NOR: NEITHER DISJUNCTION NOR PARADOX[*]

1. INTRODUCTION

Bivalent coordination constructions involving a negative first conjunct and a second conjunct introduced by *nor* such as the examples in (1)a (henceforth NEG-*nor* constructions) can be described as disjunctions ((1)b) or as conjunctions ((1)c), due to the logical equivalence of ¬ [p ∨ q] and [¬p] & [¬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.
     b. *The following does not hold: Leo ate the rice or the carrots.*   ¬ [p ∨ q]
     c. (*Leo didn't eat the rice*) AND (*Leo didn't eat the carrots*)   [¬p] & [¬q]

Based on an observation made by Lechner (2000a) for German *weder-noch* 'neither-nor' coordinations, this squib 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 scoping over the entire coordination. I will conclude that only a conjunction structure such as (1)c, 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 (cf. (2); (2)a is Lechner's (4)).[1]

(2) a. *Peter   hat   weder   das Theorem   verstanden*
         Peter   has   neither the theorem   understood
         noch   konnte   Maria   dem Beweis   folgen
         nor   could   Mary   the proof   follow
         'Neither has Peter understood the theorem, nor could Mary follow the proof.'

     b. *Leo hasn't ever/has never been to Canada, nor has Julia met the queen.*

As Lechner points out, if one assumes a disjunction structure, a paradox arises when we

[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.

look at cases such as (3) ((3)a is Lechner's (6)) where the subject of the first conjunct is a negative polarity item (NPI). Under the assumption that NPIs must be c-commanded by negation (see below for a more detailed discussion on where NPIs 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 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.'

      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 (3)b must be roughly as in (4).

(4)

                any *toddler*

                        NEG

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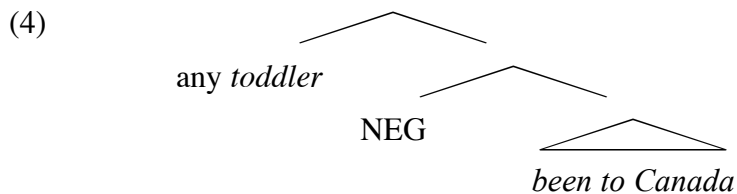
If, however, the negation associated with *neither* is below the subject, a paradox arises under a disjunction structure of NEG-*nor* coordinations. As shown in (5),[2] under a disjunction structure, negation must take scope over the whole coordination, otherwise the meaning would be [¬p] ∨ [¬q], which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

(5)   Disjunction structure

              NOT   *or*P

                    A   OR   B
        any toddler been to Canada   *Leo met the Queen*
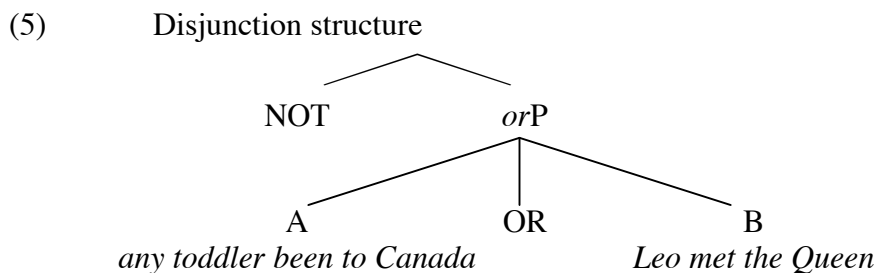
If (5) is the structure where NPI licensing takes place, a problem arises for examples such as (3). Since negation must take scope over the whole coordination, it would necessarily be in a position where it c-commands the subject of the first conjunct. Hence, under the

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[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.

structure in (5), it would be predicted that NPIs embedded anywhere in the coordination should be licensed. As shown in (3), this is not correct.

Before concluding, however, that a disjunction structure creates a paradox, we have to consider (and reject) an alternative analysis for (3). A crucial assumption in the set up 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 Y. Sharvit) would be to assume that NPI licensing must be met at a different level. More specifically, following the common view, NPI licensing could be assumed to be a surface (s-)structure condition (or a condition that must hold at both s-structure and LF). The s-structure of (3) is essentially the structure in (4). At this level, an NPI in subject position of the first conjunct is not c-commanded by negation, and hence (3) would be excluded in the same way the sentence **Any toddler has never been to Canada* is. But what about the meaning of NEG-*nor* constructions under this view? As pointed out above, these constructions cannot mean: [¬p] ∨ [¬q]. The only way to make sure that we arrive at the correct meaning (namely (5)) would therefore be to assume an obligatory process of across-the board NEG-raising. This hypothetical derivation of (3) is illustrated in (6).

