On the scopal interaction of negation and deontic modals

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Abstract. In this paper we argue that the different scopal relations that deontic modal auxiliaries cross-linguistically exhibit can be explained by assuming that (i) polarity effects arise in the domain of universal deontic modals and therefore not in the domain of existential deontic modals; and (ii) that all deontic modals must be interpreted VP in situ if their polarity requirements allow for that.

Keywords: Negation, Deontic Modality, Negative Polarity Items, Positive Polarty Items, Negative Quantifiers

1 Introduction

1.1 The data

Universal deontic modals come about in different kinds: English deontic *must, ought* and *should* scope over negation. On the other hand, *have to, need to* and *need* (without *to*) scope under negation. *Need* is a clear Negative Polarity Item (NPI) and may thus not appear in non-negative sentences.

(1)	a.	John mustn't leave	□ > ¬
	b.	John oughtn't to leave	□ > ¬
	c.	John shouldn't leave	□ > ¬
(2)	a.	John doesn't have to leave	¬ > □
	b.	John doesn't need to leave	¬ > □
	c.	John need*(n't) leave	¬ > □

Unlike universal deontic modals, existential deontic modals may only appear under the scope of negation, as is shown below for *may* and *can*:

(3)	a.	John cannot leave	¬ > ◊

b. John may not leave ¬ > ◊

This pattern is not unique for English. In fact, to the best of our knowledge, this pattern (universal deontic modals can either scope over or under negation; existential ones can only scope under negation), applies to all languages that exhibit universal and existential modals. Spanish *deber* and tener for instance, behave on a par with English *must* and *have to*, in the sense that *deber* outscopes negation, whereas *tener* does not. Given that the Spanish negative marker *no* is always attached to the left of the finite verb, this shows even more that the observed pattern must reduce to properties of the modal verbs rather than their structural position with respect to negation at surface structure.

(4) a. Juan no debe salir □ > ¬
b. Juan no tiene que salir ¬ > □

In German, things are slightly different: *sollen* ('should') behaves like English *should* and outscopes negation; *brauchen* ('need to') is an NPI comparable to English need; and *müssen* ('must'), like English *have to*, scopes under negation. There is no modal verb with the meaning of English *must*/*have* to that can outscope negation. Existential deontic modals (e.g. *dürfen* ('may')), finally, always scope under negation

(5) a. Hans soll nicht abfahren □ > ¬
b. Hans braucht *(nicht) zu abfahren ¬ > □
c. Hans muss nicht abfahren ¬ > □
d. Hans darf nicht abfahren ¬ > ◊

In Dutch, things are also different, but still fall under the generalization that we formulated above. For most speakers the verb *moeten* ('must') outscopes negation and the NPI *hoeven* ('need') is under the scope of negation:

(6) a. Jan moet niet vertrekken □ > ¬
b. Jan hoeft *(niet) te vertrekken ¬ > □

Finally some languages allow ambiguity with respect to the interpretation of universal deontics. Russian for example has two ways of combining negation with a universal deontic adjective (modal verbs are lacking in the language). Whereas the first reading (a) is one where negation unambiguously scopes over modality, the reading in b, where *dolzhna* ('obliged') has been fronted under focus is allows both scopal orders.

(7) a. Masha ne byla dolzhna chitat' knigu ¬ > □
Masha neg was obliged read book
b. Masha ne DOLZHNA byla chitat' knigu □ > ¬; ¬ > □
Masha neg obliged was read book

Although the cross-linguistic overview is far from complete, the picture that emerges is that languages are uniform in their scope-internal relation between existential deontic modals and negation, but that languages allow different scopal relations between negation and universal deontic modals depending on which modal element (verb/adjective) is taken.

1.1 Questions

The pattern above obviously calls for an explanation and therefore the two following questions need to be addressed:

(8) a. What determines the scopal properties of universal deontic modals with respect to negation?
b. Why do existential deontic modals always appear under the scope of negation?

