

SCOPE WIDENING OF NEGATION IN MODAL CONSTRUCTIONS

Vincenzo Moscati

Scope interactions of negative operators will be considered from two points of view: cross-linguistic variation and inverse scope over (root) modality. In this paper, I argue that, in order to unify the interpretive properties of the negative operator across languages and to derive the appropriate scope, we need a non-isomorphic LF-PF mapping. This can be done by means of a covert operation able to derive scope-shift readings.[°]

Introduction

If we observe clausal negation in a sufficiently large sample of languages, two things became immediately evident: the first is the high degree of variability in the structural position where the negative element is realized. The second is the stable interpretation of the sentential negative marker, independent from surface variations. This last observation seems to be largely correct, especially if we consider the meaning of non-presuppositional negative operators (Horn 1989).

However, issues related to the interpretation of negation get more complicated if we consider also its interactions with other scope bearing elements. In particular, it is still unclear if different scope assignments correspond to different surface positions. The question is whether the (cross-linguistically variable) position of NegP affect the scope of negation.

In order to answer to this question, we need to consider cases where scope-shift is detectable and one of these is given by negative modal sentences, in which negation interacts with other logic operators.

Leaving for the moment aside the problem of language variation, we can illustrate the point observing sentences with negation and a modal verb. If their scope

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interactions are bound to surface scope, we will have evidence for a transparent link between surface structure and the inner logic representation. In this case, scope would reveal to be tightly bound to the surface position of the NegP.

However, I'll show that things are different and that scope assignment is relatively unconstrained by the position of NegP. Consider the following German sentence from Büring (1997):

- (1) Du musst nicht soviel rauchen
 you must not so much smoke
 a. *you must not smoke that much* $\Box\neg p$
 b. *you don't have to smoke that much* $\neg\Box p$

As the paraphrases show, this sentence can be uttered either to express the meaning in (1a) with narrow scope of negation under the modal *müssen* or the meaning in (1b)¹ with the opposite scope assignment.

Given the two possible interpretation of (1), we need a way to connect the same surface structure to two logic representations. This example shows that the relation of (1) with its interpretation(s) require a mechanism able to account for scope inversion.

Given that the position of NegP does not tie scope assignment, a possibility is to equip syntax with a covert operation. This strategy has been proposed for other scope-shift cases, as the well-known one involving two quantifiers. Consider, for example, how the interpretations of (2) are derived adopting a QR analysis:

- (2) A doctor will interview every new patient

in this sentence, two types of covert movements might apply. The first (Heim & Kratzer, 1998) operation moves the quantifier outside the VP in order to avoid type-shifting operations, allowing us to capture the narrow scope reading of (2), the one where the same doctor interviews all the new patients:

- (2) a. $[_{IP} \text{ A doctor will } [_{VP} [\text{every new patient}]_1 [_{VP} \text{ interview } t_1]]]$

¹ Van Der Auwera (2001) discussed a similar example:

- i. Er muss das nicht tun
 he must that not do
 a. "he needn't do that" $\neg\Box p$
 b. ? "he must not do that" $\Box\neg p$

he reports the possibility of both interpretations, although he noticed that speakers prefer the interpretation (ia) with wide scope of negation. For what concerns the purposes of the discussion, what is particularly important is the possibility to have (ia). Nothing relies on the markedness of (ib).

However, this is not sufficient to derive the alternative reading, the one where every new patient is interviewed by a different doctor. This second interpretation corresponds to another representation, where the QP undergoes to a further operation:

(2)b. $[_{XP} [\text{every new patient}]_1 [_{IP} \text{A doctor will } [_{VP} t'_1 [_{VP} \text{interview } t_1]]]]$

At this point, it is important to notice that this second operation is unnecessary from the point of view of derivational convergence: it takes in input a well-formed representation in order to create another well-formed representation (but with an additional processing cost). Although this strategy is clearly non-optimal (Reinhart 2006), it is nevertheless required to capture scope-shift (Fox 2000).

The same logic can be applied to derive scope-shifting operations in general and the wide scope reading of negation in particular. Nevertheless, some caution is required given relevant differences between the two cases.

An important one is that while the argument structure gives us indications on the base position where quantifiers are base generated in (1), in the case of negation we may plausibly believe that negation can be inserted within the whole syntactic space above the VP. For this reason, we cannot use a notion of covert movement unless we have an idea of the position where the negative operator is base generated.

Although this is not an easy task, we may collect some relevant data by considering the position of the NegP with respect to other functional heads. In the next section I'll try to trace a contour of the variation of the NegP position and its phonetic realization. This discussion will be useful to isolate varieties where the desired inverse scope interpretations can be detectable.

1. Clause structure and NegP

Languages diverge in their way to express sentential negation, but despite of surface differences, the interaction of very few parameters might be sufficient to capture a great amount of this cross-linguistic variability. Two parameters in particular seems to be central in this domain and they will constitute the focus of our discussion.

A first parameter regards the morpho-syntactic status of the negative marker: it might be an affix or a free particle (Dahl 1979, in press). This difference can be structurally expressed in the x-bar schema by assuming (Haegeman 1995, Zanuttini 1997) that negative affixes and free particles are both generated in NegP, respectively in the specifier and in the head position. Notice that these two possibilities are not mutually exclusive and both the specifier and the head can be simultaneously filled, as in Standard French and West Flemish.

This observation has a long tradition which can be traced back to Jespersen (1917), who showed that this variation is largely independent from other syntactic factors (see also van Kemenade, 2000).

The second cross-linguistic variation regards instead the clausal position of the NegP. Determining the relative position of NegP with respect to other functional heads is not an easy task, but telling evidence can be collected by considering the order of affixal heads and adverbials.