(6)　a.　(*Any toddler* NOT *been to Canada*) OR (NOT *Leo met the queen*)　s-structure
　　　　➠　　NPI licensing: *
　　b.　NOT [(*Any toddler* t$_{NOT}$ *been to Canada*) OR (t$_{NOT}$ *Leo met the queen*)]　　LF
　　　　➠　　¬ [p ∨ q]

There are various theoretical questions one could raise against this type of derivation. For instance, it is not clear why across-the board NEG-raising should be obligatory in NEG-*nor* constructions, and, in contrast to standard across-the-board movement (see e.g., Höhle 1991 for German) does not allow reconstruction. Furthermore, as pointed out by a reviewer, across-the-board NEG-raising as in (6) is problematic since it violates compositionality—two negations turn into one (semantic) negation. I will set these and similar issues aside and, for the sake of the argument, assume that, in principle, a derivation such as the one in (6) is possible. Instead, I will concentrate on certain empirical problems for the analysis in (6), which will lead us to the conclusion that Lechner's paradox indeed remains.

As pointed out by Huddleston and Pullum (2002:1308ff), examples such as (7) provide straightforward evidence against the claim that *nor*-constructions always involve a disjunction structure (and NEG-raising). In (7)a, the sentence introduced by *nor* is an independent sentence—i.e., not part of a coordination from which across-the-board NEG-raising could apply. The example in (8) shows that this is also possible in German *noch*-constructions (see also Hendriks 2004 for further cases of this sort in English). In (7)b, the first conjunct is a positive statement which cannot be in the scope of negation. Hence these examples cannot be analyzed as disjunction structures plus NEG-raising.

(7)　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.

(8) *Weder   hat   Hans   geschlafen.   Noch   hat   Maria   geschnarcht.*
     Neither has John   slept.   Nor   has   Mary   snored.
     'John didn't sleep. Nor did Mary snore.'   Lechner (p.c.)

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 and 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)/(6)b makes the prediction 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 (9)a 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 (9)a is the first conjunct of a NEG-*nor* coordination (cf. (9)b). Similarly, examples such as (10)a where the subject is an existential quantifier are typically considered to be unambiguous—i.e., the subject cannot be interpreted within the scope of negation. The same holds again for coordinations (cf. (10)b), that is, only the wide scope interpretation of the existential is available.

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

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 $\lor$ q] and not as [$\neg$p] $\lor$ [$\neg$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 representation, 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 (9)b and (10)b 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 (9)b and (10)b 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 only licensed when the moved quantifier binds a variable in the second conjunct. This 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 (9)b and (10)b 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—i.e., a variable bound by the quantifiers originating in the first conjunct. As shown in (12), however, a bound variable interpretation as indicated 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 (9)b and (10)b do not take scope over the whole coordination and therefore Lechner's paradox does indeed exist 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.
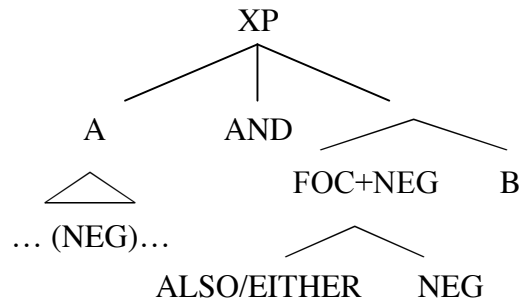
3. THE SOLUTION

In the previous section, we have seen that the first conjunct of a NEG-*nor* coordination shows exactly the same NPI licensing and quantifier scope properties as the same sentence would if it was not part of a coordination. This represents a problem for a disjunction structure which requires that the negation embedded in the first conjunct scopes 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]

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[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 J. Gajewski, however, it might be necessary to also allow a disjunction structure for certain NEG-*nor* constructions, namely VP-coordinations such as (i). 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.

   (i)   *Bill [neither insulted any instructor$_i$] nor [threatened her$_{\%i}$ assistant].*

(13) a.   Conjunction structure

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                        XP
              ┌─────────┼─────────┐
             A        AND      ┌──────┐
          ┌──────┐        FOC+NEG    B
         … (NEG)…       ┌─────┴─────┐
                    ALSO/EITHER    NEG
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   b.   AND + ALSO/EITHER + NEG: *nor/noch*

As indicated in (13)b, I assume that *nor/noch* are syntactically and semantically complex, consisting of the coordinator AND, negation, as well as a focus particle corresponding to TOO/ALSO or EITHER.[4] Before discussing some details of the composite nature of *nor/noch*, let us first see how this assumption together with the structure in (13)a captures the facts discussed so far. First, under the structure in (13)a (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 (14)a), the negation does not c-command the NPI at any level, and hence, NPI licensing fails. If, on the other hand, the NPI is c-commanded by negation as in (14)b,c, the structure is, of course, fine.

