PERFECTIVITY MIGHT NOT SCOPE OVER MODALITY

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Abstract: The present paper provides an account of the behaviour of the English modals with respect to the perfective aspect of their complement. The differences in reading (external vs. internal perfect) are argued to be contingent on the structural position of the modal in syntax and on the availability of a polarity-changing conditionality feature on the modal.

Keywords: modals, perfective aspect, external perfect, internal perfect, counter factuality

1. Introduction

1.1 A perfect modal ambiguity

Deontic and epistemic modals in English differ in how they interact with the perfective aspect of their complement. It has often been argued that, when a deontic modal merges with a perfective complement, the perfect takes scope over the modal; the reading of the whole structure is, in this case, counterfactual (Condoravdi 2001, Huddleston 2002, Stowell 2004):

(1) She could have run faster (if she had tried). [⏩but she didn't]
PERF [COULD

When an epistemic modal takes a perfective complement, the perfective is "internal"; it is the modal which takes scope over the perfect (McGinnis 1993, Huddleston 2002), modality being left unaffected by the perfective aspect of the complement:

(2) a. She must have saved him.
MUST [PERF
b. She may have saved him.
MAY [PERF

As expected, ambiguity concerning the type of modality will trigger ambiguity concerning the scope of the perfect (Huddleston 2002). Sentences like the one in (3) will allow two interpretations, since the modal itself allows both a deontic and an epistemic interpretation:

(3) He **could have helped** her.
a. His helping her was a possible but unaccomplished consequence of what he did. PERF [COULD

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b. It is possible that he helped her.
COULD [PERF

1.2 Aim and organization of the paper

The present paper tries to provide an account of the behaviour of the English modals with respect to the perfective aspect of their complement. The questions which will be addressed target precisely the empirical data in (1)-(3) above: (i) which modal constructions allow an external perfect reading?; (ii) which modal constructions allow an internal perfect reading?

Section 2 presents the empirical data. Section 3 briefly discusses the standard analysis according to which the English modals, analysed as inherently tensed, uniformly merge in Tense; the differences in reading (external vs. internal perfect) are contingent on the structural position of the modal at LF (below or above Aspect/Tense). Section 4 offers an alternative account. The differences in reading are argued to be contingent on the structural position of the modal in syntax, i.e. the interpretation of such sentences is read off syntactic structure, and on the availability of a polarity-changing feature on the modal, i.e. the counterfactual reading is argued to be derived compositionally.

2. The data

The English modals, irrespective of their interpretation (deontic or epistemic[1]), can take a perfective complement. Within an epistemic construal, the modal verb has been argued to scope over the perfect:

(4) MOD > PERF [epistemic construal]

According to the generalization in (4), when a modal is used epistemically, the perfective *have-en* does not affect the modality but the complement (McGinnis 1993, Huddleston 2002 among many others). This is illustrated in (5) below, where the epistemic modal is interpreted as denoting evaluation at Speech Time (ST). The situation which is evaluated is interpreted as past relative to ST:

(5) a. It must have been there, behind the heavy wooden door, that Jorge had disappeared.
MUST [PERF
b. They may have been invited.
MAY [PERF
c. They can't have been that stupid!
CAN'T [PERF

[1] There are two things worth mentioning with respect to deontic modality and the perfective aspect. According to earlier studies (see, for example, Hofmann 1966) only epistemic modals can merge with a perfect complement. Sentences like (i) are ill-formed on a deontic reading:
(i) *He can have danced beautifully.

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When a deontically used modal takes a perfective complement, *have -en* has been argued to be an "external perfect" which conveys "propositions of opposite polarity" (Huddleston 2002: 203-204). This is illustrated in (6), where both sentences are interpreted as denoting a situation which might have obtained in the past but did not:

(6) a. He ought not to have died, and if I had gone with my mother to the doctor and done my part as a son, I feel as if he need not have done. (BNC[2])
PERF [OUGHT
b. He could have told her if he had wanted to.
PERF [COULD

Condoravdi (2001) calls this reading "metaphysical" [3] and associates it mainly with a future in the past interpretation. The standard analysis is that in the sentences like the ones in (6), i.e. in a deontic context, the perfect scopes over the modal, placing the modality denoted by the modal in the past. This so-called "pastness" of the modality in the sentence goes hand in hand with the counterfactual interpretation of the situation denoted by the complement:

(7) PERF > MOD [deontic / counterfactual]

According to the empirical data which Condoravdi (2001) discusses in the paper, the counterfactual reading arises only in the case of *could*, *might*, *should*, *ought*, i.e. only with the so-called "secondary" or "past tense" modals (Stowell 2004). This empirical generalization is also backed up by the examples in Coates (1983).

However, there is at least one more verb which does not belong to the same group of "past tense" modals and which, when used deontically, can take a perfect complement and be interpreted counterfactually. Consider the sentences in (8) below:

(8) a. He needn't have told her about the conference; I had already invited her.
b. He needn't have told her about the conference; she may have read about it on the internet.

He needn't have told her allows both an external and an internal perfect reading:

a. he didn't have to tell her (but he did)
PERF [NEED
b. it isn't necessarily the case that he told her.
NEED [PERF

The ambiguity of the sentence with *need* in (8) indicates that counterfactual readings do not arise only in the case of the so-called "past tense" modals. This can also

[2] BNC = British National Corpus.
[3] Condoravdi (2001): "Metaphysical modality has to do with how the world may turn out, or might have turned out, to be". This definition includes both counterfactual and hypothetical readings.