The first attempt to explicitly cast the problem in these terms is found in Ouhalla (1991). He notes that in two rich agglutinating languages as Turkish and Berber, the ordering of the negative and the tense affix is reversed:

(3) Jan elmarlar-i ser-me-di-Ø (Turkish)
 Jan apples-ACC like-**neg**-past-agr

(4) Ur-ad-y-xdel Mohand dudsha (Berber)
neg-fut-agr-arrive Mohand tomorrow

In the Turkish example (3), the particle *-m-* appears closer to the root than the tense marking morpheme *-di*, which expresses past. In Berber (4) instead, the negative particle *-ur* is distanced from the verbal root by tense and agreement morphemes. Ouhalla assumes, in accordance with the *mirror principle* (Baker, 1985), that the order of morphemes reflects the ordering of functional heads. Under this premise, the examples in (3) and (4) argue in favour of a different ordering between the negative and the tense projections in the two languages. Ouhalla concludes that the ordering of the functional projections is then the following:

(5) Turkish: AgrP > TenseP > NegP > VP
 Berber: NegP > TenseP > AgrP > VP

Although Ouhalla's analysis has the merit of pointing out an interesting variation, his argument is weakened by at least two considerations. First, it is not obvious that past and future tenses are hosted by the same functional projection; second, while the Turkish verbal morphology illustrated in (3) shows a series of suffixes, Berber instead uses a sequence of prefixes.

Despite of these problems, I believe that the argument presented by Ouhalla has a substantial validity and his argument might be empirically reinforced by extending the analysis to other agglutinating languages. A typological survey, as in Miestamo (2003, 2005) can help us to find languages with the appropriate characteristics.

We saw that a problem for a direct comparison between Turkish and Berber is the fact that the first language presents a series of suffixes while the second a sequence of prefixes. For a better match, we should then compare Turkish with another language which adopts suffixation. In addition, this language should also have a distinct morpheme for past, in order to address also the second problem and compare morphemes with the same meaning.

Miestamo (2003, 2005) reports data on Malayalam, a Dravidian language, which has both properties: a sequence of suffixes and a past morpheme. Consider the example (6)

- (6) Avan pa□hi-c-illa (Malayalam)
 he study-pst-**neg**
 ‘He did not study.’

As in the Turkish example (3), here we have two distinct affixes for negation and past but in the reverse order, with negation being more external with respect to past morphology. The order of functional projections is then the following:

- (7) Turkish: AgrP > PastP > *NegP* > VP
 Malayalam: *NegP* > PastP > VP

This comparative analysis can be pushed forward and we can extend it to other tense morphemes as well.

For present tense, a good example comes from the pair given by two Colombian languages, Barasano and Kuna, spoken respectively in the Southern and in the Northern part of the country. By looking at the examples in (8) and (9), the order of suffixes in Barasano and Kuna suggests, again, that the position between *NegP* and PresentP may vary, showing a different ordering of functional projections:

- (8) Wa-be-a-ha y# (Barasano)
 move-**neg**-pres-non3p 1sg
 ‘I am not going.’
- (9) An pinsa-e-suli (Kuna)
 1sg remember-pres-**neg**
 ‘I don’t remember.’
- (10) Barasano: PersonP > PresP > *NegP* > VP
 Kuna: *NegP* > PresP > VP

Let us consider also future morphology. Inanwatan (de Vries, 1996) and Tonkawa (Hoijer, 1933) have two distinct suffixes for negation and future tense. Inanwatan, spoken in Indonesia and North West Papua, negates the clause with the suffix *-aigo*, which can be optionally preceded by the particle *náwo*. Example (11) shows that the morpheme *-aigo* follows the future morpheme:

- (11) (*Náwo*) né-se-sa-aigo (Inanwatan)
 neg 1sg-walk-fut-**neg**
 ‘I will not walk.’

The opposite ordering is instead found in the native North American language Tonkawa, documented by Henry Hoijer:

- (12) Ya,lo,n-ab-a,do-no-’c (Tonkawa)
 kill-**neg**-fut-cont-1sg
 ‘I will not kill him.’

Again, we have a variation for what concerns the ordering of projections:

- (13) Inanwatan: *NegP* > FutP > VP
 Tonkawa: PersonP > Continuative P > FutP > *NegP*

At this point, it seems to me that Ouhalla's proposal about the variability of the NegP cross-linguistically is substantially confirmed.

We can go now a step further and look at the ordering of negative adverbials. Under the assumption that negative adverbials are also hosted in NegP, variations of NegP must affect also the ordering of adverbials in its specifier. This point has been extensively illustrated in Zanuttini (1997). Among many other cases, she analyzed at deep Romance varieties which express negation using a low negative adverbial. In this case, under the assumption that adverbs stays in situ (Cinque, 1999), we could trace a clausal topography of the position of the NegP in relation to other functional projections. A complete presentation of Zanuttini's work is impossible here: I will limit the discussion to a subset of the adverbs treated in her work, remanding to Zanuttini (1997) and Cinque (1994, 1999) for a complete discussion.

Consider the adverbs *already* and *always* in Standard Italian and in two other Northern Italian varieties. Their unmarked order is given in (14) below:

- (14) Italian: già > sempre
 Piedmontese: *gia* > sempre
 Milanese: *gemò* > *semper*
 'already' > 'always'

Now, if we look at the position of the negative marker in Piedmontese and Milanese in relation to the position of the adverbials in (14), we find evidence supporting the fact that negation appears in different clausal positions.

