

Tense and Modals

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The class of true modal verbs in English is usually understood to include auxiliary verbs conveying possibility and necessity (including predictive future) that lack non-finite morphological forms; from a syntactic perspective, these verbs occur only in finite clauses (as opposed to infinitives or gerunds).

Nevertheless the true modals do not inflect for third-person singular agreement, unlike normal present-tense verbs. When they are negated, true modals always precede the negative particle not, regardless of their understood scope relative to negation, and never give rise to do-support.

The true modals include can, could, may, might, must, shall, should, will, and would. All of these select bare VP complements, for which a small-clause raising analysis is often assumed; see, e.g., Stowell (1983). The modal verb ought likewise occurs only in an uninflected finite form, though it takes a to-infinitive complement, rather than a bare VP. Finally, need behaves like a true (necessity) modal when it selects a bare VP complement, having only an uninflected non-finite form, though it also occurs as a regular control verb taking a to-infinitive complement. Modal need only occurs in negative environments, like its Dutch counterpart hoeven. These facts are illustrated in (1) and (2).

- (1) a. (I believe that) Sam may/might/must/should/will (not) leave early.
- b. *(I believe that) Sam mays/mights/musts/shoulds/wills leave early
- c. *(I believe that) Sam doesn't may/might/must/should/will leave early
- d. *I believe Sam to may/might/must/should/will leave early.

- (2) a. (I believe that) Sam need not leave early.
- b. *(I believe that) Sam needs not leave early.
- c. *(I believe that) Sam need not to leave early.
- d. (I expect that) Sam needs/doesn't need to leave early
- e. I expect Sam (not) to need to leave early
- f. * I expect Sam (not) to need leave early

The true modals also differ from other English verbs with respect to the distinction between present and past tense. In a limited set of syntactic contexts, some true modals exhibit a present/past alternation that is similar to what obtains with normal verbs; these include the pairs can/could, shall/should, and will/would in contemporary colloquial American English, as well as may/might in some conservative dialects. But the present/past alternation is semantically neutralized for these verbs in many syntactic and semantic contexts, in a way that has no parallel with normal verbs. Moreover, other true modals, including must, ought, and need (as well as may and might in

contemporary American English) do not exhibit any morphological present/past alternation. Of these, must, may, and need behave in many respects like present-tense verbs, while ought and might seem to behave ambiguously in precisely those syntactic contexts where the first group of modals exhibits a limited present/past alternation.

The question naturally arises, therefore, as to whether these true modals should really be considered to involve a morpho-syntactic combination of tense with a modal verbal head, or whether instead they should be analyzed in modern English as distinctive modal heads which occur as alternatives to tense in finite contexts, more or less in the way that they were analyzed in the earliest models of generative grammar proposed by Chomsky (1957, 1965). This question has not been definitively resolved in contemporary formal theories of syntax and semantics, despite the development of a rich formal theory decomposing inflectional elements in terms of the theory of functional projections in later Government-Binding theory and the Minimalist Program.

The question has acquired a new urgency in light of recent proposals by Cinque (1999) and others to greatly expand the set of functional projections associated with tense, aspect, and modality in the context of a broader theory of functional projections associated with various classes of adverbs, auxiliary verbs, and inflectional affixes in the world's languages. Part of the reason for this is that Cinque has shown that many of the restrictions on the temporal construals of English modals turn out to have parallels in other languages that, at first glance,

do not seem to have a distinctive morphological class of true modals on the English pattern. To the extent that these cross-linguistic parallels turn out to be valid, the question arises as to what mechanisms of grammar (and in particular, principles of syntax as opposed to rules of morphology or constructs of semantic theory) are responsible for them.

In addition to the true modals, English also has a small number of so-called semi-modal verbs, including the necessity modal have-to (that is, have taking a to-infinitive complement). This semi-modal has largely displaced must in many syntactic contexts in modern usage, most notably in order to convey modal necessity at a past time (since must lacks a past-tense form), as well as in non-finite contexts. Unlike the true modals, the semi-modal have-to exhibits normal third person singular agreement in the present tense, and is free to occur in non-finite contexts. Modern English also makes use of adjectives such as able, possible, and necessary, and past participial forms such as allowed, to convey particular types of modal force. For the most part I will not be concerned with these adjectives and participles, except to contrast them with the modal verbs, largely because they co-occur unexceptionally with tenses in finite clauses and are free to occur in non-finite clauses. However, I will not ignore the semi-modal have-to, since its tense interpretation seems to be subject to some of the same restrictions as the true modals, even though (like can/could, etc.) it exhibits a robust present/past alternation.

