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NOR: NEITHER DISJUNCTION NOR
PARADOX

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1 Introduction

Bivalent coordination constructions involving a negative first conjunct and a second conjunct introduced by *nor* such as those in (1a) (henceforth NEG-*nor* constructions) can be described as disjunctions (1b) or as conjunctions (1c), owing to the logical equivalence of $\neg [p \vee q]$ and $[\neg p] \& [\neg q]$.

- (1) a. Leo ate neither the rice nor the carrots.
Leo didn't eat the rice nor did he eat the carrots.
Leo has never eaten rice nor has he eaten carrots.

I would like to thank Yael Sharvit and Jonathan Bobaljik for extensive discussions of this squib. I am also grateful for the feedback received from Jon Gajewski, Winnie Lechner, Uli Sauerland, and two reviewers. All errors are mine.

- b. The following does not hold: Leo ate the rice or the carrots. $\neg [p \vee q]$
 c. (Leo didn't eat the rice) AND (Leo didn't eat the carrots) $[\neg p] \& [\neg q]$

Starting from an observation made by Lechner (2000a) about German *weder-noch* 'neither-nor' coordinations, I will argue that cases of NEG-*nor* coordination can be constructed (in both German and English) where the logical equivalence does not hold. More specifically, I will show that in certain contexts, negation takes narrow scope with respect to a quantifier embedded in the first conjunct, rather than taking scope over the entire coordination. I will conclude that only a conjunction structure such as (1c), with independent negation in each conjunct, allows for an element in one conjunct to take scope over negation without scoping out of its conjunct.

2 The Problem

In both English and German, the negative element of the first conjunct can appear embedded in the first conjunct, as in (2) ((2a) is Lechner's (4)).¹

- (2) a. Peter hat weder das Theorem verstanden noch konnte
 Peter has neither the theorem understood nor could
 Maria dem Beweis folgen.
 Maria the proof follow
 'Neither has Peter understood the theorem, nor could
 Maria follow the proof.'
 b. Leo hasn't ever/has never been to Canada, nor has Julia
 met the queen.

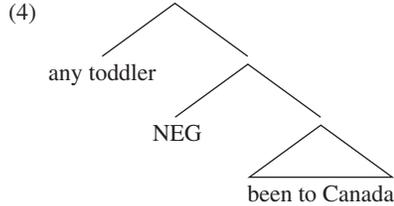
As Lechner points out, if we assume a disjunction structure, a paradox arises when we look at cases such as (3) ((3a) is Lechner's (6)) where the subject of the first conjunct is a negative polarity item (NPI). Under the assumption that an NPI must be c-commanded by negation (see below for a more detailed discussion on where NPI-licensing takes place), the ungrammaticality of these cases indicates that the negation in the first conjunct is below the subject.

- (3) a. *Auch nur einer hat weder das Theorem verstanden
 even only one has neither the theorem understood
 noch konnte jemand dem Beweis folgen.
 nor could somebody the proof follow
 'Neither has only a single person understood the theorem,
 nor could somebody follow the proof.'

¹ Since some speakers do not allow CP/IP coordination, with *neither* embedded in the first conjunct, I use mostly examples with *not* or *never* in English. This does not affect the argument.

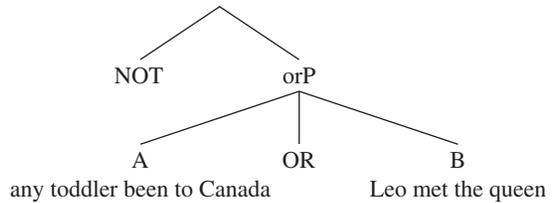
- b. *Any toddler has never been to Canada, nor has Leo met the queen.

To exclude these sentences, at the point where NPI-licensing takes place, the structure of the first conjunct in (3b) must be roughly as in (4).



If, however, the negation associated with *neither* is below the subject, a paradox arises under a disjunction analysis of NEG-*nor* coordinations. As shown in (5),² under a disjunction analysis, negation must take scope over the whole coordination; otherwise, the meaning would be $[\neg p] \vee [\neg q]$, which is not what NEG-*nor* constructions can mean.

(5) *Disjunction structure*



If (5) is the structure where NPI-licensing takes place, a problem arises for examples such as (3). Since negation must take scope over the whole coordination, it would necessarily be in a position where it c-commands the subject of the first conjunct. Hence, the structure in (5) would predict that NPIs embedded anywhere in the coordination should be licensed. As shown in (3), this is not correct.