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be seen in (9) below, where both *ought* and *need*, i.e. a so-called "past tense" modal and a non "past tense" one behave identically with respect to the scope of the perfect:

(9) He ought not to have died, and if I had gone with my mother to the doctor and done my part as a son, I feel as if he need not have died. (BNC)

On the other hand, there are deontically used modals which take a *have -en* complement and are not associated with an external perfect reading; this is the case of deontic *must* in (10) below:

(10) a. If you want to study linguistics you must first have graduated in a foreign language. (in McGinnis 1993: 73, her example 3.46)
b. Students must have taken calculus by the start of their senior year. (in Eide 2005: 327, her example 27e)

In contexts like the ones in (10), the deontic modal scopes over *have -en*; the event time (ET) of the complement of the modal is supposed to obtain prior to a Reference Time (RT) which is future relative to ST; but the modal itself is not interpreted as past and the situation denoted by the complement is interpreted as hypothetical, not as counterfactual:

(11) MOD > PERF [deontic/ET prior to a future RT]

The data discussed above indicate that deontic modals can take a perfect complement but the "external perfect" / counterfactual interpretation does not arise in all the structures in which a deontic modal co-occurs with *have -en*. Deontically used modals with a perfective complement can be associated both with an external (counterfactual) and with an internal perfect reading:

(12) a. PERF > MOD [deontic / future ET relative to a past RT / counterfactual]
[deontic / past situation relative to a present RT / counterfactual]
b. MOD > PERF [deontic / past ET relative to a future RT / hypothetical]

One further relevant empirical fact is related to the behaviour of the "past tense" modals *ought* and *should*. With these modals, "the epistemic reading is hardly possible with past time situations" (Huddleston 2002: 186), i.e. the epistemically used modal does not take scope over the perfect. Stowell (2004) also points out that when *should* and *ought* are followed by *have -en*, the reading is that of deontic obligation at a past RT rather than at ST[4]. *Should / ought + have -en* do not allow a future-shifted perfect interpretation. Compare (13a) to (13b) below:

[4] It is worth mentioning, though, that Stowell (2004) acknowledges that semantic judgments of *should / ought + have -en* are not without problems: "Though the relevant semantic judgments are extraordinarily delicate and difficult to distinguish from their other potential root-modal reading (where the modal has a present-tense interpretation and its complement is past shifted with respect to it), my intuition is that the relevant reading is

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(13) a. You must have left by the time we arrive.
b. ??You ought to / should have left by the time we arrive.
(Stowell 2004, his examples 23c and d)

Sentences like the ones in (14) are all associated with a deontic reading and they all convey a counterfactual interpretation; the modal falls within the scope of the perfect:

(14) a. He shouldn't have gone to bed earlier last night.
b. She ought to have left yesterday.
c. Max ought to have kept his mouth shut at the meeting.
(Stowell 2004, his example 22b)
d. You should have bought that book when you had the chance.
(Stowell 2004, his example 22a)

Notice that, when taking a bare infinitive as their complement, both *should* and *ought* allow a future interpretation of their complement, on a par with *must*:

(15) a. You should leave as early as possible tomorrow.
b. You ought to visit them when you go to London in June.

Epistemically used modals with a perfective complement seem to allow two possible readings as well, summarized in (16):

(16) a. MOD > PERF [epistemic / evaluated past ET]
b. PERF > MOD
[epistemic / past-shifted situation relative to a present RT / counterfactual]

The reading in (16b) is restricted to *may* and *might*, though:

(17) a. ... relevant safety warnings were not made public. If they had been, action may have been taken and the disaster avoided. (Denison 1992, his example 26)[5]
b. But you might have done it. Don't you wonder sometimes, what might have happened if you'd tried?

It is difficult, however, to state whether in such contexts the modal should be interpreted as denoting dynamic (in the sense of Palmer 2001) or epistemic possibility.

Summing up, the empirical data show that deontic modals do not always scope under the perfect and epistemic modals do not always scope over the perfect.

in fact possible. [= the counterfactual one] [..] It strikes me as more plausible to suppose that [...] the relevant deontic obligation held at the past times in question, rather than obtaining at the utterance time".

[5] "In a few examples it can be argued that the meaning of *may* is "dynamic" (Palmer 1979: 36-37) or "root" (Coates 1983: 18-21) possibility, in which case a suitable paraphrase is 'it would have been possible for ... to ...'. However, an epistemic reading cannot be ruled out, and it is not always clear whether we have an epistemic or a root sense or indeed a merger of the two" (Denison 1992).

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Counterfactual readings (or external perfect readings) can obtain with (some) deontic modals: (i) the so-called "past tense" modals: *could*, *should*, *ought* and (ii) *need*. Depending on the analysis of *may* and *might* in (17), counterfactual readings (or external perfect readings) are also attested with (some) epistemic modals. The internal perfect reading can obtain with all the epistemic modals, and also with some deontic modals, e.g. *could* and *must*. There does not seem to be any one to one mapping between type of modality (deontic or epistemic, possibility and necessity) and the way in which modality interferes with perfectivity (external vs. internal perfect).

Note that the alleged scope reversal which one finds with counterfactual readings is possible with deontically used modals, in spite of the fact that metaphysical modality is traditionally classified as epistemic. Actually, back in the 60s, Hofmann (1966) argued that deontic modals can never take a perfect complement. According to this view, the mere presence of a perfective complement would trigger epistemic interpretation. But, if the modal in such structures is always epistemic, the data go against the common view according to which epistemic modality scopes exclusively over the perfect since epistemically used modals with a perfect complement can also be interpreted within the scope of the perfect, as seen above.