In the rest of this paper we will address these questions and argue that the scopal behaviour of deontic modals follows form independently motivated assumptions concerning (i) the status of polarity items and (ii) the possible positions of interpretation of lexical elements in the tree.

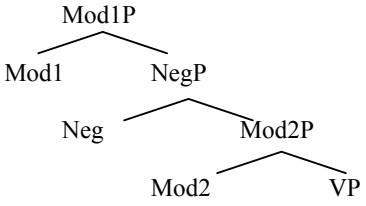
2 Previous proposals

The scopal relations between modals and negation has been observed and studied by a number of scholars, most notably [1], [2], [3], [4], [5] and [6]. In this section we will discuss and evaluate two proposals, which are quite similar in nature.

2.1 Cormack & Smith (2002)

According to Cormack and Smith [4], there are two positions for modals, Modal1 and Modal2, and (sentential) negation scopes in between them.

(9)



Cormack and Smith adopt the following assumptions: (i) the scopal order between modal types is derived by semantic / conceptual necessity (though their formulation of this is not quite clear), i.e. the fact that epistemic modals scope over deontic does not follow from any syntactic principle; (ii) it is a property of syntax that there are

two possible positions for modals, one above and one below negation (the position that the negative marker occupies); and (iii) which specific modals go in Modal1 and which in Modal2 is lexically specified and therefore idiosyncratic in nature.

(10) John doesn't have to leave
[John [$_{NegP}$ doesn't [$_{Mod2P}$ have to leave]]] ¬ > □

(11) John mustn't leave
[John [$_{Mod1P}$ must [$_{NegP}$ n't [$_{vP}$ leave]]] □ > ¬

(12) … dass Hans nicht abfahren muss
[$_{CP}$ dass Hans[$_{NegP}$ nicht [$_{Mod2P}$ [$_{vP}$ abfahren] muss]]] ¬ >□

However, this analysis faces several problems. Although the assumption that the epistemic > deontic ordering is semantically / conceptually necessary, the necessity of the split between Modal1 and Modal 2 is less plausible. First in many languages there is no syntactic evidence for two different positions. This is illustrated for Spanish below. (Note that this may not be derived from movement of the negative marker *no*, as generally the surface position of the negative marker *no* always corresponds to its LF position.)

(13) a. Juan no debe salir □ > ¬
b. Juan no tiene que salir ¬ > □

Secondly, it remains unclear why only deontic universals modals allow for a lexical split. Why couldn't deontic existentials be analysed as Modal1? Cormack and Smith argue that children start out with a learning algorithm that takes all (deontic) universals to be Modal1 and all existentials to be Modal2 and that children may reanalyse some Modal1's as Modal2's if the language input forces them to so (e.g. need is reanalysed from Modal 1 to Modal2). But why couldn't a Modal2 be reanalysed as a Modal1?

2.2 Butler (2003)

Butler's analysis [5] is similar in spirit to [4]. He also derives the scopal properties from a universal syntactic template. For that he distinguishes between different functional projections for epistemic and root modals as well as different functional projections for existential and universal modals. Butler's analysis follows Cinque's/Rizzi's cartographic approach in the sense that all scopal properties reflect a universal basic structure. For negation and modality that is:

(14) EpistNecP > (NegP) > EpistPosP > (strong) subject > RootNecP > NegP > RootP > vP

Under Butler's proposal it follows immediately that all epistemic deontic modals take scope under negation, whereas a deontic universal like must outscopes negation.

However, it becomes unclear now why some deontic universals may not outscope negation, such as English *have to* or German *müssen*. Although Butler only briefly addresses this question, the only way to deal with such examples is to posit that the negative marker in those cases is in the higher NegP. However, such a solution introduces new problems as well. First, it becomes unclear again why other modals, such as *must*, may not be outscoped by such a high negation and secondly, it predicts that in all cases where negation outscopes *have to* (or any other deontic modal that scopes under negation), it also outscopes the subject. However, this predictions is too strong as it incorrectly rules out cases such as (15):

(15) Many people don't have to work
'There are many people who are not required to work'

Finally it should be noted that this solution reduces the syntactic approach that Butler proposes into a lexical idiosyncratic approach as well: it needs somehow to be lexically encoded which position negation occupies when combined with a deontic universal. It is however unclear what kind of a mechanism could be responsible for that.