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

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[4] The claim that (at least certain occurrences of) *nor* correspond to AND+NEG is, of course, 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).

(i)   *Wir sahen   nicht   Tier   noch   Mensch*
       we   saw   not   animal nor   human
       'We saw neither animals nor humans.'   [Lechner 2000b: (65)]

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 a 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 *L. met the queen*)

Second, the scope properties in (9)b and (10)b (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 (15)a (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 (15)a', i.e., when the same clause is part of a coordination. Similarly, whatever blocks ambiguity in (15)b will also block ambiguity when (15)b is part of a coordination as in (15)b'.

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

Lastly, since the structure in (13)a 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 (7)a and (8) (the former is repeated here as (16)a). 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 (7)b (repeated as (16)b) 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 (13)b, 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. What I would like to do for the remainder of this squib is to show that this decomposition is also motivated on syntactic grounds and provide some initial motivation for this third element suggested. A question I will not be able to engage in here is how exactly the structure AND + ALSO/EITHER + NEG ends up being pronounced as *nor/noch*. For the purpose 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]

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[5] One might ask why, under this account, the coordinators in English and German appear to be (at least in

Let us go back to (16)b. 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 pointed out by Hendriks (2004), *nor* coordinations do impose the requirement that the first conjunct (or the preceding context) is negative, however, negation does not need to be overt but can also be implied or presupposed. Thus, what makes (16)b felicitous is the negative implication that the view and the beach are the only attractions of the hotel (i.e., that there are no other attractions). Assuming this is correct and 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.

I would like 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 similar to constructions with the fully suggested spelled out versions of *nor—and also not* or *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 combination of ALSO/EITHER+NEG presupposes that there is a proposition in the set of alternative propositions introduced by the focus which 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.

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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* would indeed be accidental (and, in fact, support the claim made here that *nor* contains a focus particle such as EITHER plus negation). Further support comes from the cross-linguistic 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.

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

(18) a. *Entweder hat Peter das Theorem   verstanden*
         Neither   has Peter the theorem   understood
         oder   Maria konnte dem Beweis   folgen
         or   Mary   could   the proof   follow
         'Either Peter has understood the theorem, or Mary could follow the proof.'

   b. **Weder   hat Peter das Theorem   verstanden*
         Neither has Peter the theorem   understood
         noch   Maria konnte   dem Beweis folgen
         nor   Mary   could   the proof   follow
         'Neither has Peter understood the theorem, nor could Mary follow the proof.'

   c. *Weder   hat Peter das Theorem   verstanden*
         Neither has Peter the theorem   understood
         noch   konnte Maria   dem Beweis folgen
         nor   could   Mary   the proof   follow
         'Neither has Peter understood the theorem, nor could Mary follow the proof.'

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 the one in *and also not* constructions.

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[7] A reviewer notes that examples such as (i) appear to contradict the claim that *noch* cannot embed a V2 clause in German. 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 (18)b where *weder* is not a constituent negator, a structure in which [*noch Maria*] forms a single constituent is excluded.
   (i) *Weder   Hans   hat   geschlafen   noch   Maria   hat   geschlafen*
        Neither John   has   slept   nor   Mary   has   slept
        'Neither John has slept, nor Mary has slept.'

(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　 Mary　 could　 the proof　　follow

　　b.　*und*　*auch*　*nicht*　*konnte*　*Maria*　*dem Beweis*　*folgen*
　　　　 and　 also　 not　 *could*　Mary　 the proof　　follow
　　　　 'Neither has Peter understood the theorem, nor could Mary 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 is in Spec,CP, and hence must be followed by the finite verb.[8] Furthermore, 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 (20)a, negation alone cannot occupy Spec,CP in German, whereas negation plus a focus particle can (cf. (20)b), a composition of *noch* into just AND+NEG would be problematic.

(20)　a.　*Nicht*　　　*konnte*　*Maria*　*dem Beweis*　*folgen*
　　　　　 Not　　　　 could　 Mary　 the proof　　follow
　　　　　 'It was not the case that Mary could follow the proof.'

　　　b.　*Auch*　*nicht*　*konnte*　*Maria*　*dem Beweis*　*folgen*
　　　　　 Also　 not　 could　 Mary　 the proof　　follow
　　　　　 'It was also not the case that Mary could follow the proof.'

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, plus negation.

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[8] A reviewer notes that an alternative account for (18)b 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
　　　　 Neither　　has　 Peter　 the theorem　　understood
　　　　 noch　　　[*Maria*　*konnte*　*dem Beweis*　*folgen*]_TP
　　　　 nor　　　　 Mary　 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 have seen in section 2 is not the case.

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