# LF-Negation Raising in Double Modal constructions

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*Abstract*

*The overt realization of sentence negation is variously realized across different languages and even languages that share many common features often differ with respect to the structural position where the negative marker surfaces. This variation raises the question of whether those surface differences have an effect at LF. In order to try to answer this question, this paper will explore the possibility that the PF-realization of negation corresponds to its logic scope. This hypothesis will be tested against modal constructions, showing that surface variations of NegP are not relevant in the computation of the scope of negation with respect to intentional operators. Direct empirical support for the possibility to covert move negation at LF will be given considering double modal constructions in German.*

## 1. SURFACE VARIATION AND LOGIC MAPPING

It is relatively uncontroversial in the literature that languages show a great variability in their means to express negation. It is well known, for example, that some languages convey a negative sentential meaning by using a verbal affix which directly attaches to a verbal host, while other languages adopt a self-standing negation which can be separated from the verbal complex and which shows characteristics similar to the ones of adverbials. Among the romance languages, Standard French is famous as it negates a sentence showing both the affix *en-* which is part of the verbal morphology and the adverb *pas* which surfaces in a different and lower structural position

(1) Jean n'a pas lu
J. Neg aux Neg read
'*Jean didn't read*'

This is a clear case of redundancy, probably due to diachronic variation (Jespersen 1917), which reveals that even a single language may switch between two different settings of the mechanism governing the expression of the negative operator.

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The duplication of *ne-* and *pas* in French also illustrates another important characteristic, which is the possibility of negation to surface in different structural positions. In the case of French, the difference in the positioning of *ne-* and *pas* can be related, following Haegeman (1995) to the X/X' difference which allows the head *ne-* to move together with the auxiliary in the functional projection hosting this latter element. Even if it is possible in French to support an analysis which base-generates two different elements in a unique structural position between TP and AgrP (Belletti 1990, revisiting Pollock's 1989 proposal), a single fixed position is not sufficient to account for the broad cross-linguistic variation related to the position of NegP.

This is clear if we compare negative markers of the same kind, both head or both adverbials, in languages with a similar syntactic structure. Ouhalla (1991) notes, for example, that Turkish and Berber express negation by means of a verbal affix, but he also notes that this affix appears in reverse order with respect to Tense in the two languages:

(2) a. Jan elmarlar-i ser-me-di-∅ (Turkish)
J. apples-ACC like-**neg**-past-agr

b. Ur-ad-y-xdel Mohand dudsha (Berber)
**neg**-fut-agr-arrive M. tomorrow

In (2a) the negation *me* is closer to the verb stem than the affix expressing Past, while in the Berber example (2b) the situation is the opposite, with the Future affix *ad* being closest to the verb with respect to the negative morpheme *ur*. This contrast is hard to account unless we do not assume that the structural position where NegP is realized is subject to parametrical variation. This claim is further supported if we compare negative markers which are both adverbial like and show ordering differences with respect to the position of the past participle and other adverbial elements. Consider the other minimal pair from Zanuttini (1997):

(3) a. l'a <u>semper</u> 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'

b. da 'ntlura, a l'ha pi *nen* <u>sempre</u> vinciu (Piedmontese)
from then, s.cl. s.cl. has more neg always won
'since then, he has no longer always won'

In sentence (3a) from Milanese, the sentential negative marker *no* follows the adverbial *semper* 'often' and the past participle *pagà* 'paid'. In (3b) instead, the negation *nen* precedes the adverbial and the participle. Once again two varieties, in this case two Northern Italian dialects, which share all the relevant syntactic features, show a difference in the order of the negative marker with respect to other elements. A complete survey of the syntactic range of variation is not possible here but there are many crosslinguistic data (see Moscati 2006a) in support of the idea that negation may be syntactically realized from positions as low as the VP, as in the case of Milanese, up to position CP-internal, as in some Irish varieties (McCloskey, 2001).