3 Analysis

In order to overcome the problem that approaches that are built on syntactic templates face, we argue instead that the scopal behaviour of deontic modals results from their lexical semantic properties, *in casu* their polarity properties. In accordance with two additional assumptions concerning the locus of interpretation of negative and deontic modal elements, we argue that all discussed facts follow directly.

3.1 Neutral and polar modals

As discussed before, the domain of (universal) deontic modals is one where NPI specifications hold.

(16)	a.	Sue need *(not) leave.		¬ > □
	b.	Je hoeft dat *(niet) te doen	Dutch	¬ > □
	c.	Du brauchst dass *(nicht) zu tun	German	¬ > □
		You need.NPI that (NEG) to do		
		'You don't need to do that'		

Since NPIs surface in the domain of deontic modality, we should also expect there to be Positive Polarity Items (PPIs), as any domain that has one of these classes also exhibits the other class (quantifiers over individuals, adverbs, etc.). Adopting the presence of PPI's in the domain of deontic modals, the scopal properties of English

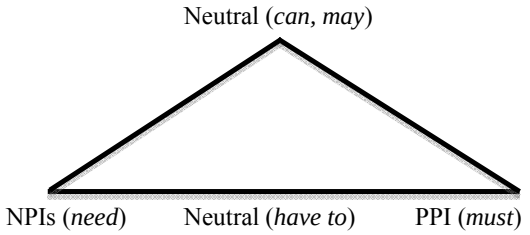
must, *should*, *ought* are already captured as these elements necessarily scope over negation.[1]

Finally, it should be noted that not all deontic modals are polarity items. English have to or German *müssen* can occur in positive sentences (hence they are not NPIs) and they appear under the scope of negation in negative sentences (hence they are not PPIs). This class of modals are referred to as 'neutral deontic modals'

At the same time, for reasons that we do not understand, no NPIs surface in the domain of deontic existential modals. On the basis of the same type of reasoning we applied above, no PPI deontic existential modal is expected to surface either, a prediction that to the best of our knowledge is borne out.

The landscape of deontic modals thus looks as follows:

(17)



3.2 Deontic modals and negation

However, this specification of deontic modals in terms of their polarity properties does not suffice to account for the scopal behaviour that deontic modals exhibit. It only explains the fixed scopal properties of NPI/PPI modals with respect to negation, but not the scopal relations between neutral deontic modals and negation. I.e. why does have to always scope under negation (and is that really always the case)?

Let us make the following two assumptions: (i) negation never lowers at LF: it is interpretated in its surface position and may only raise to a higher position at LF if it moves along with another, independently, raising element; (ii) deontic modals are base-generated VP-in situ. The first assumption is uncontroversial; the second, however, is not.

Received wisdom has it that in English these (and other) modals are base-generated in I^0 (Dutch and German modals e,g, are generally assumed to be base-generated inside VP). If so, then there is no position for them to reconstruct to under negation. But is received wisdom correct in this case? The argument for generation in I^0 stems from the fact these modals always *appear* in I^0. Such modals are taken to differ in two ways from regular verbs: they only come in tensed forms *and* they are generated in I^0. However, only the first of these characterizations is needed, as it by itself derives the second one. We know that these deontic modal auxiliaries are moving verbs since they can make it up to C^0:

[1] The reader is referred to [7] where, independently from us, a number of arguments is provided that English *must* is a PPI.

(18) Can/may/must he leave?