The obvious question which arises targets the conditions under which modal constructions allow an external/internal perfect reading. This is the question which I will be addressing in the following sections.

3. Previous solutions

One familiar account for the data discussed in section 2 is that the difference between epistemic and deontic modals with respect to the scope of the perfect is due to a difference in structure; at one point in the derivation the epistemic modal occurs in a position higher than Tense/Aspect and, consequently, it takes scope over the perfect. A deontically used modal will occur in a position lower than Tense/Aspect and will be outscoped by the perfect. This view is implemented in different ways. According to the standard generative approach, all the English modals are uniformly merged in Inflection/Tense; this implies that the deontic and the epistemic interpretations are derived from a common syntactic structure. Jenkins (1972), for example, argues that there is no syntactic evidence available that the distinction epistemic/deontic is reflected syntactically at the deep structure level, showing that even on semantic grounds one could postulate the same structure for the two readings. The same position has been defended in more recent studies, such as Wurmbrand (1999) or Zagona (2008). Zagona (2008:275) explicitly argues that one should distinguish between languages in which deontic modals behave like lexical verbs and epistemic modals like functional categories, and where the two types of modals may occupy distinct syntactic positions, and languages like English, where modals represent a homogeneous class and uniformly occur in one single structural position: [C... [$_{\text{Tense}}$ modal] vP].

If one adopts this analysis, in order to account for the fact that the perfect *have -en* can scope only above deontic modals whereas the epistemic ones are outside the scope of the past tense/perfective aspect, one has to assume that in English epistemic modals

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undergo movement to a position higher than Tense/Aspect at LF, resulting in the LF structure: epistemic modal > Tense/Aspect > deontic modal. Such an approach, however, relies on the availability of LF movement. Within more recent minimalist studies (Chomsky 2001) LF movement is no longer a viable operation. Syntactic structure is encapsulated and sent off, at the end of each phase, to the interface components for phonological and semantic interpretation. Whichever approach one might adopt, one still needs to state what exactly would force LF movement, i.e. one has to make additional assumptions to explain why LF movement takes place in some cases but not in others. Moreover, in several more recent analyses it is not always clear whether the scopal order is derived by semantic necessity or by syntactic features.

The alternative account would be to derive the order epistemic > Aspect > deontic without invoking movement at LF. Several recent studies have argued, in the wake of Ross (1969), Zubizaretta (1982) or Roberts (1985), that modals do not uniformly Merge in Tense. Deontic modals may be base-generated as an adjunct to VP (Picallo 1990), in VP (Avram 1998, 1999, Iatridou and Zeijlstra 2009) or immediately above vP (Butler 2003)[6]. The epistemic modals have been argued to merge in Inflection (Picallo 1990) or higher, above Tense/Aspect, possibly in various positions of the left-periphery of the clause (Avram 1998, 1999, Cinque 1999), according to the type of modality which they denote. Such an approach can straightforwardly account for the fact that epistemic modals are always higher than Aspect, i.e. out of the scope of the perfect; since they merge in a position above the inflectional domain, they can only outscope the perfect. However, it fails to explain why epistemic *might* allows an external perfect reading or why deontic *must* allows an internal perfect reading.

An analysis of the way in which the English modals interfere with perfectivity should answer at least the following questions:

(i) which modals allow an internal perfect reading and how can we account for that?
(ii) which modals allow an external perfect reading and how do we explain that?
(iii) how do we derive the counterfactual reading and how do we derive the epistemic interpretation of *might* in a sentence like *He might have killed them*?

In what follows, I will be addressing these questions building on the view that certain aspects of semantic interpretation are read off syntactic structure; in particular, the external/internal perfect interpretations are contingent on properties of the modal verb and of the complement with which it merges in the derivation.

4. A possible solution

4.1 The starting point

In this section I offer an alternative solution building on the analysis put forth in Avram (1998, 1999). The main claim is that modals have one single core meaning, but they merge with complements of different complexity: vP, AspP, TP. The complexity of

[6] One has to mention that in Butler's (2003) analysis the two structural positions associated with the deontic and with the epistemic interpretation of modals are discussed with respect to LF representation.

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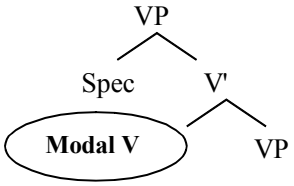
the complement is the one which determines the merge position of the modal as well as its scope potential. The extension of meaning from deontic to epistemic modality is correlated with an "extension" of the complement with which the modal merges in the derivation.

According to the syntactic analysis which I am adopting in this paper, the English modals can merge in three distinct structural positions: a position in the lexical layer of the clause, one in the functional layer and a third one at the borderline between the functional and the operator layers. Importantly, with the exception of the position in the lexical layer, one cannot associate the deontic / epistemic reading with one single structural position. The structural position can only determine the scopal potential of the modal which is given by the complexity of the complement.

Also, following Avram (2008), I assume that the relevant distinction for the understanding of syntax/semantics mappings in the case of modals is the one between subject-oriented vs. discourse-oriented modality. The deontic vs. epistemic distinction is semantically underspecified and, consequently, context dependent (see, for example, Papafragou 2000 and the works cited therein).

According to Avram (1998, 1999), the English modals which denote subject-oriented modality merge in the lexical layer:

(18)



Modals merging in the lexical layer behave like lexical verbs in some respects; they are "lexical auxiliaries" (Roberts 1993; see also Iatridou and Zeijlstra 2009). They assign an adjunct theta-role to the subject (Zubizaretta 1982, Roberts 1985); they mediate, in some way, between subjects and their properties. In sentences like the ones in (19), both the modal and the lexical verb assign a theta-role to the argument in subject position:

(19) a. John can speak 10 languages fluently.
b. He will become a linguist.