Let us consider first the position of the Piedmontese sentential negative marker *nen*. This particle does not interfere with verb movement and it can be considered as an adverb. It occupies a position between *gia* 'always' (15) and *sempre* 'always' (16), since it follows the former and precedes the latter:

- (15) A l'avia *gia nen* salutami cul di la (Piedmontese)
 s.cl s.cl'had already neg greeted-me that day there
 'Already on that day he had not greeted me'
 (16) A l'ha *nen dine sempre* tut (Piedmontese)
 s.cl scl'has neg told-us always everything
 'He hasn't always told us everything'

The example (16) shows that *nen* precedes not only the adverbial *sempre*, but also the past participle *dine*. This means that the past-participle reaches a position above the one of *sempre*. We have then an indication that in Piedmontese the following order holds: NegP > Past-Part P > AspP.

Now consider the other Northern Italian variety, the one spoken in Milan. A first difference between Milanese and Piedmontese is that in the former language the past participle reaches a position lower than the continuative aspectual:

- (17) L'ha *semper di* tüscòs (Milanese)
s.cl'has always said all
'He has always said everything'

Contrary to the Piedmontese example in (16), here the past participle *di* appears to the right of *semper*. This shows that Past Participial forms in Milanese reach a position lower than in Piedmontese.

For what concerns negation, in Milanese it is expressed² by the postverbal adverbial *no*. This particle occupies a position immediately above the VP, lower than the position reached by the past participle, which appears to its left:

- (18) El l'ha *scrivuu no* (Milanese)
s.cl. s.cl written neg
'He hasn't written'

By comparing the examples (17) and (18), Zanuttini concludes that in Milanese the NegP has to be lower than the projection hosting the past participle and the habitual projection, in accordance with the ordering AspP > Past-Part P > NegP. This expectation is confirmed by the following example, where the three elements appear together in the expected order:

- (19) L'a *semper pagà no* i tas (Milanese)
s.cl'has always paid neg the taxes
'It's always been the case that he hasn't paid taxes'

The differences between Milanese and Piedmontese show that, while it is possible to find a strict correspondence in the order of adverbials in different languages, the position of negative adverbs resist to a cross-linguistic generalization.

Leaving aside the case of negative quantifiers, the order of negative heads and adverbials supports the idea that negation may be realized in any functional position above the VP. Moreover, Moscati (2006, 2010) showed that many languages realize it within the complementizer system. The conclusion is that negation can be realized in the whole syntactic space above the VP.

The problem which I would like to address here is how this variation relates to the scope of the negative operator. In the next section, I'll consider the interpretation of the Milanese sentential negative marker '*no*' with respect to deontic modality.

² Here we consider only the negative marker *no* whose properties are well described in Zanuttini (1997). Notice that Milanese also has another negative marker, the adverbial element *minga*, with a presuppositional meaning.

2. Scope over modality

Given that there exists converging evidence, both from the relative position of functional heads and adverbials, in favour of the variability of the NegP, we may ask now what is the role played by the position of NegP in determining the scope of the negative operator. In the rest of the paper, I'll try to address this question by considering the interplay between negation and modality. In particular, I will consider what happens once a language sets the position of NegP at the lower edge of the inflectional system. Given that other scope bearing elements can be inserted in the projections c-commanding negation, inverse wide scope relations might be obtained only if scope is unconstrained by the surface position of the negative marker.

Let us go back again to the case of Milanese. We saw before that, among the Romance varieties studied by Zanuttini (1997), it realizes the sentential negative marker in the lowest position. Now, consider the following sentence with a deontic modal:

- (20) El gà de studià no
 s.cl must of to-study neg
 a. he is required not to study $\Box\neg p$
 b. he is not required to study $\neg\Box p$

in (20) the modal verb *gà* has a meaning similar to the quasi modal English verb 'have to' and the sentence can be interpreted in accordance either to the paraphrases given in (20a) or to the one in (20b). When negation takes narrow scope under the modal, the sentence is interpreted as a prohibition (20a). When instead the inverse scope reading is selected, the sentence does not express a prohibition anymore but a permission not to study (20b). How can we account for this ambiguity?

If we consider the structure of (20), on the basis of the data discussed by Zanuttini, the modal c-commands negation at PF. In this respect, nothing changes if we decided to adopt a restructuring process (Rizzi 1982) or if we consider the modal as a functional head (Cinque 2006). According to this last proposal, the deontic modal is base generated in the head of an appropriate functional projection ModP, in a structural position above NegP.

- (21) ${}^{AgrP} [El_j' g\grave{a}_k \quad {}^{ModP} [t_k \quad {}^{TP} [de \text{ studi\grave{a}}_v \quad {}^{NegP} [no \quad {}^{VP} [t_j \ t_v \]]]]]]$

Given the structure in (21), the narrow scope interpretation of negation in (20a) is unproblematic since it is the isomorphic PF/LF reading. What is unexpected is the possibility to have inverse wide scope of negation over modality. This is the reading (20b).

As in the case of quantifiers, a possible solution is to derive the alternative interpretation by applying some further operation. Given that (20b) cannot be obtained by the representation in (21), the negative operator must be displaced and

processed above ModP. Assuming that this process applies in syntax, we will have an operation as the following:



A similar operation which moves negation in syntax has been proposed in Haegeman (1995) and in Haegeman & Zanuttini (1991). However their operation is more similar to the obligatory movement which has been proposed by Heim & Kratzer (1998) for object quantifiers. In fact, this movement is required to any element with a negative feature in order to take scope over the event variable and have sentential scope. Consider for example sentence (23):

(23) John sees nothing, does he?

in this sentence a negative quantifier in object position is able to have scope over the whole event. This interpretation is confirmed by the application of the well-known Klima's test: positive tags are licensed only by negative clauses, as in (23).