If these modals are movers, and if they are always tensed, then it follows that if they are generated in a VP, they will always move to at least I^0. In short, this view is as consistent with the facts as the generation-in-I^0 view is, and, as we will see, it is superior to the latter in getting the facts with one fewer special assumption about modals.

The only difference between deontic modals being base-generated in I° and being base-generated inside VP is that in the latter case, these modals are taken to be lexical verbs and therefore they must be interpreted in their base position as well.

On the basis of these assumptions all facts follow naturally. Let's discuss first the examples in (1)-(3), repeated as (19)-(21) below:

(19)	a.	John mustn't leave	□ > ¬
	b.	John oughtn't to leave	□ > ¬
	c.	John shouldn't leave	□ > ¬

Must, *ought* and *should* are base-generated VP in situ, and thus in a position lower than negation. However, since they are PPIs, their appearance under negation would make the sentences crash at LF and therefore, as a last resort option, these modals are interpreted in a higher head position to which they have moved in order to check their tense features and where they outscope negation.

(20)	a.	John doesn't have to leave	¬ > □
	b.	John doesn't need to leave	¬ > □
	c.	John need*(n't) leave	¬ > □

In (20) the same story applies, except for the facts that these modals, being neutral or even NPIs, do not render the sentence ungrammatical if they are interpreted in their base position, which is lower than negation. Therefore there is no proper trigger that could force them to raise across negation and the only reading these sentences receive is one where negation outscopes the modal.

(21)	a.	John cannot leave	¬ > ◊
	b.	John may not leave	¬ > ◊

Since there are no polar deontic existential modals all deontic existentials are neutral and remain to be interpreted at their base position, just like the cases in (20).

The Spanish facts are also covered, as the PPI modal *deber* will be forced to raise to a higher position at LF, whereas no such trigger exists for 'tener', which will therefore remain in its surface position at LF.

(22)	a.	Juan no debe salir	□ > ¬
	b.	Juan no tiene que salir	¬ > □

Now, let's consider the German cases:

(23) a. Hans soll nicht abfahren □ > ¬
b. Hans braucht *(nicht) zu abfahren ¬ > □
c. Hans muss nicht abfahren ¬ > □
d. Hans darf nicht abfahren ¬ > ◊

Note that German exhibits V2 in main clauses. However, V2 does not change the position where lexical verbs are interpreted in general. In this sense, V2 is to be considered a PF phenomenon. At LF, lexical verbs are still present at their base position. *Sollen* is a PPI and thus raises across negation at LF. *Brauchen* on the other hand is an NPI and will thus remain in situ (there is no trigger for raising; in fact the presence of such a trigger would violate its NPI licensing conditions). *Müssen* is neutral and won't raise at LF either. *Dürfen*, finally, is an existential and therefore neutral as well: hence ¬ > □.

Finally, the Russian examples need to be discussed. In the natural cases, negation outscopes the modal adjective *dolzhna* ('obliged'), so it cannot be analysed as a PPI modal. However, as an instance of constituent negation and being focussed it may outscope negation. This is the case in (24)b, which is ambiguous. Note that this is not a regular case of Russian sentential negation (as the auxiliary *byla* ('was') is not preceded by a negative marker). The question thus rises why this adjective may outscope negation. One possible solution is that it is an instance of metalinguistic negation, comparable to (25), but the exact analysis of (24)b is still subject of further study.

(24) a. Masha ne byla dolzhna chitat' knigu ¬ > □
Masha neg was obliged read book
b. Masha ne DOLZHNA byla chitat' knigu ¬ > □; □ > ¬
Masha neg obliged was read book

(25) It's not that you don't NEED to read those books, you MUST not read those books!