However, before concluding that a disjunction structure creates a paradox, we must consider (and reject) an alternative analysis for (3). A crucial assumption in the setup of Lechner's paradox was that the structure in (5), which is the structure required to express the correct meaning of NEG-*nor* constructions, is also the structure where NPI-licensing takes place. An alternative (which was pointed out to me by Yael Sharvit) would be to assume that NPI-licensing must take place at a different level. More specifically, following the common view, NPI-licensing could be assumed to be a surface structure (S-

² It is not relevant for this squib whether coordinations are analyzed as binary- or ternary-branching structures. For simplicity, I represent them as ternary-branching structures.

We can thus conclude with Huddleston and Pullum (2002) that at least certain *nor*-constructions cannot involve a disjunction structure. The question then is whether *NEG-nor* constructions ever involve a disjunction structure, or in other words, whether the derivation in (6) could be maintained for examples such as the ones in (3). We will see that even for these cases a disjunction structure is problematic; it will create a paradox once we look at the scope properties of negation in *NEG-nor* constructions.

The argument is simple. A structure such as (5)/(6b) predicts that at the level where the structure is interpreted, negation should take widest scope. The examples in (9) and (10) show that this is not correct. First, universally quantified subjects in negative sentences such as (9a) can be interpreted with wide or narrow scope with respect to negation (provided the right intonation is used). Crucially, the same ambiguity is found when (9a) is the first conjunct of a *NEG-nor* coordination (see (9b)). Similarly, examples such as (10a) where the subject is an existential quantifier are typically considered to be unambiguous; that is, the subject cannot be interpreted within the scope of negation. The same holds again for coordinations (see (10b)); that is, only the wide scope interpretation of the existential is available.

- (9) a. Everyone didn't talk to the king. $\forall > \neg/\neg > \forall$
 b. Everyone didn't talk to the king
 nor did they/anyone/John call the
 queen. $\forall > \neg/\neg > \forall$
- (10) a. Someone didn't talk to the king. $\exists > \neg/*\neg > \exists$
 b. Someone didn't talk to the king
 nor did they/anyone call the queen. $\exists > \neg/*\neg > \exists$

The facts in (9) and (10) are highly problematic for the disjunction analysis proposed above. While NPI-licensing could be seen as a surface structure phenomenon, quantifier scope cannot. In order for the coordination to be interpreted correctly (i.e., as $\neg [p \vee q]$ and not as $[\neg p] \vee [\neg q]$), negation must scope out of both conjuncts and take scope over the entire coordination. However, the scope properties of quantifiers show that negation takes scope under the subject of the first conjunct.

Since, on the disjunction analysis, any operator that takes scope over negation must take scope over the entire disjunction, the final piece of the argument is to exclude a derivation for (9b) and (10b) where the low scope readings of negation arise as the result of quantifier raising (QR). More specifically, one might suggest that the wide scope of the quantifiers originating in the first conjunct in (9b) and (10b) is the result of QR of these quantifiers to a position above negation after *NEG-raising* has applied. A QR analysis of this sort, however, can be excluded on the following grounds. As argued in Ruys 1992 (see also Fox 1995), although non-across-the-board QR is possible in principle, this form of movement is licensed only when the moved quantifier binds a variable in the second conjunct. This is illustrated in (11).

- (11) a. A student likes every professor and hates the dean. *every > a
 b. A student likes every professor_i and hates his_i assistant. every > a

Now, if the wide scope interpretation of the first-conjunct quantifiers in (9b) and (10b) were the result of non-across-the-board QR of these quantifiers above the raised negation, these constructions should allow (in fact, require) a bound variable in the second conjunct—that is, a variable bound by the quantifiers originating in the first conjunct. As shown in (12), however, a bound variable interpretation is impossible in NEG-*nor* constructions.

- (12) a. *Everyone_i didn't talk to the king nor did he_i meet the queen.
 b. *Every politician_i didn't lie nor did his_i secretary accept a bribe.

Thus, the quantifiers in the first conjunct in (9b) and (10b) do not take scope over the whole coordination and therefore Lechner's paradox indeed exists for NEG-*nor* coordinations if they are analyzed as disjunctions. In the next section, I will show that the paradox disappears if NEG-*nor* coordinations are analyzed as conjunctions.