Although the apparent similarity with what happens in (23), the operation described in (22) is different in at least an important respect: in (21) negation has already sentential scope and nothing but scope-shift requires the negative operator to reach XP in (22). For this reason, I will consider this operation to be optional and defined as follows:

- (24) Optional Negation Raising is possible when:
 α c-command β at PF but β scopes over α .
 where: α is a logic operator and
 β is the logic operator ' \neg '

In the next section, I'll consider other cases where the scope shifting operation described in (24) is required, as in West Germanic languages, where inverse scope readings over modality can be found not only with the sentential negative markers but also with negative quantifiers.

3. Inverse scope in West Germanic languages

3.1. Sentential negation

West Germanic languages as German, Dutch and West Flemish³ mark sentential negation through a negative adverbial hosted in a position immediately above the VP (Laenzlinger 2004, Haegeman 2002). According to these analyses, the structural position and the syntactic status of the sentential negative marker in West Germanic

³ West Flemish, in addition to the negative adverbial *nie* also has the negative head *en-*, which marks the clausal interpretation of negation.

languages shares relevant similarities with the Milanese *no*. In what follows I will show that the similarity can be pushed a step further. If we consider also the structural position of modals in these languages, analogous inverse scope readings can be found.

In order to do that, we need to control two relevant factors: the first is the clausal architecture with respect to the precise order of functional projections; the second concerns the polarity restrictions active on the modal paradigm. In fact, many scholars (see van Der Auwera 2001, De Haan 1997), describe the choice of the modal in German and Dutch as sensitive to polarity. This means that different forms can be employed to convey the same strength, but with a different scope with respect to negation.

However, even if it is certainly true that scope can be disambiguated through the appropriate lexical choice of the modal, it is also true that this mechanism is not perfect. This can be shown by considering the German modal *müssen* ‘must’ in its deontic use. Consider our first example, repeated here as (25):

- (25) Du musst nicht soviel rauchen
 you must not so much smoke
 a. *you don't have to smoke that much* $\neg\Box p$
 b. *you must not smoke that much* $\Box\neg p$

Although the narrow scope reading is usually preferred (van Der Auwera 2001), according to Büring this sentence can be uttered to express either the meaning (25a) or (25b). In absence of a special intonation (rising pitch accent on the modal, associated with topicalization), interpretation (25b) is licit.

The same intuition has been confirmed with some native speakers for sentences (26) and (27). They judged (26a)-(27a) as acceptable interpretation for (26) and (27):

- (26) Hans muss Julia nicht sehen
 Hans must Julia neg to-see
 a. *Hans is not required to see Julia* $\neg\Box p$
 b. *Hans is required not to see Julia* $\Box\neg p$
- (27) ... dass Hans Julia nicht sehen muss
 ... that Hans Julia neg see-inf must
 a. ... *that Hans is not required to see Julia* $\neg\Box p$
 b. ... *that Hans is required not to see Julia* $\Box\neg p$

Assuming that NegP is projected immediately above the VP, we can imagine that the same mechanism of raising the negative operator is at play to derive the interpretations in (25a), (26a) and (27a).

This conclusion crucially relies on two assumptions: the first is that modals are functional elements generated outside the VP and the second is that the modal

projection is above NegP. It seems to me that both can be maintained and that there are good reasons to believe that *muss* c-commands *nicht* at PF.

For what concern the first assumption, the functional status of *müssen*, this analysis present several empirical advantages over a VP internal analysis of modal verbs, as discussed in Wurmbrand (2004).

She extended Cinque's (2001, 1999) proposal to German modals, including them in the set of verbal forms which have to be considered as functional heads. Her analysis is based on the fact that modals do not behave as lexical verbs in at least two important respects: first, they are not able to assign theta roles; second, they show rigid ordering restrictions which can be captured by assuming an ordered hierarchy of functional projections⁴.

With regard to the absence of theta role assignment, it is possible to demonstrate that modals do not select an external argument⁵. If this would be the case, we expect that they would behave as raising verbs and that non-thematic expletives could appear in subject position. This expectation is confirmed and the expletive 'es' which corresponds to a *wheater-it* subjects can be used in (28a). This is in contrast with other verbs which only apparently have restructuring properties as in (28b)

- (28) a. Es muß morgen schneien
it must tomorrow snow
'It must snow tomorrow'
- b. *Es plante zu schneien
it planned to snow
'It planned to snow'

Another argument in favour of the idea that modals do not assign theta roles to external arguments is confirmed by the impossibility to form passives. In fact, if we embed an unaccusative verb under a modal, none of the them is able to assign a theta role to the external argument. Consider first the contrast between (29a-b):

- (29) a. unergative
Es wurde einen Abend lang getanzt
it was an evening long danced
'They danced for an evening'

⁴ The form *sehen muss* has been treated as a composite head (von Stechow, 1984) to account for the fact that it cannot be interrupted. However Haider (2003) shows that these complex forms can be separated and that smaller constituents may be topicalized, as in the following example: [*Erklären*] _{VP} *müßte man das können* 'One ought to be able to explain that'.