In (19a), for example, the argument *John* receives a "compound" theta-role: one assigned by the lexical verb *speak* and one assigned by *can*. Such an approach could account for the fact that the modal verb may impose selectional restrictions on the subject. Besides deontic and epistemic modality, Palmer (2001) identifies a third type of modality: dynamic modality, i.e. real-world ability, possibility, intention/willingness, within which he further distinguishes between subject-oriented dynamic modality (20a) and neutral dynamic modality (20b):

(20) a. My dance teacher can walk on her hands.
b. Salaries can rise very quickly in these professions.

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The subject-oriented dynamic readings seem to correspond to those readings in which an adjunct theta-role can be assigned. There are several other recent studies which assume that in English deontic modals are merged in the VP (see, for example, Iatridou and Zeijlstra 2009) or, within current minimalist analyses, that they occupy a position immediately above vP (Butler 2003). We will, however, follow Avram (1999) in associating this lexical position exclusively with subject-oriented dynamic modality: real-world possibility/ability and intention/willingness. This restriction is imposed by the availability of the so-called adjunct theta-roles which "seem to form a limited semantic class, having primarily to do with notions of volition and intention" (Roberts 1985).

Such modals are incompatible with non-thematic subjects, such as expletives or idiom chunks (21a-b), or with [-agentive] subjects (such as weather *it*) (21c):

(21) a. *There can [= be able to] remain two students in the room.
b. *Tabs can [= be able to] be kept on anyone nowadays.
c. *It can [= is able to] snow heavily tonight.

They also lack a passive counterpart, as first noticed in Jenkins (1972). Consider the well-known difference illustrated in (22)-(23) below:

(22) a. This doctor may examine the patients tomorrow.
b. The patients may be examined by this doctor tomorrow.
(23) a. This doctor can examine such patients.
b. Such patients can be examined by this doctor.
c. ???Such patients are able to be examined by this doctor.

On a deontic reading, (22b) is the passive counterpart of (22a); but (23b), if *can* is used as a subject-oriented modal or, in Palmer's terms, as a subject-oriented dynamic modal, is not the passive counterpart of (23a). This is more transparent in (23c), a possible paraphrase of (23b) on a subject-oriented reading.

The complement of these modals does not have any temporal independence; there is one event across the modal and the lexical verb, on a par with complex predicates[7]:

(24) ??Today John can speak 10 languages fluently tomorrow.

There is a genuine present tense/past tense alternation with these modals: they have a genuine past tense counterpart, i.e. one which can be used with past time reference in direct discourse (not only in indirect speech, as with other modals):

(25) a. They can skate beautifully.
b. They could skate beautifully when they were 5 years old.

Subject-oriented modals cannot take a perfect complement:

[7] This analysis is not incompatible with the standard one: "we might regard Aux-V as a verbal complex [...]" (Chomsky 1981: 140).

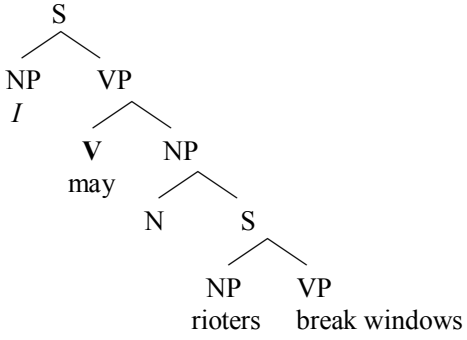
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(26) * He can have danced beautifully. [can = be able to].

Following Avram (1998, 1999) I assume that subject-oriented modals in English merge in the lexical layer. However, I will revisit the structure in (18) from a vP-shell perspective. Ross (1969) analysed a modal verb as transitive in its deontic reading. The sentence in (27) was analysed as in (28):

(27) Rioters may break windows.

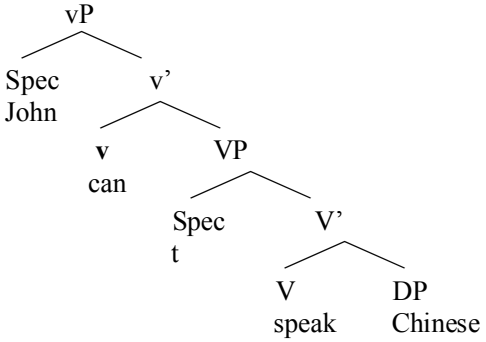
(28)



Notice, however, that his example contains a discourse-oriented modal, or a speaker-oriented one. I will adopt a transitive structure only for subject-oriented modals. If the modal is subject-oriented, the matrix subject and the subject of the complement are identical and they have the same theta-role (received from two verbal sources). Within a vP-shell analysis, *John* in (29) receives a theta-role from the modal and one from the lexical verb; it merges in the specifier of V and then moves to the specifier of v. The modal occupies the position of the light causative. Little v contains an uninterpretable inflectional feature (Tense) (the modal is inherently tensed) and the lexical verb does not move overtly to v if v hosts a modal verb (30):

(29) John can speak Chinese.