This variation in the PF realization of NegP opens up a series of questions regarding the interaction between this level of representation and the semantics. One of those questions which I will address here is how the mapping between PF and LF might be done, given that PF is subject to a great degree of cross-linguistic variation. The null hypotheses is that there

exists a direct mapping between the two levels of representations, but this view is extremely problematic, as I will try to show, both on conceptual and on empirical ground. Firstly, given the fact that languages differ in their PF realization of NegP, we will be forced to conclude that languages also differ in the logic scope that the negative operator might have, with all the consequences that derive from the idea that languages vary in their logic representation and in their expressive power. However, this view cannot be rejected *a priori* and, if the observation that two different PFs trigger two different LFs is made, we should carefully consider the null-hypothesis of an isomorphic PF-LF mapping. On the other hand, if differences in the surface realization of negation do not reflect variations in meaning, we have to discard the idea that LF is sensitive to variations of NegP.
In the following sections I will provide evidence in favour of this last possibility, supporting the idea that it is the correct approach and that the logic representation of negation is not bound by its surface realization.

## 2. INVERSE SCOPE OVER MODALITY

One standard argument in favour of movement in Logic Form has traditionally been built on the presence of the ambiguity stemmed from the presence of two scope-bearing elements within a single clause. This has been the case for Quantifier Raising (May 1985) which, independently of its specific formulations (Beghelli & Stowell 1997, Hornstein 1995, Fox 2000, Reinhart 2006) can be characterized as an indispensable syntactic operation able to multiply at LF the interpretable sites available for quantificational elements. In the presence of an ambiguity, one resort is to formulate the presence of two competing logic representations, where a semantic operator might occupy different structural positions. This logic might be applied to account for sentences where a modal operator is combined with negation, a combination which in certain cases gives rise to an ambiguity solvable only by admitting that some covert operations apply at LF. I will focus next on a sub-case of this more general problem and I will consider the inverse scope readings of negation over modality.

In order to found the desired configuration where negation has inverse scope over modality, it is necessary to individuate a language where negation surfaces in a low structural position, below the syntactic projection where the expression of modality appears. I will consider here two cases, from Milanese and from Standard German. Both languages have an adverbial negative marker which surfaces in a structural position immediately above the vP and which is overtly C-commanded by a modal. Consider first Milanese:

(4) El gà de studià *no*
s.cl must of to-study neg
a. he is not required to study ¬ > □
b. he is required not to study □ > ¬

Sentence (4) [1], taken from Zanuttini (1997) results ambiguous between the two readings (4a) and (4b), where the first reading is the inverse scope reading. In sentence (4) the modal verb *gà*, similar in meaning to the English quasi-modal 'to have' overtly c-command the negation *no*. We already saw in (3) that this particle follows low verbal forms such as past participles and low adverbial like 'always', two facts that suggest that among Romance varieties,

[1] Thanks to Leonardo Gatti e Federico Misirochi for judgments.

Milanese belongs to the group with the lowest expression of negation within the Inflectional System. The structural representation of (3), repeated as (5), is the following:

(5) l'a semper pagà *no* i tas

$^{AgrP}[l_j'\ a_k\ \ ^{TP}[t_k\ \ ^{AspP}[\text{semper}\ \ [\ ^{PartP}\ \text{pagà}_v\ \ ^{NegP}[\text{no}\ \ ^{VP}[\ t_j\ t_v\ \text{i tas}\ ]]]]]]$

The representation in (5) results from standard assumptions on verb movement. For example, the possibility that the modal verb is originated in a ModP situated below NegP is excluded since under this view the auxiliary *a* needs to cross the past participle *pagà* which is another head element. This possibility is not desirable given the presence of intervention effects on movement (Head Movement Constraint Travis, 1984). Those considerations ultimately favour the order ModP > NegP in (5). Under this analysis, which straightforwardly applies also to sentence (4), is problematic to derive the inverse scope reading presented in (4a).