It is well known that most modal verbs conveying possibility

or necessity can be used with either epistemic or root-modal force. Root-modal construals of possibility modals often involve notions of ability or permission, while necessity modals may carry deontic or quasi-imperative force. Epistemic modal construals may have an evidential or quasi-predictive interpretation. The examples in (3) most naturally allow a root-modal interpretation, while those in (4) most naturally allow an epistemic reading:

- (3) a. Jack can't swim
b. You must leave immediately.
c. Sam should be more careful.
d. They ought to fix that elevator.
e. Susan may not go out alone at night.
- (4) a. That can't be a dodo bird; they're extinct.
b. Jack must have already left; there are no lights on in his house.
c. It should rain this evening.
d. There ought to be a subway station somewhere nearby.
e. George may have already checked in; he arrived a few hours ago.

Because of various restrictions on the availability of each type of reading, some of which are specific to particular modal verbs, not all occurrences of modals are in fact ambiguous along the root/epistemic dimension. For example, can, unlike could, allows

an epistemic reading only when it occurs in the scope of negation (including yes/no questions):

- (5) a. ??That can be a sparrow; they are common around here.
b. That could be a sparrow; they are common around here.

Similarly, the possibility modal might has only an epistemic construal in contemporary colloquial American English, despite the fact that it derives historically from the past-tense form of may, which allows a root-modal sense of permission. Nevertheless the epistemic/root ambiguity is sufficiently pervasive cross-linguistically so as to suggest that homophony is not involved; rather, the ambiguity seems to be analogous to the distinction between anaphoric and deictic construals of pronouns.

Epistemic and root construals of modals differ from each other in terms of how they interact with tense and aspect, as well as with lexical aspectual classes (aktionsarten). For example, Zagana (1990) notes that when the complement of an epistemic modal is stative, the eventuality-time (or the interval of habitual quantification) may be understood to coincide with the modal time (the time at which the modal evaluation obtains), yielding a so-called simultaneous reading. In many contexts this is the most natural reading, though in most cases a future-shifted context is also possible. When the complement of the modal is eventive, however, it must have a future-shifted with respect to the modal evaluation time:

- (6) a. John must/should be in class today. (simultaneous or
future-shifted)
b. Joe must/should leave today. (only future-shifted)
- (7) a. John could/may be at home (simultaneous or
future-shifted)
b. Joe could/may take the train (only future-shifted)

As in other syntactic contexts, habitual and progressive eventive predicates behave like stative predicates with respect to this distinction. Unsurprisingly, if the complement of the epistemic modal contains the periphrastic perfect (have plus the past participle), the complement has a past-shifted interpretation relative to the modal time. These facts are illustrated in (8):

- (8) a. John must take the bus to school (every day).
b. Sam should be lying on the beach by now.
c. Karen may have already finished her paper.

In contrast, most root-modal construals favor a forward-shifted reading of the eventuality time relative to the modal time, regardless of the aspectual class of the complement of the modal, except in the case of ability-readings of can and could, for which a simultaneous reading is natural. For the most part I will abstract away from these aspectual distinctions among the modal complements, though I will return to the case of the periphrastic perfect further below.

I shall focus instead on another distinction between root and epistemic modals, namely that epistemic modals generally may not fall under the logical scope of tenses (at least when the tense and modal occur in the same clause), whereas root modals are in general free to do so. More concretely, when a modal verb occurs in a past-tense form, the modal evaluation may be understood to hold at a past time in the case of a root-modal interpretation, whereas an epistemic construal generally requires the modal evaluation to hold at the utterance time, as though it were a present-tense modal. (Actually, this is an oversimplification, since it ignores a distinction between two types of epistemic readings, as I discuss further below.) Conversely, root modals, unlike epistemic modals, may not in general take logical scope over tenses (again, when they occur in the same clause).

In English, these distinctions can be illustrated most straightforwardly with respect to the possibility modals can and could. When these modals are used to convey the root-modal senses of ability and permission, they participate in a semantically viable present/past tense alternation, just like normal verbs. This is illustrated in (9), where UT designates the utterance time:

- (9) a. Carl can't move his arm (ability at UT)
 b. Carl couldn't move his arm (ability at a past time)
 c. Max can't go out after dark. (permission at UT)
 d. Max couldn't go out after dark. (permission at a past
 time)

Example (9a) asserts that, at the utterance time, it is not possible for Carl to (habitually) move his arm. In (9b), could functions as a past-tense form of can in (9a); at some time prior to the utterance time, it was not possible for Carl to move his arm. Examples (9c-d) work similarly. In contrast, when could is used epistemically in simple sentences, it cannot have a past-tense interpretation:

- (10) a. Jack's wife can't be very rich.
'It is not possible that Jack's wife is very rich.'
- b. Jack's wife couldn't be very rich.
'It is not possible that Jack's wife is very rich.'
*'It was not possible that Jack's wife was very rich.'