⁵ It is harder to show that modals do not assign thematic roles to internal arguments, since they select a VP which can absorb the thematic role. For this issue, see Wurmbrand (2004, 2006) and Cinque (2006, 2004c).

b. unaccusative

*Es wurde am Flughafen angekommen
it was at the airport arrived
'They arrived at the airport'

the different grammatical status of (29a-b) shows that only unergative verbs can be passivized, while unaccusatives cannot be used to form passives. The generalization is that passives are only possible if the predicate involves an underlying external argument. Wurmbrand shows that, if we embed an unaccusative under a verb which is able to assign a theta role to the subject (as 'to try'), passives are possible. The reason is that it is the embedding verb which saves the structure by theta role assignment. This, however, is not possible under modals as *müssen*⁶:

(30) *Der Wagen wurde (zu) reparieren gemusst/müssen
the car-nom was (to) repair must-part/inf
'They had to repair the car'

this again supports the idea that modals are inert with regard to theta-roles assignment.

The second kind of arguments in support of the functional analysis of modals comes from the ordering restrictions active on their sequence. The pair in (31) shows that *dürfen* and *müssen* need to respect a fixed order, with the first modal being higher in the structure and able to reach the V2 position:

(31) a. Er *dürfte* zu Hause sein *müssen*
He might at home be must
'He might have to be at home'
b. *Er *muß* wieder singen *dürften*
He must again sing might
'It must be the case that he might sing again'

⁶ The ungrammaticality of modal passives does not seem to be limited to German, but appears to be a more general property of modals (Aissen and Perlmutter 1983, Burzio 1986). Also in Italian passivization has a degraded status, as shown in the following sentences:

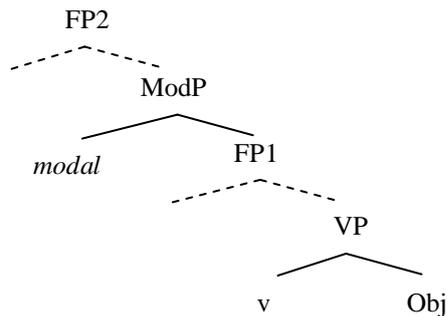
- i. *L'esercizio è stato dovuto riscrivere
the exercise is been required to rewrite
ii. *Quel tramonto non fu più potuto rivedere
that sunset not was anymore can see-again

Again the ungrammaticality of (i-ii) might be related to the purely functional role expressed by modals. Cinque (2004) suggests that the ungrammaticality of (ii) is due to the fact that modals are base-generated outside the vP shell, above the functional projection VoiceP responsible for passivization.

Some considerations are in order here. In (31) *dürfen* has an epistemic meaning while *müssen* has a deontic one. It could be possible that semantic restrictions determine the c-command relations. However this doesn't seem to weaken the argument, since the epistemic modal have to be merged higher than the deontic modal in order to be successively able to move, *in syntax*, to V2. This means that syntax has to insert the epistemic modal above the deontic projection, in conformity with the ordering ModEpistemicP > ModDeonticP.

All these effects (ordering restrictions, lack of theta-role assignment, raising verb properties) can be easily accounted for by assuming that modals are not lexical verbs taking a VP complement but are instead directly generated within the inflectional system. Wurmbrand labels this kind of structures as *functional restructuring*, to combine the early restructuring properties noted by Rizzi (1982) with the more recent proposal of a primitive monoclausal structure (Cinque 2006). Modal projections are then part of the inflectional system of German, sandwiched between other functional projections and dominating the VP:

(32) *functional restructuring*



At this point we can go back to our original problem, namely to determine the PF-structural relation between negation and modality. Which can now be restated in functional terms as the attempt to determine the position of NegP and ModP(s). We can provisionally assume that functional heads in West-Germanic languages are ordered as follows:

(33) ModP > NegP > VP

This ordering, with ModP above NegP can derive the correct word order either assuming a head final (HF) analysis or a remnant movement (RM) derivation. In fact, if we consider, for example, sentence (27) repeated here as (34), both representations in (34a-b) are possible:

(34) dass Hans Julia nicht sehen muss
 that Hans Julia neg see-inf must

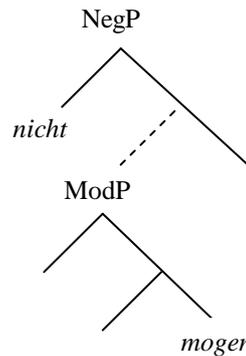
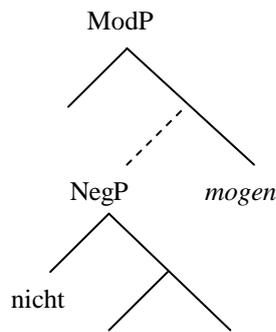
(34) a. [...[ModP [AgrOP Julia_{Obj} [NegP nicht [VP t_{Sub} t_{Obj} [v°sehen]]]]][Mod° muss]]] (HF)

(34) b. [... [FP [ModP t_{muss} [AgrOP Julia [NegP nicht [VP t_{Hans} sehen t_{Julia}]]]]]_{XP} muss
 [t_{XP}]](RM)

However, even if (34a-b) might capture the right word ordering, they do not provide evidence in favour of a structure ModP > NegP. For example, if we adopt the head-final analysis in (34a), modals (in embedded clause without V-to-C movement) are always expected to surface to the right of *nicht*. But the same correct word order obtains even if we invert the order of projections:

(34)a. ModP > NegP

(34)c. NegP > ModP



We clearly need to integrate the picture with more elements to decide between (34a) and (34c).