The second case I wish to discuss is given by the interaction of negation and modality in German, which *mutatis mutandis* closely resembles the problem posed for Milanese. In German the sentential negative marker is realized immediately above the vP but when presented in combination with a verb expressing modality, it can take wide scope over this latter element:

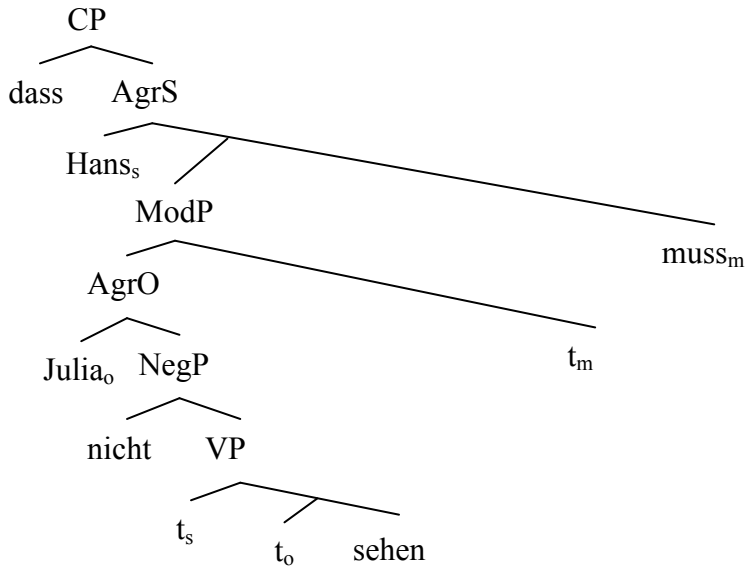
(6) Hans muss Julia nicht sehen
H. must J. neg to-see
a. Hans is not required to see Julia ¬ > □
b. Hans is required not to see Julia □ > ¬

(7) ...dass Hans Julia nicht sehen muss
that Hans Julia neg see-inf must
'...that it is not necessary that Hans sees Julia'
a. Hans is not required to see Julia ¬ > □
b. Hans is required not to see Julia □ > ¬

In sentence (6) the modal verb appears in V2 position, thus c-commanding negation but taking narrow scope below it at LF. The preferred –if not the only- reading is the inverse one given in (6a)[2]. If we cancel the V2 effect by embedding (6) and transforming it in a subordinate clause, again negation might take scope over the same modal (7a). Many different analyses for SOV languages have been proposed, stemming from the original head-final analyses or from Keyne's *remnant movement* analisys (Zwart 1993, Den Dikken 1996, Haegeman 2002, Koopman & Szabolcsi 2000) but a common feature is that there is a substantial agreement in considering the position triggered by Object-Shift below ModP and above NegP. For the point at issue here, nothing changes if we derive (7) through remnant movement (Moscati 2006a) or adopting the head-final analysis as long as this choice does not have consequences on the relative ordering of the relevant functional projections ModP and NegP. Let us adopt the head final analysis and give sentence (7) the following representation:

[2] Thanks to Christian Biemann, Patrick Grosz and Wolfganf Meyer for judgments and discussions.

(7')




Looking at (7') it is evident that we are in the same situation already presented for Milanese: negation is c-commanded by modality at PF, but it might be interpreted with wide scope at LF. At this point the problem posed by the existence of inverse scope readings (4a) and (6a-7a) should be clear and it is evident that those readings cannot be accounted for by the representations given in (5) and (7').

We need a mechanism that can create a configuration in which the negative operator c-command the modal operator at LF. In principle there are two means to achieve this result: either reconstructing the modal in a position below negation or raising negation above the modal operator. Next I will consider the first hypothesis, showing that it is not void of problems and it faces at least one important empirical problem in double modal constructions.