In both (10a) and (10b), the speaker reports his or her epistemic modal evaluation holding at the actual utterance time. Thus, could in (10b) does not have a past tense epistemic modal interpretation: it cannot report an epistemic modal evaluation holding at a past time. Furthermore, because the complement of the modal does not contain perfect aspect, it cannot receive a past-shifted interpretation analogous to that of (8c); the possible eventuality of John's wife (not) being rich is also located at the utterance time (UT). To force a past tense reading of (10b) it is necessary to construe could as a root modal involving ability or permission.

Why should this be so? The most natural explanation is surely that true past tense can combine with can only in the case of a

root-modal construal and not in the case of an epistemic construal. But why? Before addressing this question, I will provide some more evidence supporting the claim that the distinction does not involve an idiosyncrasy of can and could, but rather is pervasive to the modal system.

Because can and could constitute the only true modal pair that exhibits a present/past alternation on a root-modal construal, it is not possible to precisely replicate the paradigm in (9) and (10) with other true modals. Nevertheless the necessity semi-modal have-to seems to work in a similar, though not identical way. On its root-modal construal, have-to exhibits a semantically viable present/past alternation, where the past tense locates the modal evaluation at a past time preceding the utterance time.

- (11) a. John has to stay home today because he is sick.
b. John had to stay home last night because he was sick.

On its epistemic construal, however, the past-tense form had to, like epistemic could, is construed as if the modal evaluation time were in the present tense; that is, the epistemic modal judgment must hold at the actual utterance time. Differently from epistemic could, however, epistemic had to locates the eventuality time of its complement in the past, as though it were interpreted like has to have, or must have:

- (12) a. There has to be at least a hundred people here.
b. There had to be at least a hundred people there.

'There must have been at least a hundred people there.'

In other words, the morpho-syntactic past tense in (12b) is interpreted as though it were under the scope of the epistemic modal have-to, despite the fact that, from the perspective of the theory of verbal head movement, it should originate syntactically in a position above that of the modal. This suggests an analysis whereby the epistemic semi-modal is required to undergo movement in the derivation of the Logical Form (LF) representation to a position above that of the past tense, which is then interpreted as though it were equivalent to a (non-finite) perfect under the scope of the semi-modal. The semi-modal then has an interpretation consistent with its having a status as a present tense form.

This analysis leads to a number of analytical and theoretical consequences. First, the tense-modal scope reversal must be prevented from applying in the case of epistemic could in (10b), since it does not allow an interpretation equivalent to that of can't have. This suggests that epistemic could is not a morphologically past-tense form of epistemic can; this is supported by the fact that epistemic could is free to occur in non-negative environments, unlike epistemic can. Second, it suggests that the relevant factor requiring the epistemic modal to occur above the domain of past tense holds either at the level of Logical Form, or in the semantic representation deriving therefrom (if these two notions are in fact distinct).

Before addressing the nature of the relevant conditioning factor, I will briefly introduce some more data, both from English and from other languages. Although other true modals do not exhibit the full range of paradigmatic variation along the dimensions of present/past and epistemic/root interpretation that we have seen with can/could and have-to, they still conform to the operative generalization that (true) past tense must be construed under the scope of an epistemic modal. For the sake of brevity I confine my discussion to modals that allow for the possibility of (apparent) past tense forms in at least some syntactic contexts.

I begin by establishing the latter possibility. As Abusch (1997) observes, the modals might and ought, when they occur in a complement clause governed by an intensional verb in a past-tense main clause, can be understood to have a modal evaluation time located in the past; this is actually true regardless of whether they have an epistemic or root-modal construal. The same is true of should and could.

- (13) a. Caesar knew that his wife might be in Rome. (epistemic)
b. Susan told me that she ought to stay home. (root)
c. Max said that he should leave. (root)
d. Fred thought that there could be at least a
hundred people at the reception. (epistemic)

In all of these examples, the modal evaluation can be understood to hold at a past time relative to the actual utterance time.