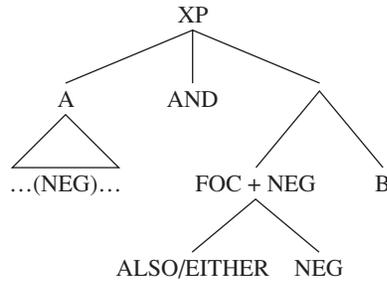
3 The Solution

We have seen that the first conjunct of a NEG-*nor* coordination shows exactly the same NPI-licensing and quantifier scope properties as it would if it were not part of a coordination. This represents a problem for a disjunction structure, which requires that the negation embedded in the first conjunct scope out of that conjunct, in fact, out of the whole coordination. I would like to suggest that these problems (and some other puzzles) can be solved if NEG-*nor* coordinations are analyzed as conjunctions, as in (13), rather than as disjunctions.³

³ Ideally, one would want to assume that all *nor/noch*-constructions involve the same (conjunction) structure in (13). As pointed out to me by Jon Gajewski, however, it might be necessary to also allow a disjunction structure for certain NEG-*nor* constructions, namely, VP-coordinations such as (i).

- (i) Bill [neither insulted any instructor_i] nor [threatened her_i assistant].

If a bound variable interpretation as indicated is possible, a conjunction structure would be problematic. To bind the variable in the second conjunct, the QP *any instructor* would need to scope out of the coordination. Under a conjunction structure, however, this would bring the NPI outside the scope of *neither*—resulting in the wrong meaning. Hence, if examples such as (i) are acceptable with a bound variable interpretation, only a disjunction structure seems to be possible. Unfortunately, speakers disagree sharply on the judgment of these examples, and therefore no conclusion can be drawn at this point.

(13) a. *Conjunction structure*b. AND + ALSO/EITHER + NEG: *nor/noch*

As indicated in (13b), I assume that *nor/noch* are syntactically and semantically complex, consisting of the coordinator AND, negation, and a focus particle corresponding to TOO/ALSO or EITHER.⁴ Before we look at some details of the composite nature of *nor/noch*, let us see how this assumption together with the structure in (13a) captures the facts discussed so far. First, given the structure in (13a) (in contrast to the disjunction structure in (5)), the meaning of the coordination does not impose a particular scope requirement on the negation in the first conjunct. Hence, negation can be embedded anywhere in the first conjunct throughout the derivation. This immediately explains the NPI-licensing properties discussed in the previous section. Since there is no requirement that NEG must scope out of the first conjunct to derive the correct interpretation, there is no need for negation to move at all. Thus, in sentences such as (3) (see (14a)), the negation does not c-command the NPI at any level; hence, NPI-licensing fails. If, on the other hand, the NPI is c-commanded by negation as in (14b–c), the structure is, of course, fine.

- (14) a. (Any toddler NEG been to Canada) AND ALSO (NOT
Leo met the queen)
→ NPI-licensing: *

⁴ Of course, the claim that (at least certain occurrences of) *nor* correspond to AND+NEG is not new. As mentioned in the text, Huddleston and Pullum (2002:1308ff.) suggest this for examples such as (7). Furthermore, Lechner (2000b) raises the question of whether *noch* should simply be interpreted as negation in examples such as (i) (from Lechner 2000b:65).

- (i) Wir sahen nicht Tier noch Mensch.
we saw not animal nor human
'We saw neither animals nor humans.'

I would like to thank a reviewer for the suggestion that *nor* also includes TOO/ALSO or EITHER. Although I will not be able to provide a detailed analysis of exactly which element is involved in *nor*-constructions, the presence of such an element will be motivated by the syntactic and semantic properties of these constructions.

- b. Leo has never seen any beavers, nor has Julia met the queen.
(Leo NEG seen any beavers) AND ALSO (NOT Julia met the queen)
- c. Neither has any toddler ever been to Canada, nor has Leo met the queen.
(NEG any toddler ever been to Canada) AND ALSO (NOT Leo met the queen)

Second, the scope properties in (9b) and (10b) (repeated in (15)) are correctly predicted to be parallel to the scope properties in simple clauses involving the same elements. That is, whatever process allows ambiguity in (15a) (i.e., whether this is assumed to be reconstruction of the subject under negation or movement of negation above the subject) will also allow ambiguity in (15a')—that is, when the same clause is part of a coordination. Similarly, whatever blocks ambiguity in (15b) will also block ambiguity when (15b) is part of a coordination as in (15b').

- (15) a. Everyone didn't talk to the king $\forall > \neg / \neg > \forall$
a'. . . nor did they/anyone/John call the queen.
- b. Someone didn't talk to the king $\exists > \neg / * \neg > \exists$
b'. . . nor did they/anyone call the queen.