## 3. RECONSTRUCTION OF MODALITY

Let us explore the first of the two possibilities presented in the previous paragraph. As just said, one way to derive the problematic inverse scope readings is by reconstructing the modal verb in a position below negation. If this solution is on the right track, it follows that negation does not play any special role in the derivation of inverse scope readings and that it is instead the operator expressing modality that will be affected by some kind of covert movement. We may refer to this hypothesis as the *Reconstruction Hypothesis*. This hypothesis relies on the possibility that there exists at least one position below NegP where the modal can reconstruct and I will show that this prerequisite has important consequences on the analyses of modal verbs.

Moreover, if we assume that the mechanism required to derive inverse scope is based on the reconstruction of the modal, we also expect that whenever such a mechanism cannot apply, also inverse scope should be impossible. We can state the following prerequisite and consequence for the Reconstruction Hypothesis:

i) there exists a reconstruction site below the position where NegP is realized
ii) the inverse scope readings are impossible when reconstruction is blocked

In order to evaluate Reconstruction, in this section I will consider if there is evidence supporting i) and if the empirical prediction in ii) is borne out.

*3.1. VP-internal reconstruction*

If we want to derive the inverse readings in (4a) and (6a-7a) by diminishing the scope of the modal operator, one way to obtain this result avoiding counter-cyclic lowering movements is to recur to the reconstruction of the modal verb in a lower position. This is an alternative to the representation given in (7'), where the modal is base-generated in its functional projection ModP, which is the view proposed by Cinque (1999). An alternative is that the modal has been moved in this position through possibly successive head movements (Lechner, to appear). At *prima facie* this seems to be a tenable position, but I will show that it encounters several problems when we try to determine the original position from where the modal verb has been moved.

One possibility is that modals are lexical verbs, originating within the vP, but this solution has important consequences on the treatment of 'restructuring constructions'.

It is known that sentences with a modal verb selecting an infinitive clause show certain kinds of monoclausal effect (Rizzi 1976, 1982). This can be illustrated looking at some properties of Italian:

(8) a. *lo odio fare *t* di notte
obj.cl. I-hate to-do by night

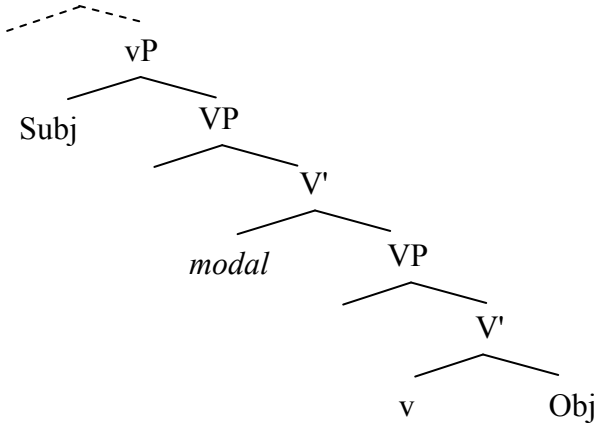
b. lo posso fare *t* di notte
obj.cl. I-can to-do by night
'I can do it by night'

Sentences in (8) show that clitic climbing, a phenomenon that is considered to be clause bounded (8a), might be found with a special class of verbs as the ones expressing modality, volition and motion. This observation, together with other special properties of the verbs belonging to this set (Rizzi 1982, Burzio 1986, Cinque 1988, 2006) suggests that modals in sentences such as (8b) are 'transparent' with regard to a series of syntactic phenomena. In their original formulation, monoclausal effects were derived through a 'restructuring rule' which takes a bi-clausal construction and which transforms its input in a monoclausal sentence. I will not refer to this formulation here, rather but I will consider a more recent proposal by Cinque (2004) according to which modal verbs are functional heads[3] in opposition to a competing analysis which considers modal verbs as being lexical verbs base-generated in vP. Wurmbrand (2004) refers to this opposition as one between *lexical* and *functional* restructuring. Since the discussion here will be based on Wurmbrand's original work, I will maintain this denomination.