Laenzlinger (2004) presents a rich series of data regarding the ordering of adverbials in German, tracing a fine-grained topography of the syntactic space (*mittelfeld*) between the left periphery and the upper bound of the VP. For what concerns modality, he considered the adverb *wahrscheinlich* ‘probably’ to be the specifier of a modal projection expressing epistemic modality. Such an adverb precedes to the left the other modal adverbs, with *freiwillig* ‘spontaneously’ being the lowest one:

(35) ...weil Hans wahrscheinlich freiwillig einen Apfel oft gegessen hat.
 ...because Hans probably spontaneously an apple often eaten has
 ‘...because frankly Hans probably spontaneously often ate an apple’

This relation, which can be replicated for a wide range of other adverbs, supports an ordering of projections where Epistemic modality dominates other kind of

modalities. What is especially interesting is the fact that low IP adverbials as *freiwillig* must appear to the left of the sentential negative marker *nicht*, as sentence (36), adapted from Laenzlinger, shows:

- (36) weil der Mann freiwillig diese Sonate nicht oft gut gespielt hat.
 because the man spontaneously this sonata not often well played has
 ‘because the man probably not often played the sonata well’

By looking at (36), it is also possible to notice that *nicht* may be followed by other adverbials as *oft* and *gut* which express, respectively, an aspectual and a manner meaning. Such adverbs might occur to the right or to the left of negation. In this former case, which is the one given in (36), it is possible that these adverbs can be replicated inside the VP (as suggested in Cinque 1999) or that NegP is higher than aspect and manner. In any case, what is important for our purposes, is that *nicht* is lower in the structure than any adverb with a modal meaning.

On the basis of the adverbial ordering, Laenzlinger proposes the following organization of the German inflectional system:

- (37) SubjP>MoodPspeech-act>ModPep>ModPvol>ObjP>NegP>AspP>MannP

At this point, there is sufficient evidence to support the claim that, also in German, modality is expressed in the inflectional system in a position above NegP. Given this situation, let us go back to sentence (27), repeated here as (38)

- (38) ...dass Hans Julia nicht sehen muss
 ...that Hans Julia neg see-inf must
 a. ...that Hans is not required to see Julia $\neg \square p$
 b. ...that Hans is required not to see Julia $\square \neg p$

given that ModP dominates NegP at PF, we need a way to widen the scope of the negative operator in order to obtain the inverse wide scope (38a). This situation is similar to Milanese and (38a) can be derived by widening the logic scope of the negative operator by raising it above ModP:

- (39) ${}^{CP} [\dots {}^{XP} [OP \neg [{}_{ModP} [\dots [{}_{NegP} nicht [{}_{VP} t_{Hans} t_{Julia} [{}_{V^0} sehen]]]]]]] [{}_{Mod^0} muss]$
-

The representation in (39) ultimately illustrates another instance of the Negation Raising operation presented in (24) and it allows to derive the desired inverse scope reading.

Double modal constructions

I will now briefly consider the possibility that the wide scope reading of negation could be obtained in the opposite way: by lowering the scope of the modal operator. This could be a viable hypothesis if modals are base generated VP internally, as

lexical verbs. However, we saw that they resist to such an analysis, not being able to have an external argument and showing rigid ordering restrictions.

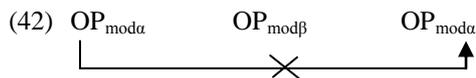
A further argument against reconstruction comes from sentences with more than one modal verb, where reconstruction is blocked. Consider for example the following sentences from Italian:

- (40) Gianni deve poter parlare
 Gianni must can to-speak
 a. 'it is necessary that G. can talk' $\square\Diamond p$
 b. *'it is possible that G. must talk' $*\Diamond\square p$
- (41) Gianni può dover parlare
 Gianni can must to-speak
 a. *'it is necessary that G. can talk' $*\square\Diamond p$
 b. 'it is possible that G. must talk' $\Diamond\square p$

In both sentences (40) and (41), the only possible interpretation is the surface scope reading: in (40) the modal *deve* 'must' takes wide scope over the modal *potere* 'to be able to', while the inverse relation holds in (41).

This phenomenon can be accounted for in different ways. A first possibility is that the higher of the two modals expresses Epistemic Modality, which takes scope over the deontic modality, and that it is generated in a higher functional head.

A second way to exclude the inverse scope is derivational. In this case reconstruction is blocked by a general principle of syntax as the *Minimal Link Condition* (Chomsky, 1995) or *Relativized Minimality* (Rizzi, 1990). Since reconstruction of the highest modal needs to create a link over the lowest modal, an intervention effect occurs:



This observation is not restricted to Italian, but it extends also to German. Consider sentence (43), with the two modals *können* and *müssen*:

- (43) ...dass ich einschlafen können muss.
 ...that I fall.asleep can must
 a. '...that I must be able to fall asleep' $\square\Diamond p$
 b. *'...that I can necessarily sleep' $*\Diamond\square p$

This sentence is unambiguous and only reading (43a) is possible. Again, the only interpretation is the one consistent with surface scope.

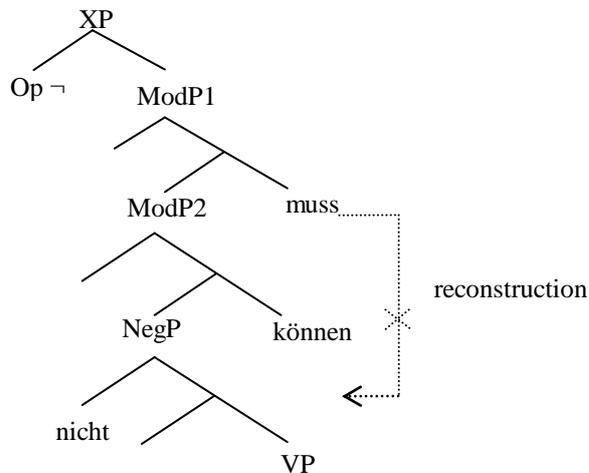
The conclusion is that whenever two modal verbs are present within the same sentence, their scope is rigidly fixed by their surface position and any kind of reconstruction or raising is excluded.