(30)

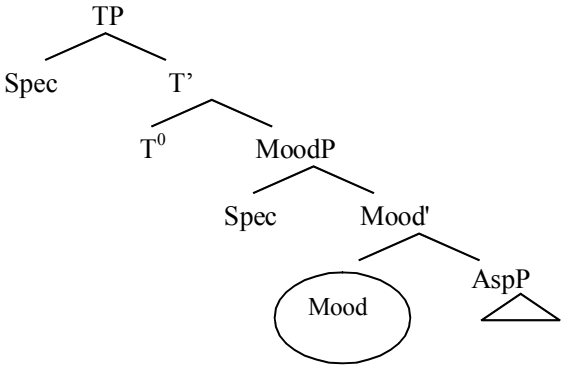


Summing up, following Avram (1998, 1999) I assume that subject-oriented modals in English merge in the lexical layer, within the vP, and take a bare VP complement (as in 30).

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A second Merge position for the English modals is in the functional domain of the verb, in a Mood projection, immediately below Tense[8]:

(31)



The modals which merge in this functional position differ from the subject-oriented ones in several respects. Firstly, they do not seem to impose any selectional restrictions on the subject, which is assigned a theta-role by the lexical verb alone. They can be used in structures with expletive subjects or with weather *it*:

(32) a. There can be a party as long as it's not too loud.
b. There must be a solution to this problem on my table, tomorrow morning!
(Wurmbrand 1999, her examples 3)
c. In order for the crop not to fail, it must rain tomorrow.
(Wurmbrand and Bobaljik 1999)

Such data reveal that, unlike the modals which are merged in the vP, the ones in the functional layer do not mediate between the subject and its property. They do not denote subject-oriented modality.

They also differ from subject-oriented modals with respect to passivization of the embedded object. Also, the complement which they take has some temporal independence:

(33) Today we must do it tomorrow, but yesterday you said it had to be ready by Monday.

These modals can also take a perfect complement which is interpreted as having an "internal perfect" reading, as well as a progressive complement:

(34) a. You must have finished everything by the time they get back.
b. You must be dancing when they enter the room.

[8] This is, in Ouhalla (1991), the position in which all the modals merge in English.

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This indicates that the first merge position is higher than AspP, which allows the modal to take a perfective or a progressive complement. In (34a) the complement of the modal verb can only be interpreted as having a future ET value relative to the modal, i.e. a modal which merges in Mood1 does not allow a perfect complement to denote a situation whose ET is prior to the time of the modal, i.e. ST.

Such data indicate that the complement which Mood1 modals take is structurally more complex than the complement of the subject-oriented modals which merge in vP. The complement includes at least an Aspect Phrase, which can host the markers of the perfective/progressive aspect.

Also, as mentioned above, the modals which are merged in the vP have a genuine past tense:

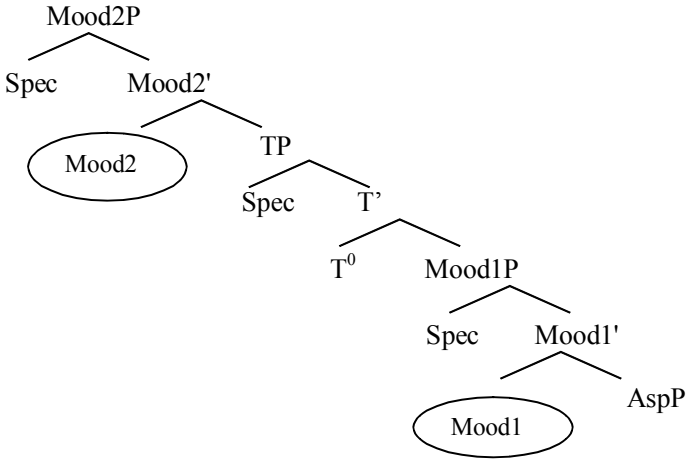
(35) a. Dad wouldn't lend me the car, so we had to take the train.
b. She could play the piano when she was 5.

The modals which are merged in Mood1 also have a past tense counterpart, though this past tense form may be felicitously used only under certain conditions:

(36) a. When I was a child, I could stay up late every Saturday.
b. But Boon didn't know this. He must seduce me. And he had so little time: only from the time the train left until dark. (Denison 1992, his example 64)

The third position in which modals are merged is a second Mood position, higher than Tense:

(37)



The modal whose first merge position is Mood2 takes scope over the whole sentence; it denotes discourse-oriented modality. It occurs in the operator domain of the

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clause, affecting the interpretation of the whole sentence. The proposition is presented as necessarily/possibly true or false (Anghelescu 1981: 59). In particular, the modal is higher than Tense and, unlike the modals which merge in Mood1 or those which merge in the vP, it lacks a genuine past tense form which can be used in direct discourse. These modals are always part of the speech act, i.e. present, signalling evaluation of propositions at ST:

(38) a. They may have killed her.
b. They might be brothers.

Importantly, they are not interpreted exclusively epistemic or deontic, i.e. there is no one to one mapping between their syntactic position and their interpretation. But they are all wide scope modals: they take scope over the whole sentence[9].

4.2 Features of counterfactual modals

Another important ingredient of my alternative solution is rooted in Leech's (1971) and Perkins' (1987) analyses of the so-called secondary modals *could*, *might*, *should*, *ought*. According to Leech (1971), they all have a hypothetical meaning. Perkins (1987) states that they all have a conditional feature. As we saw in section 2, when these modals are used deontically and take a perfective complement, they allow an external reading of the perfect associated with a counterfactual interpretation. With these modals the perfect is argued to outscope the modal.