Third, since the structure in (13a) correctly represents the meaning of NEG-*nor* coordinations, no across-the-board movement of negation is required, and hence no special treatment is necessary for the cross-sentential NEG-*nor* constructions in (7a) and (8) (the former is repeated here as (16a)). Furthermore, assuming that *nor* corresponds to AND + ALSO/EITHER + NEG and that *nor*-coordinations therefore do not involve across-the-board movement of negation, it follows that, in principle, the first conjunct does not need to involve syntactic negation. Hence, examples such as (7b) (repeated as (16b)) are expected to be possible.

- (16) a. He was one of those people who can't relax. Nor did he have many friends.
- b. The hotel had good views and a private beach; nor were these its only attractions.

Let us now turn to the assumption in (13b)—namely, the claim that *nor/noch* consist of three syntactic/semantic elements, AND + ALSO/EITHER + NEG. The semantic decomposition of *nor* into AND + NEG (rather than a disjunction analysis) has been motivated by the various properties discussed so far. In the remainder of this squib, I would like to show that this decomposition is also motivated on syntactic grounds and provide some initial motivation for the third, ALSO/EITHER element. A question I will not be able to address here is how exactly the structure AND + ALSO/EITHER + NEG ends up being pronounced as *nor/noch*. For the purposes of this squib, I

simply assume that these elements, when adjacent to each other, are optionally merged at PF and spelled out as the single items *nor/noch*.⁵

Let us go back to (16b). Although examples of this sort show that *nor*-coordinations without syntactic negation in the first conjunct are possible, it should be noted that these constructions are rather limited and only possible in certain contexts. As Hendriks (2004) points out, *nor*-coordinations do require that the first conjunct (or the preceding context) be negative; however, negation does not need to be overt but can be implied or presupposed. Thus, what makes (16b) felicitous is the negative implication that the views and the beach are the only attractions of the hotel (i.e., that there are no other attractions). Assuming that this is correct and that there is a requirement of overt or implied negation in the first conjunct, the question arises how this can be captured in the conjunction structure suggested here.

I would like to follow the suggestion made by a reviewer that the requirement of a negative first conjunct or negative preceding context is imposed by the meaning of the ALSO/EITHER part of *nor* in conjunction with negation. As shown in (17), *nor*-coordinations behave similarly to constructions with the suggested fully spelled-out versions of *nor*: *and also not* and *and not either*.⁶ Without any further context—in particular, without any negative implication (such as that John was not supposed to leave)—these examples are infelicitous.

- (17) a. #John left *nor* did he turn off the stove.
 b. #John left *and* he did not turn off the stove *either*.
 c. #John left *and* he also did not turn off the stove.

Although I cannot provide a detailed analysis of constructions involving these focus particles here, the basic idea would be that the semantics of the focus particles, which take scope over negation, presupposes a contextually salient negative proposition (or, in other words, the

⁵ One might ask why, under this account, the coordinators in English and German appear to be (at least in part) morphologically related to disjunctions rather than conjunctions (cf. *either-or—neither-nor*; *entweder* ‘either’—*weder* ‘neither’). I assume that this similarity is accidental. Although the etymology of *nor* is not entirely clear, the *Oxford English Dictionary* suggests that *nor* is probably the shortened form of *nother* ‘neither’. If this is the case, the similarity between *or* and *nor* is indeed accidental (and, in fact, supports the claim made here that *nor* contains a focus particle such as EITHER plus negation). Further support comes from the crosslinguistic distribution of these coordinators. As pointed out in Haspelmath 2007, a morphological similarity between *neither-nor* coordinators and disjunctions is not a general property of languages. For instance, the Latin *neither-nor* coordinator is clearly related to a conjunction (cf. *que* ‘and’; *ne-que—ne-que* ‘neither-nor’). On the other hand, in Dutch and many other languages, there is no morphological relation at all between *neither-nor* coordinators and other coordinators (see Haspelmath 2007 for further details).

⁶ There are subtle differences between these examples, which presumably are due to minor differences in the semantics (e.g., the nature of the presuppositions) of the elements involved.

combination of ALSO/EITHER + NEG presupposes that in the set of alternative propositions introduced by the focus, there is a proposition that is false). Since the most salient context is the preceding first conjunct (or the preceding sentence in cases such as (16)), the negative requirement will arise for that utterance. Assuming that these ideas pan out, the similarity of the constructions in (17) provides initial support for the claim that *nor*-coordinations involve a focus particle such as ALSO or EITHER.