This fact can be relevant in connection with the interpretation of negative sentences. If inverse scope is derived through the reconstruction of the modal, we expect that such a reading will be excluded whenever reconstruction is forbidden, as in the double modal construction in (43). However the following example shows that, although the scope of the highest modal is frozen by the presence of the second modal, negation is able to scope over it:

- (44) a. Karl muss nicht schwimmen können
 Karl must not swim can
 'it is not necessary that Karl is able to swim' $\neg\Box\Diamond p$
- b. ...dass Karl nicht schwimmen können muss
 ...that Karl not to swim able must
 '...that it is not necessary that Karl is able to swim' $\neg\Box\Diamond p$

In the matrix sentence (44a), the scope of the modals *können* and *müssen* is fixed and only surface scope is possible. Now that reconstruction is blocked, the only way to derive the paraphrased meaning is to raise the negative operator above the highest modal *müssen*, and the same applies to the embedded sentence (44b).

(45)



3.2. Split scope readings

Another interesting piece of evidence in favour of LF-Negation Raising comes from the scope of negative quantifiers interacting with modality. This kind of constructions has been discussed in Jacobs (1991) and Rullmann (1995). For Dutch,

Rullmann (1995) showed that certain readings cannot be derived by covertly moving the quantifier as a whole. Consider the following sentences from Dutch:

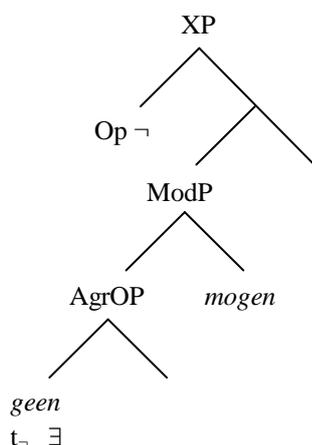
- (46) Ze mogen geen eenhoorn zoeken
 they are allowed no unicorn seek
- a. 'there is no unicorn x such as that they are allowed to seek x ' $\neg\exists > \diamond$
 b. 'they are allowed to seek no unicorn' $\diamond > \neg\exists$
 c. 'they are not allowed to seek a unicorn' $\neg > \diamond > \exists$
- (47) Ze hoeven geen verpleegkundigen te ontslaan
 They need no nurses to fire
- a. For no nurse x it is the case that it is necessary to fire x $\neg\exists > \square$
 b. #It is necessary that they fire no nurses $\square > \neg\exists$
 c. It is not necessary for them to fire a nurse $\neg > \square > \exists$

West Germanic languages do not show negative concord and negative quantifier can negate a sentence as the only negative elements. In both sentences (46) and (47) the negative operator introduced by the quantifiers creates complex interactions with the modal, giving rise to three different interpretations. If we consider sentence (46), *geen eenhoorn* 'no unicorn' might be interpreted taking wide or narrow scope over the modal *mogen*. This results in the interpretations (46a-b). In (46a), unicorns might exist but for none of them the research is permitted, while in the quite unnatural interpretation (46b), it is permitted to search for unicorns, even if they do not exist. The last interpretation, which is the most natural, expresses instead the prohibition to look for existing unicorns (46c). This reading shows that quantification and negation in '*geen eenhoorn*' have independent scope and that the negative feature might be raised in isolation to take scope over the modal.

This reading becomes even more prominent if we use a modal as '*hoeven*' which takes narrow scope under negation. In this case, the negative operator must obligatorily raise (together with the quantifier (47a) or alone (47c)) to take scope over the modal.

The interpretations in (46c)-(47c) are referred to as the *split scope* readings and the solution proposed by Jacobs (1991) and Rullmann (1995) is to consider quantifiers as 'geen' as complex elements which include a quantifier plus a negative operator (see Zeijlstra and Penke 2005 for similar data on German; De Swart 2000 for a different analysis).

If this analysis is correct, the mechanism proposed for deriving the inverse scope reading can straightforwardly apply to the negative feature, raising it in a position dominating modality, being it another instance of the Negative Raising operation:



4. Negative Chains

In the previous paragraphs we have seen that the inverse wide scope of negation over modality can be derived by applying a covert syntactic operation. In this final section I will tentatively propose a characterization of this operation in terms of a chain-formation mechanism. Once the chain is formed, each link can be a possible interpretive site for the negative operator, originating the scope shifted readings. I assume that the selection of the interpretable link of the chain is restricted by polarity and that modals with a negative polarity force the interpretation of the negative operator in a c-commanding position.

If we want to consider the operation of LF-Raising as related to a chain of positions, a very important question is what closes the chain in its higher position and why do we need this higher link. A possible answer is to say that this higher link is needed only for generating the scope-shifting interpretations. However, I wish to pursue another direction, in order to independently motivate the existence of the topmost link. The crucial assumption is that sentential negative markers do not only express the negative logic operator and that negation is also a discourse-related category. As such, it must be realized also in the higher clausal positions.

If we consider the syntactic left periphery of the clause (Rizzi, 1997) as the locus where discursive features are encoded, many languages express sentential negation by means of negative complementizers. In Ulster Irish, for example, a negative complementizer is required not only in embedded but also in matrix clauses, as shown by the two examples from McCloskey (2001):

(48) Creidim *nach* gcuirfidh sí isteach air.
I-believe neg put-fut she in on it
'I believe that she won't apply for it.'

(49) *Cha-r* ól tú a gcuid uisce.
neg-past drank you their portion water
'You didn't drink their water.'