The external perfect/counterfactual reading, on the other hand, does not (normally) obtain with the primary modals. This leads us to conclude that the modals which allow an external perfect interpretation when merging with a *have -en* complement are modals with a conditional feature, i.e. the counterfactual reading is contingent on a [+conditional] feature. They denote evaluative modality (Anghelescu 2000: 304). The fact that these modals are "conditional modals" can be seen when we compare them to their equivalents in various other languages. von Fintel and Iatridou (2008), for example, in their analysis of *ought* as a weak necessity modal, show that in other languages a strong necessity modal with conditional morphology is used to translate this English verb. They mention Greek, French, Spanish, Russian, Dutch, Hungarian. Romanian can also be added to their list. Following the idea in von Fintel and Iatridou (2008), the present analysis departs from any previous study which treats these modals as "past tense" modals and which tries to account for the fact that they allow an external perfect interpretation in terms of tense. Stowell (2004), for example, argues that present tense modals never allow a scope reversal reading (an external perfect, in our terms) because "the present tense morpheme

[9] One reviewer asks in what way such an analysis can account for the fact that in standard English modals cannot co-occur. Avram (1999) extends the notion of "chain" as defined in Guéron and Hoekstra (1995) from Tense-chain to Mood-chain and Negation-chain. She defines such representational chains in English as including a link in the lexical domain, one in the functional domain and one in the complementizer domain, at the borderline between the functional and the operator layers (p. 17). The feature associated with the chain (Tense / Mood / Negation) can be overtly realized, along the chain, only once. This explains why a Mood chain can contain only one modal or why Negation can be overtly marked only once.

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that they contain may not occur under the scope of a higher tense, so that if the perfect is scoped over the modal and construed as a past tense, the resulting LF scope relation would violate the polarity requirements of the present morpheme in the finite modal". That it is not tense the core ingredient is further supported by modals like *need* and *may*. In spite of the fact that they are, in Stowell's terms, present tense modals, they allow scope reversal. Let us examine them one by one.

As can be seen in (39), *need* with a perfect complement allows scope reversal:

(39) I think now that I need not have been so prim and stand-offish, but I was afraid to wound him further by giving him what might possibly be taken for false 'encouragement'. (BNC)

It has been argued in the literature that deontic *need* is polarity sensitive, behaving in modern English as a negative polarity item (Iatridou and Zeijlstra 2009). The sentences in (40) actually indicate that the distribution of deontic *need* is not restricted to negative sentences; it can be used in any type of non-assertive context:

(40) a. John need*(n't) leave. (Iatridou and Zeijlstra 2009, their example 2c)
b. Need we do it?
c. Possibly, too, the building trade was invaded by a new class of speculator who made conditions even worse than they need have been by extracting high profits out of the unprecedented demand for cheap houses. (BNC)
d. The director retired soon after with a tax-free cash lump sum a lot smaller than it need have been, because all the calculations were based on an artificially small definition of final pensionable salary. (BNC)

The conditional is by definition non-assertive. We are now in a position to revisit our previous conclusion: the "counterfactual modals" are (deontic) modals with a non-assertive feature, i.e. the counterfactual reading is contingent on a non-assertive feature of the modal.

Notice that when affirmative *need*, used epistemically, takes a perfect complement, the interpretation is not of the external perfect type:

(41) It need have been irrelevant only at the time the edition of the digesta was made, which according to Schulz was in the late third century. (BNC)

These counterfactuals could be defined as deontic modals "recategorized" as evaluative modals because of their non-assertive feature. Stowell (2004) also notices that with counterfactual modals the boundary deontic/epistemic is slightly fuzzy; he states that "metaphysical or alethic modality, though traditionally classified as epistemic, in fact more closely resembles root modality than true evidential epistemic modality, at least in terms of its relationship to tense (and perhaps more generally)". I argue that counterfactual modals are basically subject-oriented deontic modals with a non-assertive feature which triggers their re-interpretation as evaluatives. This may also provide a hint

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with respect to the ambiguity of the sentences with *might*: the counterfactual reading is plausibly associated with dynamic possibility, i.e. when the perfect is interpreted as "external", the reading associated with the modal is not of the epistemic type.

That it is conditionality which creates a non-assertive context and allows a counterfactual reading can also be seen in the recent use of *may* + *have -en* in contexts in which *might have -en* would be expected. Denison (1992) discusses several examples in contemporary British English in which *may have -en* has an obvious counterfactual interpretation:

(42) a. Swift launch may have saved Penlee lives. (Denison 1992, his example 1)
b. Equally, if the order and allocation of tales were changing, it is quite likely that both may have been subsequently changed by Chaucer in some further revision if he had lived to make one. (Denison 1992, his example 17)
c. ... relevant safety warnings were not made public. If they had been, action may have been taken and the disaster avoided. (Denison 1992, his example 26)

This seems to suggest that in the contemporary language *may* overlaps with *might* (traditionally analysed as the tentative or as the conditional counterpart of *may*, Perkins 1987) for some speakers, i.e. *may* is interpreted as being a conditional modal. For our present discussion, such data provide evidence that present tense modals with a perfect complement are also compatible with a counterfactual interpretation provided they can be interpreted as conditional; consequently, the external perfect interpretation / counterfactuality should be accounted for in terms of a non-assertive feature of the modal.

Summing up, the counterfactual reading obtains with subject-oriented deontic modals which have a non-assertive feature.

