg\text{p})$
$= \neg\text{p}\wedge\neg\text{q}$

We've thus shown why *nici* must co-occur with negation, and that is because the presence of negation allows EXH^{N} to scope above it and access stronger alternatives which can be innocently excluded. Since the overall contribution of EXH^{N}

[13] One reviewer has asked why we don't also consider alternatives without the negation, since we consider alternatives obtained via deletion. Note that if we were to consider such alternatives, then all the alternatives would be symmetric, and thus none would be excludable, resulting in the vacuous application of EXH. While this will have to remain a stipulation for now, the same stipulation regarding the non-deletion of negation has to be adopted even in the simpler cases involving indirect implicatures, i.e. cases of strong scalar items giving rise to implicatures when they occur in the scope of negation.

[14] One might wonder whether the first instance of EXH^{N} does not count as vacuous. While at the point of insertion it is, its global contribution does lead to strengthening given that its presence alters the alternatives under consideration by the higher instance of EXH.

leads to a strengthened interpretation, the acceptability of *nici* in entailment-reversal environments, more generally, falls out, as does its contribution to the overall meaning, that of an additive.

Before we conclude, it deserves pointing out that *ni* neg-words as well as the additive *nici*, have a very restricted distribution, being allowed to appear only under negation and *without*, as well as in fragment answers, as per the distribution of neg-words in strict negative concord languages. I will not discuss how to derive this restricted distribution, but I point the interested reader to Fălăuş and Nicolae 2016 for details on how to derive this distribution within an exhaustification-based framework.

3.4 The negative antecedent requirement

Having shown how the additive interpretation and the restricted distribution are derived, we next turn to the antecedent requirement. Like *şi*, *nici* requires an antecedent, but unlike with *şi*, the antecedent needs to be negative. At which point does the presupposition triggering mechanism apply? There are two options, either below or above the negation. If it applies below the negation, the material presupposed, namely q, would end up contradicting the resulting interpretation in (21f). If, on the other hand, the triggering mechanism is postponed until the matrix level, the negative additive implication $\neg q$ will end up being presupposed, as desired.

3.5 Carving out the space of possibilities: *şi* or *nici*?

There is one potential concern that still needs to be addressed, namely why the positive particle *şi* cannot be used with negation and have the LF in (21). I argue that this relates to the morphological point made in the beginning of this section, namely that *nici* spells out two particles, each of which associates with a distinct EXH operator. I argue that each instance of exhaustification (assuming recursive exhaustification counts as a single instance) corresponds to a focus feature on its associate. In the case of *nici*, which spells out N-ADD, there are two such features. On the other hand, *şi* can host only one focus feature, meaning that there can only be one instance of EXH associating with it.

On a separate but related note, one might wonder why *şi* cannot take wide scope with respect to negation. Recall from section 2.3 that if it did, the resulting interpretation would be the same as what we derive with *nici*, yet *şi* and *nici* never overlap in their interpretation. There are languages, e.g. Japanese, where the same particle, namely *mo*, can be used in both positive and negative contexts; in fact, in Japanese *mo* is the only way to express additivity. For such particles we would surely want to argue that they have the option of scoping above the negation, unlike *şi*, thereby deriving an interpretation akin to that contributed by *nici*. This seems like a deeper problem which will have remain an open issue for now. What seems to be at play is some type of competition between the two particles, *şi* and *nici*: while in the presence of negation *şi* is ambiguous, *nici* is not, so of the two possible interpretations of *şi*, only the one not shared with *nici*

can ultimately survive. How to best formalize this remains an open problem, but interestingly one we see in other cases of ambiguity resolution.

4 Summary and open issues

In this paper I presented a new analysis for pairs of additive particles like Romanian *şi* and *nici* which, I argued, captures their additive interpretation and distribution. While Ahn's 2015 recent analysis is similarly able to capture the distribution of these particles, it is conceptually not as well suited for pairs of particles such as the Romanian ones which very clearly share a morphological and presumably semantic core with conjunctive rather than disjunctive particles; recall that her analysis takes the negative particle *either* to be a disjunction at its core. That is not to say that an analysis such as Ahn's is not viable and possibly even better suited for other additive particles, such as English *either*, which also doubles as a disjunction (*either A or B*) and free choice determiner (*either boy*), although note that her analysis cannot immediately be extended to account for these other uses.

The study of additive particles, especially in the context of polarity, is a very fertile area cross-linguistically. There is ample variation both in terms of the possible interpretations of these elements, as well as in the different roles they may play within a language. Not only has this variation not received a proper theoretical analysis, it has not even been fully mapped out yet (see for example Gast and van der Auwera 2011 and Crnič 2011). Take for example the negative additive particle. As mentioned above, English *either* can also double as a positive disjunction and a free choice determiner. This is not the case in Romanian, where instead it can be used to form negative words by attaching to an indefinite NP (*nicio fată* 'no girl'), something we also see in, e.g., Hindi (Lahiri, 1998). The creation of NPIs based on additive particles like *nici* and indefinite NPs is in fact cross-linguistically common. The common analyses of these elements attribute, however, a scalar semantics to the additive particles, whereby they contribute an *even*-like interpretation. This is not surprising since additive particles are cross-linguistically known to double as scalar particles. There is variation within this area as well, however. While Spanish *ni* must express a scalar meaning, Romanian *nici* can express it, while English *either* cannot.

Nici can also appear in complex coordinations, e.g. *nici A nici B* 'neither A nor B' to convey the conjunction of two negated propositions. French *ni* can also function as a negative additive particle as in Romanian, as well as as a negative connective *A ni B* 'neither A nor B' and can be doubled, as in Romanian, *ni A ni B* 'neither A nor B.' The distribution and interpretation of these particles is so varied and multi-faceted that many authors have argued that a unified account is not possible for all their different uses (see e.g. recent work particularly on French *ni* by Gonzalez (2020)). Clearly much is left to be understood.

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