According to a lexical restructuring analysis, modal verbs are normal lexical verbs originating within the vP and taking as complement a reduced clause. Thus the transparency effects related to the lack of a clause boundary are a consequence of the properties of the selected complement:

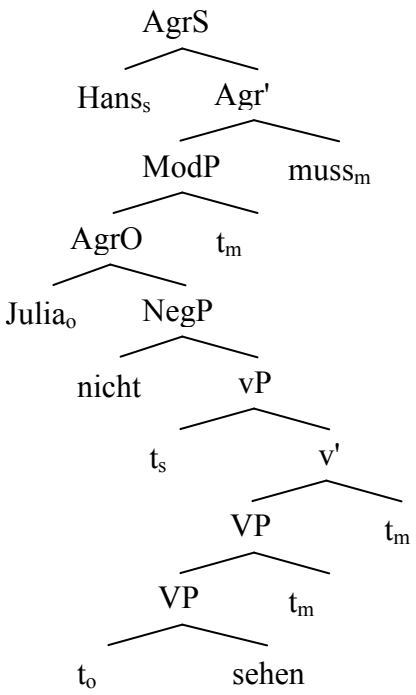
[3] It is possible to re-cast the restructuring mechanism in terms of functional projection (Cinque, 2006). It will empirically differ only with respect to the optionality of restructuring (Rizzi p.c.).

*lexical restructuring*




The hypothesis of modal reconstruction is directly related to the lexical restructuring just presented, since lexical restructuring makes available a vP-internal site where the modal might reconstruct. In this way the semantic interface has access to an additional position constituted by the lower trace of the modal without any further need to covert-move the negative operator in order to generate the inverse scope readings.
Therefore, an alternative for (7) is the following representation with the presence of different traces left behind by the movement of the modal verb:

7"




If the representation (7") is on the right track, we can straightforwardly account for the inverse scope interpretation (7a). As it is possible to see looking at (7"), the modal moves to ModP leaving behind a certain number of traces, depending on the richness of the functional

structure we assume. The crucial observation is, however, that the lowest of those traces is inside the VP, in a position lower than NegP.
The inverse scope readings are then problematic only for the first representation we have given in (7'), which is instead consistent with *functional restructuring*. Functional restructuring, in fact, assumes that modals are fixed and base generated in the functional domain. Under this view, there are no traces and, by consequence, no other interpretable sites.
At first sight, the hypothesis of lexical restructuring seems to be superior to the functional restructuring alternative in deriving the inverse scope readings with respect to negation, proviso that head-movement of the modal comes for free. One might argue that this is the case, since modals must rise in order to reach a spec-head configuration with the subject in AgrP. But notice that if this is the only reason for moving the modal out of the vP, it will not be easy to explain the ordering restrictions active on modals.

(9) 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'

This pair shows that modals cannot be freely ordered and that the linear order is constrained in some way. If modal movement is motivated by some sort of general syntactic mechanism (i.e. Subject criterion, Rizzi 2004), it will be impossible to explain why only one modal can be attracted in the relevant position. A solution is to consider that modal movement is feature-driven in dedicated structural positions (a proposal similar to the one of Beghelli & Stowell for QR). But notice that if we resort to this mechanism, modal movement is not free anymore, but additional stipulations have to be made. The hypothesis of functional restructuring, on the other hand, might account for the facts in (9) assuming the same extended ordering of functional projections but without movement.
The real argument against base-generating modals within vP comes, however, from a series of empirical facts presented in Wurmbrand (2004), which strongly argues against the lexical restructuring hypothesis which relies on two assumptions: firstly, that modals, being lexical verbs, express thematic relations; secondly, that modals take a (reduced) clausal complement.