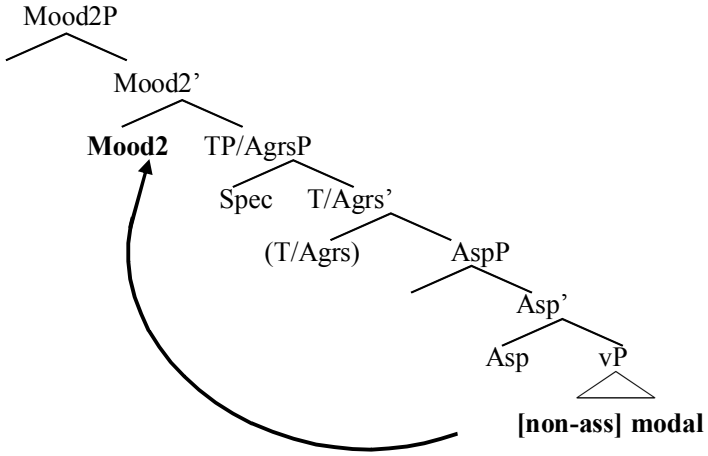
4.3 The structural position of counterfactual modals

Given their non-assertive feature, the counterfactual modals acquire an evaluative interpretation. As such, one can talk about an epistemic extension of their deontic use via subjectivization. A modal with a non-assertive feature can only be interpreted as evaluative. I suggest that they surface in Mood2, the position of first Merge for wide scope, evaluative modals[10], a position which they reach via movement:

[10] Rivero (1994) posits a Mood phrase higher than Tense for all Balkan languages, a position which hosts invariant particles that express futurity and the subjunctive mood. The main feature across these elements is an irrealis mood feature. For English, it might be the case that this Mood phrase hosts evaluative modals which take scope over the whole sentence, i.e. which behave like sentence operators.

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(43)



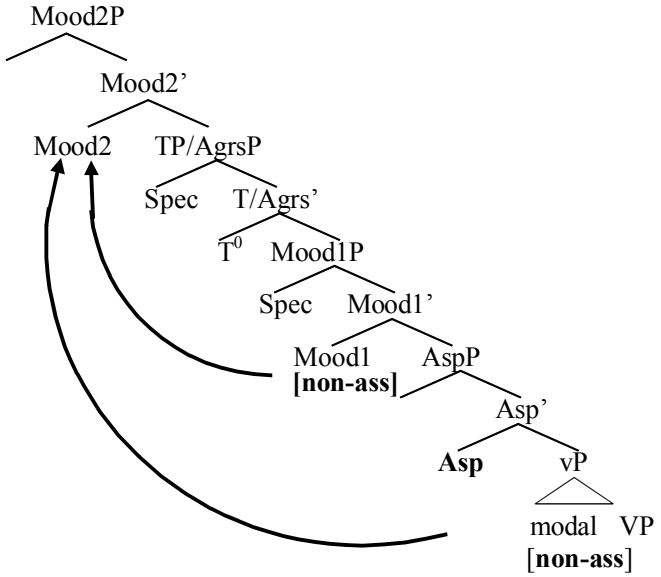
They have the scope properties of Mood2 modals. But, unlike the evaluative epistemic modals which merge in this position, they allow a counterfactual interpretation. This difference can be accounted for compositionally (as I will show below) and not necessarily in terms of scope. The epistemic modals are merged directly in Mood2. Consequently, they are always higher than the perfect. Still, they do not allow a counterfactual interpretation.

Deontic *should* and *ought* are always interpreted as [+conditional], they lack a non-conditional counterpart. They are inherently non-assertive. When they take a perfect complement, the sentence is never ambiguous between an external/internal perfect interpretation. The complement is always interpreted as past-shifted and not as future perfect (vs. deontic *must*). They denote discourse-oriented modality. It is therefore plausible to assume that they Merge directly in Mood2, on a par with epistemic modals. Their conditional feature is the one which forces them to be merged directly in Mood2, the projection of evaluative modality.

Conditional deontic/dynamic modals other than *should* and *ought* reach Mood2 via movement. Thus, the modal is associated with two structural positions: the lower copy (the position of first Merge) and the high overt copy (in Mood2P). This can solve the problem of subject-oriented modals, which have to assign the adjunct theta-role in a lexical domain, i.e. vP. If they have a conditional feature; after first merge in the vP domain, they move to Mood2P (see 43 above) and the interpretation of the perfective complement will be counterfactual. Discourse-oriented modals which are not evaluative merge in Mood1, higher than AspP; they can take a perfect complement whose interpretation is hypothetical when their temporal interpretation is present. If they are non-assertive (as is the case of the negative polarity item *need*), they move up to Mood2:

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(44)



Mood2, then, hosts three types of modals: epistemic modals, whose point of first Merge is Mood2, discourse-oriented deontic modals which become evaluative because of their conditional / non-assertive feature and subject-oriented dynamic modals with a conditional feature. The epistemic modals will allow a perfect / past reading of the perfect complement, the other two will allow a counterfactual reading in the same context:

(45) a. They might have killed me, mightn't they? (BNC) [non-assertive dynamic]
b. They might have killed him. Who knows? [epistemic]

The hypothesis which I am advancing is that the internal / external perfect reading is derived compositionally. The counterfactual reading is contingent on a [non-assertive] feature of the modal. The conditional or negative feature in the modal acts like a marker of polarity and creates a non-assertive context for the complement; polarity effects, however, arise only in the domain of deontic modals (Iatridou and Zeijlstra 2009). The type of modality (epistemic / counterfactual) is dependent on the availability / non-availability of polarity effects. Demirdache and Uribe-Etxebarria (2008: 1805) make a distinction between the perfect complement of epistemics and the one of counterfactual modals. They argue that "epistemic modal perfects involve perfect *have*" whereas metaphysical modal perfects do not involve a true present perfect (p. 1810). For our analysis this view implies that the perfect which is in the scope of a conditional modal is not a genuine perfect. This difference is only interpretative in contemporary English. It is not "overt", because there is one single auxiliary: *have*. The use of *have* as an auxiliary of irrealis, however, is not new in the contemporary language. In the Late Modern period, English had two perfect auxiliaries: *have*, used with transitive verbs, and *be*, used with certain intransitives (verbs of motion) (van Gelderen 2006: 215). The presence of an

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irrealis feature "almost guarantees the choice of *have* even in texts and with verbs that might otherwise allow *be*" (Denison 1992), i.e. it seems that the use of *have* as an irrealis auxiliary played a part in the spread of perfective *have* to the detriment of *be*.