3.3 Deontic modals and negative DPs

Another puzzle concerning the interaction between (deontic) modals and negation concerns the ambiguity of neutral modals with respect to Negative DPs, as has been observed by Iatridou & Sichel [6]:

(26) [6: 11]

Type of Modal wrt sentential negation	Interpretive possibilities of (Negative component of) NegDP
Mod>Neg	Mod > $Subject_{Neg}$
	Mod > $Object_{Neg}$
Neg>Mod	$Subject_{Neg}$ >Mod
	$Object_{Neg}$ > Mod
	Mod > $Object_{Neg}$

While neutral and NPI modals behave similarly w.r.t. sentential negation, they behave differently with negation inside NegDPs. Iatridou & Sichel show that neutral modals scope under a NegDP in subject position but are ambiguous with respect to a NegDP in object position:

(27) a. Nobody has to/needs drive. ¬ > □
b. He has to/needs to do no homework tonight. ¬ > □ (pref.)
c. In order to see how other people live, he has to/needs to get no new toys for a while. □ > ¬

However, an NPI modal will scope under negation no matter where that negation is. English NPI *need* is not sufficiently part of colloquial English for reliable judgments, but for German neutral DM *müssen* versus NPI *brauchen*, the facts are very clear: while *müssen* behaves exactly like English *have to/need to* in (27), *brauchen* is fine only in (28)a-b; in (28)c the intended reading is impossible to yield with *brauchen*:

(28) a. Keiner muss/braucht (zu) fahren ¬ > □
Noone muss/braucht leave
(29) b. Er muss/braucht keine hausarbeiten (zu) machen ¬ > □
He muss/braucht no homework do
c. Um zu sehen, wie andere leben, muss/*braucht er eine Zeitlang keine neuen Geschenke (zu)□bekommen □ > ¬
In order to see how other people live, he muss/*bracht to get no new toys for a while

These facts immediately follow from the presented analysis that takes modals such as English *have to* and German *brauchen/muessen* to be interpreted in their base position. Since objects are in the complement of the modal verb, they allow for an interpretation where the neutral modal outscopes them, but as these Negative DPs are able to undergo quantifier movement, the negation is able to outscope the modals as well. Subject Negative DPs, on the other hand, already at surface structure outscope the neutral modal, which therefore can never be put in a position where it outscopes the negation. Note that since NPI modals must be under the scope of negation, in these cases the narrow scope reading of the object is never available.

4. Conclusion and discussion

In the beginning of this paper we addressed two questions:

(30) a. What determines the scopal properties of universal deontic modals with respect to negation?
b. Why do existential deontic modals always appear under the scope of negation?

In this talk we argue that once it is adopted that (i) modals that always outscope negation are PPIs, (ii) only deontic universal modals exhibit polarity effects (there are no PPI/NPI deontic existentials), deontic modals are lexical verbs (sometimes in disguise), and (iv) negation does not lower at LF, all known facts concerning the scopal behaviour of deontic modals with respect to negation naturally follows.

In this talk we have applied this analysis to a small number of languages and we have shown how on the basis of these assumptions we could derive the attested facts.

However, a number of questions remain open. First, it remains unclear how polarity effects are acquired, i.e. how does the child know that *must* is a PPI and *need* an NPI? This is not a question that is specific for this analysis, but rather a general question for anyone trying to understand how any polarity items are acquired.

Second, why is it the case that only deontic modals exhibit polarity effects? In other words, why is the triangle in (17) a triangle?

Third, it is not really clear how to deal with the Russian cases of ambiguity. Note that since this analysis is based on PPI-hood as a trigger for LF movement, the proposal is generally not at ease with these kinds of ambiguities

Fourth, under this analysis it is assumed that that Negative DPs may undergo (some kind of) quantifier raising. It is a known fact, however, that Negative DPs do not outscope higher quantifiers (i.e. give rise to reverse readings). Take for instance CC.

(31) Everybody touched no desert $\forall > \neg\exists$; $*\neg\exists > \forall$

However, what we assume (31) shows is that the relative scopal ordering of two quantifiers remains frozen. It does not show that *no desert* is forbidden to raise across the subject, as long as the is raises again across the object again. So (31) does not count as a proper counterargument against a QR analysis of negative DPs. The more general question as to what blocks the inverse reading in (31) remains an open question though.

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