In Ulster Irish, the particles *cha* and *nach* are best analyzed as negative complementizers which negate the sentence alone. The negative feature here has to be considered as interpretable and visible at the semantic interface.

In other languages, instead, a negative complementizer must be selected by another negative element and cannot negate a sentence by itself. Examples (50) and (51) show that in Basque the negative complementizer *enik* has to be licensed by negation in the matrix clause, being it the negative marker *ez* or a negative verb as *ukatu* 'deny':

(50) *Ez* du Zuriñek ^{CP}[inor etorriko *denik*] esan
no has Zuriñek anyone come will-that said
'Zuriñek has not said that anybody will come'

(51) *Amaiak* ^{CP}[inork gorrotoa *dionik*] ukatu du
Amaia anyone hated has-thatN denied has
'Amaia denied that anybody hated her'

Ulster Irish and Basque are similar in that they require the marking of embedded clauses as negative, but they differ in the interpretability of this feature.

From a typological analyses of different languages, Moscati (2006, 2010) shows that the overt morphological marking of negation in the complementizer is a well-attested option and that negative complementizers vary with respect to finiteness, interpretability and the distinction root/embedded.

This variety may not be accidental and it can be a reflex of the necessity to type negative clauses, in accordance with Cheng's (1991) proposal that all clauses must be typed in Comp. If this is correct, negative clauses could be marked either overtly or covertly and the negative feature can be only formal, as in Basque, or also interpretable as in the variety of Ulster Irish.

Now, if a negative feature is required in the CP for clause-typing reason, we have a reason to assume a link between the negative feature expressed by negative markers and a higher CP-internal position. This can be captured in different ways, and in what follows I'll implement this idea adopting the proposal presented in Pesetsky & Torrego (2004). They claim that there is no principled reason to assume (with Chomsky 1998, 2001) that valuation and interpretation must be met in the same syntactic locus: it should be possible to evaluate a feature in overt syntax and to interpret it in a different position. Using their extended feature typology, an idea

already proposed by Zeijlstra (2004), we might have interpretable but unevaluated syntactic features as in (52a) and also uninterpretable but evaluated features as in (52b):

- (52) a. F = [+val], [-int]
 b. F = [-val], [+int]

This can be used to derive the inverse scope readings through a chain formation mechanism: instances of the same feature can be co-indexed in order to create a chain in which one instance must be valued in syntax and the other must be interpretable at the semantic interface (see also Brody, 1997).

Going back to clause-typing, the highest link of the negative chain must always be in Comp, being it interpretable or not. I assume that the interpretable link of the chain is automatically assigned to the overt sentential negative marker⁷ and that a different assignment is possible only for scope-shifting reasons.

This means that whenever the sentential negative marker is the only scope bearing element, it carries an interpretable feature which types the clause by a link within the complementizer:

- (53) ...dass _[-i/-v] Hans Julia nicht sieht _[+i/+v]
 ...that Hans Julia neg sees
 ‘...that Hans doesn’t see Julia’

However, when another scope bearing element as a modal is present in the clause, in order to generate an alternative reading and to obtain scope shift, interpretability can be obtained in the highest position. Consider again sentence (27) repeated here as (54):

- (54) ...dass Hans Julia nicht sehen muss
 ...that Hans Julia neg see-inf must
 a. ... that Hans is not required to see Julia $\neg\Box p$
 b. ... that Hans is required not to see Julia $\Box\neg p$

Under the surface scope reading (54b), the interpretability coincides with the position of the sentential negative marker *nicht*, and the derivation is similar to (53) and reported in (54b). However, when the modal has polarity (as in the case of *müssen*, when mild restrictions emerges on (54b)) and when scope shift is required in general, the instance of the negative feature of *nicht* is assigned a [-interpretable] value and both scope and clause typing are obtained in Comp, deriving the inverse scope reading as in (54a):

⁷ In the case of Basque, the fact that *enik* is not interpretable seems to violate this assumption. This is not the case, since interpretability is selected on the overt sentential negative marker *ez* in the matrix and we have a case of negative concord in the embedded.

- (54)a. [CP dass $\underbrace{\text{neg[+i/-v]} \dots [\text{ModP} \dots [\text{NegP nicht neg[-i/+v]}]}_{\text{scope}}$ [VP t_{Sub} t_{Obj} [sehen]]] muss]
- (54)b. [CP dass $\underbrace{\text{neg[-i/-v]} \dots [\text{ModP} \dots [\text{NegP nicht neg[+i/+v]}]}_{\text{scope}}$ [VP t_{Sub} t_{Obj} [sehen]]] muss]

Conclusions

The account proposed here for the inverse scope reading of negation allows us to derive the scope-shift interpretation without assuming any LF-movement for modal verbs. This proposal has the advantage of being consistent with the observation that modal heads respect strong ordering restrictions, with regard to both surface order and logic scope (Cinque, 1999). If this observation holds, this implies that in the case of modal verbs there is an isomorphic mapping between LF and PF that must be respected. Moreover, there are also several empirical problems militating against the option to lower the modal operator. All those drawbacks can be avoided if we allow the negative operator to raise, with the welcome consequence of having a unified explanation for other phenomena involving negation and modality, such as the split-scope readings.

Another advantage related with the introduction of Negation Raising is that it allows us to unify the scope of the negative operator regardless of the broad parametrical variation found across languages. If we express such an operation in Pesetsky & Torrego's system, we have a way to respect the parameterization through the checking of valuation in the appropriate and variable position of NegP. At the same time, we have a way to relegate variations only to PF, since the logic scope of the operator might be widened at LF by the presence of covert interpretable negative features.

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