With regard to the first assumption, it is at dubious that modals are capable of θ-role assignment. It is not easy to determine if modals have an internal object, given that they obligatorily select an infinitive complement, but when we turn to the external argument, there are clear indications that they behave as raising predicates. Consider the case of German. Here unergatives intransitive predicates can be passivized whereas unaccusatives cannot

(10) a. unergative
Es wurde einen Abend lang getanzt
it was an evening long danced
'they danced for an evening'

b. unaccusative
* Es wurde am Flughafen angekommen
It was at the airport arrived
'They arrived at the airport.'

This difference seems to be a diagnostic for the presence/absence of the external argument. In (10a) the verb *tanzen* 'to dance' selects an external object, allowing passivization, while in (10b) such possibility is blocked with the unaccusative verb *kommen* 'to come'. Modal verbs behave exactly like unaccusatives with respect to passivization:

(11) * Der Wagen wurde (zu) reparieren gemusst/müssen
the car-NOM was (to) repair must-PART/INF
'they had to repair the car'

In (11) the transitive verb *reparieren* is embedded under the modal, but despite of the possibility of having long-passives in German in restructuring context, passivization is not allowed in constructions involving a modal matrix verb as (11)[4].
Support for the raising predicate analysis for modal verbs comes from the possibility to have non-thematic subjects as *weather-it* subjects:

(11) 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'*

In (11a) the modal verb, similar to functional restructuring verbs and raising predicates in general, is compatible with the expletive *es* 'it' while a non restructuring verb (11b) which assigns an external θ-role cannot appear with a vacuous expletive. The impossibility of passive constructions, combined with this last observation that a semantically vacuous expletive subject might be licensed by modals, indicates that modal verbs lack an external argument.

What is harder to demonstrate is that the internal argument is also absent. In fact modals always take what can be considered a clausal complement and one can always assume that this complement absorbs the θ-role assigned to the internal object. But remember that the lexical restructuring analysis considers the complement of the modal verb as being clausal. We can than check if this complement has clausal properties. One way to do so is to consider the possibility to pied-pipe a relative clause. This possibility is given in German with non-restructuring verbs, but is blocked in restructuring modal context:

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[4] 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 (11) is due to the fact that modals are base generated outside the vP shell, above the functional projection VoiceP responsible for passivization.

(12) a. . . . der Roman [ den zu lesen ]INF der Hans plante
. . . the novel [ that to read ]INF the John-NOM planned
. . .'the novel that John planned to read'

b. * . . .der Roman [ den lesen ]INF nur der Hans muß
. . .the novel [ that read ]INF only the John-NOM must
. . .'the novel that only John must read'

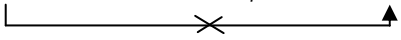
The contrast seen in (12) follows if we assume that only full-clauses can pied-pipe and that in (12b) the pied-piped element is only a fragment of the main clause, in conformity with the functional restructuring hypothesis.
To summarize, the idea that modal verbs originate outside the vP allows us to explain i) all those properties as the lack of passivization and the presence of expletive subjects related to the absence of the external argument, ii) the impossibility of pied-piping the infinitival complement of a modal verb, and iii) the ordering restrictions in force on the relative ordering of modals. From this discussion, it seems that there is no evidence –but instead counterevidence- that modals reconstruct VP internally.

*3.2. Double modal constructions*
Even if we have several arguments against the idea that modals originated within the vP-shell, this is not enough to exclude the possibility that modals reconstruct in a some other position lower than negation. Next I will present an argument against this last possibility and against reconstruction in general.
So far we have focused on some specific properties of modals, but a more general line of reasoning might be followed to exclude lowering of the modal operator. Remember that what we want to account for is the inverse scope readings for sentences (4), (6) and (7). We repeat (7) as (13):

(13) ...dass Hans Julia nicht sehen muss
that Hans Julia neg see-inf must
a. Hans is not required to see Julia ¬ > □
b. Hans is required not to see Julia □ > ¬