In languages like Romanian, one finds a different picture, but with the same types of ingredient: the equivalent of *be* is the perfect auxiliary used in conditional structures and the equivalent of *have* is the perfect auxiliary used in realis structures:

(46) a. Ai **fi** putut telefona.
COND AUX.2SG be can-PAST PART telephone
'You could have rung up.'
b. N- ar **fi** trebuit să cumperi atîta bere.
not COND AUX.3SG be must.PAST PART SĂ buy-SUBJ.2SG so.much beer
'You shouldn't have bought so much beer.'

(47) Am terminat cartea.
have finished book-the
'I have finished the book.'

As can be seen in (46), in Romanian there is a special auxiliary for irrealis contexts (Avram 1999, 2000, Avram and Hill 2007); invariable *fi* 'be' spells out a non-factual state of affairs signalling irrealis tense in combination with the [non-assertive] feature of the conditional. Conditional modals, for example, acquire a counterfactual reading only in combination with a *fi* 'be' complement; otherwise a hypothetical reading is available. Compare (46) above to (48):

(48) a. Ai putea telefona.
COND AUX.2SG can -INF phone
'You might ring (them) up.'

The Romanian data are transparent with respect to the ingredients of counterfactuality: a [non-assertive] deontic modal or conditional morphology and an (irrealis) perfective complement. Notice that such a modal construction can hardly be interpreted as genuinely epistemic (see also Avram 1999, Zafiu 2008). In (49), both sentences contain a modal with conditional morphology and both are interpreted as having a counterfactual value; the verb is interpreted as a deontic modal with conditional morphology:

(49) a. Ar fi trebuit să aştepte o
COND AUX.3SG be must-PAST PART SĂ wait-SUBJ.3SG an
oră. (Zafiu 2008: 710)
hour
'(S)he should have waited for an hour.'
b. Ar fi putut să dea un
COND AUX.3SG be can-past part SĂ give.SUBJ.3SG a
telefon. (Zafiu 2008: 711)
phone
'(S)he could have made a phone call.'

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The Romanian data seem to support the view that only deontic/dynamic modals are subject to polarity effects, possibly because epistemic modals, which are evaluative, are never assertive.

If the present analysis is on track it indicates that actually the perfect never takes scope over the modal. The modal in a counterfactual construction is anchored into ST, the evaluation of the proposition is at ST. From Mood2, its [non-assertive] feature goes down into the complement. The complement has to be "past" relative to ST in order to allow a counterfactual interpretation. The fact that the modality itself may be perceived as "past" is a mere side effect of the counterfactual reading of the complement. Compare (50) to (51):

(50) Had Forbes lived longer, he *might have founded* at Edinburgh a school of naturalists as he hoped, and which was impossible at that date in London; and he *might have written* a major work. (BNC)

(51) Next year, when recession time hits, people *might have forgotten* us. (epistemic, perfect have) (BNC)

In (50), the RT in the complement of the modal is prior to ST, i.e. past. And the situation is interpreted, at ST, as counterfactual. In (51), the RT in the complement of *might* is future relative to ST. The situation is interpreted, at ST, as hypothetical. With deontic *must* the counterfactual reading is excluded because the modal is assertive and the complement of a modal expressing deontic obligation can only be future relative to ST:

(52) You *must have left* by the time we arrive. (Stowell 2004, his example 23c)

The apparent exception illustrated by the counterfactual *may* / *might* + *have -en* can be solved if one assumes that *may* / *might* is a conditional dynamic modal in such structures.

5. Conclusions

The aim of this paper has been to provide an account for the behaviour of the English modals with respect to the perfective aspect of their complement. In particular, the following questions were addressed, repeated here for convenience:

(i) which modals allow an internal perfect reading and how can we account for that?

(ii) which modals allow an external perfect / counterfactual reading and how do we explain that?

The data examined so far suggest that discourse-oriented modals which take a perfect complement first merge in a structural position higher than AspP, i.e. they are never within the scope of the perfect. When they are merged in Mood2, higher than TenseP, from where they take scope over the whole clause, their perfect complement is interpreted as "past" relative to ST. When first merged in Mood1, from where they move to TenseP to check the tense feature, their perfect complement is interpreted as future relative to ST, i.e. as hypothetical. Subject-oriented modals first merge in the vP from

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where they move to TP. They reach Mood2 only when they have a non-assertive value, which turns them into evaluative modals. This is the only context in which they can take a perfect complement. Otherwise, their complement can only be a bare VP.

The counterfactual reading arises compositionally from (i) the non-assertive value of the modal, which affects the polarity of the complement, and (ii) the temporal interpretation of the complement: its RT has to be prior to ST. The ET in the complement can be either prior or posterior to this RT. But the RT has to be past relative to ST. The auxiliary used in this type of complement is not a genuine perfect auxiliary but an instance of irrealis *have*. Polarity effects do not arise with epistemic modality; only deontic modals can change their polarity. An epistemically used modal, merged in Mood2, does not change its polarity when it has a conditional feature because it is inherently evaluative; such a feature will not affect the polarity of its complement. The counterfactual interpretation is excluded in this case.

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