The last piece of evidence I would like to present here for (13) concerns a second puzzle noted by Lechner (2000a) regarding the syntax of German NEG-*nor* constructions. As shown in (18a), in sentential *entweder-oder* 'either-or' coordinations, the second conjunct can be a full verb-second (V2) complement. That is, the constituent after *oder* is a full CP with some XP occupying Spec,CP and with the finite verb in C. Crucially, NEG-*nor* constructions cannot embed a full V2 complement under *noch* 'nor'; rather, the finite verb has to immediately follow *noch*. This is shown in (18b) versus (18c) (Lechner's (3) and (2), respectively).⁷

- (18) a. Entweder hat Peter das Theorem verstanden oder
 either has Peter the theorem understood or
 Maria konnte dem Beweis folgen.
 Maria could the proof follow
 'Either Peter has understood the theorem, or Maria
 could follow the proof.'
- b. *Weder hat Peter das Theorem verstanden noch
 neither has Peter the theorem understood nor
 Maria konnte dem Beweis folgen.
 Maria could the proof follow
 'Neither has Peter understood the theorem, nor could
 Maria follow the proof.'
- c. Weder hat Peter das Theorem verstanden noch
 neither has Peter the theorem understood nor
 konnte Maria dem Beweis folgen.
 could Maria the proof follow
 'Neither has Peter understood the theorem, nor could
 Maria follow the proof.'

⁷ A reviewer notes that examples such as (i) appear to contradict the claim that *noch* cannot embed a V2 clause in German.

- (i) Weder Hans hat geschlafen noch Maria hat geschlafen.
 neither Hans has slept nor Maria has slept
 'Neither Hans has slept, nor Maria has slept.'

However, it seems to me that in (i), [*noch Maria*] forms a single constituent in Spec,CP (i.e., *noch* involves constituent negation), exactly parallel to [*weder Hans*] in the first conjunct. This form of constituent *noch* is only possible when the first conjunct also includes a constituent negator. Thus, in (18b), where *weder* is not a constituent negator, a structure in which [*noch Maria*] forms a single constituent is excluded.

If *noch*—like *oder*—were a simple coordinator, this fact would be puzzling. The structure in (13), however, allows us to provide an explanation. Recall that *noch* is syntactically complex, consisting of the actual coordinator AND + ALSO/EITHER + negation. Let us therefore compare (18) with the spelled-out version of *noch*: *und auch nicht* ‘and also not’. As shown in (19), the word order in *noch*-conjuncts is identical to that in *and also not* constructions.

- (19) Weder hat Peter das Theorem verstanden . . .
 neither has Peter the theorem understood
 a. *und auch nicht Maria konnte dem Beweis folgen.
 and also not Maria could the proof follow
 b. und auch nicht konnte Maria dem Beweis folgen.
 and also not could Maria the proof follow
 ‘Neither has Peter understood the theorem, nor could Maria follow the proof.’

This parallelism strongly supports the claim that *noch* in (18) occupies the same position as *auch nicht* in (19). The standard account for (19) is that *auch nicht* is an XP in Spec,CP, and since German does not allow CP-recursion, this XP has to be followed by the finite verb in C. I suggest that (18) has exactly the same structure—that is, *noch* corresponds syntactically to *also not*, which occupies Spec,CP and hence must be followed by the finite verb.⁸ Moreover, as pointed out by a reviewer, German provides further support for the presence of a focus particle as part of *noch*. Since, as shown in (20a), negation alone cannot occupy Spec,CP in German, whereas negation plus a focus particle can (see (20b)), a decomposition of *noch* into just AND + NEG would be problematic.

- (20) a. *Nicht konnte Maria dem Beweis folgen.
 not could Maria the proof follow
 ‘It was not the case that Maria could follow the proof.’
 b. Auch nicht konnte Maria dem Beweis folgen.
 also not could Maria the proof follow
 ‘It was also not the case that Maria could follow the proof.’

⁸ A reviewer notes that an alternative account for (18b) would be to assume that these cases involve TP-coordination as in (i). In this case, the ungrammaticality could be explained as a violation of the Coordinate Structure Constraint, since the finite verb has moved out of only one conjunct.

- (i) *Weder hat [Peter das Theorem verstanden]_{TP} noch [Maria konnte dem Beweis folgen]_{TP}.
 neither has Peter the theorem understood nor Maria could the proof follow

I do not pursue this option here, since it does not extend to (19). Furthermore, this structure seems to entail that the negation of the first conjunct takes scope over the whole coordination, which we saw in section 2 is not the case.

To conclude, I have shown in this squib that NEG-*nor* constructions are best analyzed as conjunctions rather than disjunctions and that the coordinations *nor/noch* are syntactically and semantically complex, consisting of the coordinator AND, a focus particle such as ALSO/EITHER, and negation.

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