What we want to check is if whether the inverse reading (13a) can be derived through an operation able to reconstruct the modal verb below negation. Obviously this configuration must obey general principles of syntax. For example, the idea that there exists a ban for a linguistic object to establish a distance relation across another object of the same kind is less controversial. This principle, which has taken several formulations in the literature (*Minimal Link Condition*, Chomsky 1995; *Relativized Minimality*, Rizzi 1990), should also govern the reconstruction of the modal operator. Therefore we expect that if another modal operator is present, reconstruction (or raising) will be impossible:

(14) $OP_{mod\alpha}$ $OP_{mod\beta}$ $OP_{mod\alpha}$



This expectation is confirmed if we consider double modal constructions, and in fact, in cases where there are two expressions of modality, scope relations are rigidly fixed and the only

possible reading is the one visible at PF. This observation seems to exclude any instance of covert movement. Consider the following Italian sentences:

(15) Gianni deve poter parlare
G. must can to-speak
a. it is necessary that G. can talk □ > ◊
b. *it is possible that G. must talk * ◊ > □

(16) Gianni può dover parlare
G. can must to-speak
a. *it is necessary that G. can talk * □ > ◊
b. it is possible that G. must talk ◊ > □

In (15) the linear order is the modal *deve* 'must' preceding *poter* 'can' and the logic scope of this sentences is isomorphic to the observable PF representation, with the only possibility being to interpret the highest modal as taking scope over the lowest one. This is not an idiosyncratic property of the modal *dovere* but seems to hold in general. In fact, if we reverse the linear order, the inverse interpretation holds in (16). This suggests that some kind of intervention effect is really in force on the interpretation of double modal constructions. This observation is not restricted to Italian, but is also seen in German. Consider (17):

(17) ...dass ich einschlafen können muss.
...that I fall.asleep can must
a. ...that I must be able to fall asleep □ > ◊
b. *...that I can necessarily sleep * ◊ > □

The only interpretation possible is the one given in (17a), where the modal *muss* which c-commands at PF the other modal verb *können* asymmetrically takes scope over it. Again this shows that the possibility of disjoining the LF interpretation of a double modal sentence from its surface realization is impossible. This directly follows if we assume that this is due to a violation of the Minimal Link Condition.

Given this state of affairs, we expect that if the reconstruction of the modal is the operation responsible for the inverse wide scope interpretation of negation, this reading will be unavailable when reconstruction is impossible. But this conclusion is disproved by negative double modal sentences:

(18) a. Karl muss nicht schwimmen können
Karl must not swim can
*'it is not necessary that Karl is able to swim'* ¬ > □ > ◊

b. ... dass Karl einen Kilometer nicht schwimmen können muss
I believe that K. one Kilometre not to swim able must
*'... that it is not necessary that Karl is able to swim one kilometre'* ¬ > □ > ◊

Sentences in (18) present the two modals *können* and *mussen* that are interpreted, as already shown for sentences (15-17), in accordance with their surface scope. But those sentences also present another scope bearing element, the negative marker *nicht*, which occupies the specifier of the low projection NegP, crucially lower than the position where modals surfaces (see § 1). The low position of NegP is also confirmed by Austrian German (as pointed out to

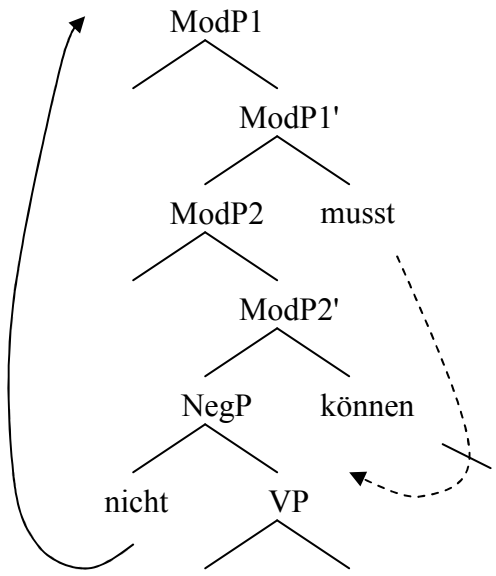
me by Patrick Grosz) where the position of negation is clearly situated in a low portion of the middle-field, as suggested by its position following the low-particle *ja*:

(19) a. Der Karl muss **ja** nicht schwimmen können
the Karl must ja not swim can
*'Karl (as you know) doesn't have to be able to swim'*

b. ...dass du **ja** nicht einschlafen können musst
...that you PRT not fall.asleep can must
*'that you are (as you know) not required to be able to fall asleep'*

Sentences in (19) also show that in this variety negation does not obey with an isomorphic mapping between LF and PF but instead it is interpreted with the widest scope among the three logic operators. The interpretation of (18) and (19) is then unexpected if it relies on the reconstruction of the modal. I suggest that the only way to derive the wide scope reading of negation over the modal complex is to covert-move negation in a position where it c-commands at LF both modal verbs. I will refer to this operation as LF-Negation Raising[5]. It is now possible to derive the interpretations in (18) and in (19) without any need to move the modal and in conformity with the functional restructuring hypothesis. The mechanism is illustrated in (18b') below:

(18b')




The dashed line in (18b') indicates the impossibility to reconstruct the modal in ModP1 in a position below ModP2 while the black arrow expresses LF-Negation Raising in a position c-commanding ModP2.

[5] This operation is different from *Negative Raising* (Horn 1989) and actually it is the exact inverse. Negative raising has been proposed to account for scope diminishment of sentences as i., interpreted as equivalent to ii.:
i. I do not believe that John will come
ii. I do believe that John won't come
In sentence i. the negative marker surfaces in a position higher than the one where it could be interpreted.

Adopting this derivation, we can capture the fact that the scope relations between two modal verbs are fixed by their superficial c-command ordering and that this constraint doesn't apply to the negative operator. It is reasonable then to assume an operation as the one illustrated in (18b') which raises only negation. This alternative allows us to straightforwardly account for the problematic sentences (4) and (7) presented in the first paragraph. We repeat here (4) and (7) as (20) and (21):

(20) ...dass Hans Julia nicht sehen muss
*'that Hans is not required to see Julia'*

(21) El gà de studià *no*
*'he is not required to study'*

Remember that the problem is to establish how those sentences can receive the interpretation with negation taking wide scope. The solution proposed here is to adopt a derivation similar to the one presented in (18b'), moving at LF the negative operator in a position where it c-command modality. The two representations given below shoe how inverse scope reading might be derived moving the negative operator but keep fixed the position of the modals:

(21') ...dass $^{AgrP}$[Hans $^{XP}$[$Op_{neg}$ $^{ModP}$[ $^{AgrOP}$[Julia $^{NegP}$[nicht $t_{OPneg}$ $^{VP}$[sehen] ] ] $OP_{mod}$] ] $muss_i$]

(22') $^{AgrP}$[El $gà_i$ $^{XP}$[$Op_{neg}$ $^{ModP}$[$t_i$ $^{TP}$ [de studià $^{NegP}$[ *no* $t_{OPneg}$ $^{vP}$[ ...] ] ] ] ] ]

In those representations negation is dislocated in a projection generically labelled XP while the modal is left in the position where it is base generated, allowing us to avoid all the problems related with modal movement previously discussed.

## CONCLUSIONS

The account proposed here for the inverse scope readings of negation allows us to derive the problematic interpretations 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. We saw that, aside from this consideration, there are also several empirical problems that make the option to lower the modal operator at least problematic. 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 (see Rullmann, 1995; De Swart, 2000; Penka, Doris & Hedde Zeijlstra. 2005) involving negation and modality.
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 since variations in its realization might affect only the superficial level but its logic scope is free to be widened at LF by means of covert movement.

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