Although this might at first glance appear to be at odds with the generalization that past tense does not scope over an epistemic modal in the case of (13a,d), a more careful consideration of the facts shows that this is not the case. The first point to note is that the modal evaluation time in these examples, although it is located in the past relative to the utterance time, must coincide with the eventuality time of the main clause intensional predicate. Unlike occurrences of past tenses with normal verbs in the same syntactic environment, the modal evaluation time cannot have a 'past-shifted' reading relative to the main clause event time, nor for that matter can it have an 'independent past' interpretation (in the sense of Enc (1987)). Thus, the interpretation of these epistemic modals is analogous to that of a simultaneous 'sequence of tense' construal with normal verbs, which is licensed in precisely this syntactic environment. Since a traditional analysis of this 'simultaneous' reading of the past tense is that it is in some sense an occurrence of a present tense in disguise, these examples in fact conform to the relevant generalization; the epistemic modal is construed as though it were a present-tense modal, relative to the time of the main clause event-time. In this respect, these epistemic modals differ from true present-tense epistemic modals such as must and may, which require a 'double-access' interpretation in the same environment, whereby the modal evaluation time must correspond to an interval that includes both the actual utterance time and the past-tense main clause eventuality time:

- (14) a. Caesar knew that his wife may be in Rome. (epistemic)
b. Fred said that there must be at least a
hundred people at the reception. (epistemic)

This double-access interpretation of the epistemic modals in (14) is exactly what we find with present-tense forms of normal verbs in this environment. The contrast between (13) and (14) thus suggests that the epistemic modals in (13) do in fact involve an occurrence of the morphological past tense, even though they do not violate the generalization that the past tense in question cannot be construed as a normal past tense scoping over the epistemic modal in the same clause (as is shown by the lack of a past-shifted reading).

When the epistemic modals in (13) occur in main clauses, they receive an interpretation that is unambiguously that of a present tense, supporting the view that, although these modals arguably contain a morphological past tense morpheme, this morpheme may not receive a true past tense interpretation scoping over the epistemic modal:

- (15) a. John might go home today.
'It may be that John will go home today.'
b. Susan should be at the station.
'It's likely that Susan is (or will be) at the station'
c. Max ought to know the answer.
'It's likely that Max knows (or will know) the

answer.'

Abusch (1997) suggests that the modals in (13) are in fact tenseless forms which can receive a simultaneous reading relative to the evaluation time obtaining in their surrounding syntactic environment, differing both from morphologically past tense modals and present-tense modals such as those in (14). Though her proposal has some appeal (and is certainly consistent with the contrast noted above between could and had to), there is a hitherto unnoticed fact that points in the opposite direction. When these modals govern intensional verbs which themselves select complement clauses containing the morphological past tense, the latter tense can receive a simultaneous 'sequence of tense' reading relative to the main clause eventuality time, as is illustrated in (16). This is not possible when the main clause modals are present tense modals such as can, or may, as in (17), where the past tense in the complement clause must receive a past-shifted reading relative the main clause event time:

- (16) a. Sam might say that he lived in Paris.
b. Sam could claim that he knew the answer.

- (17) a. Sam may say that he lived in Paris.
b. Sam can't claim that he knew the answer.

Since the relevant syntactic conditioning environment for a simultaneous construal of a morphological past tense in a

complement clause involves an occurrence of a morphological past tense in the main clause, this supports the view that the modals in (13) may in fact be morphologically complex forms containing morphological past, even though the interpretation of these modals is such that the past tense in question can never be understood to scope over an epistemic modal in the same clause.

In addition to the English facts discussed above, data from other languages generally supports the basic empirical claim that past tense may scope above a root modal occurring in the same clause but not above an epistemic modal in the same clause. A range of evidence supporting this claim is provided by Cinque (1999), based on observations relating to the linear order of affixal morphology and modal adverbials such as possibly, necessarily, maybe, etc., and their counterparts in other languages; I refer the reader to Cinque's work for discussion of such cases. I will mention instead some cases involving further apparent instances of tense-modal reversals similar to those involving English had to discussed above. Bravo (2000) cites the following examples from Spanish, where a possibility modal occurring in an inflected imperfect or perfect past tense displays the same kind of alternation. When the modal is understood to have root-modal force, it is interpreted as though it falls under the semantic scope of the past tense, but when it is understood to have epistemic modal force, the past tense is interpreted as though it were a (non-finite) perfect occurring in the complement of a present-tense epistemic modal; that is, the modal evaluation time must be understood to coincide with the

actual utterance time:

- (18) a. El ladron pudo entrar por la ventana
the thief can-Impf enter through the window
'The thief was able to enter through the window' (root)
or 'It is possible that the thief entered through the
window.' (epistemic)
- b. El ladron ha podido entrar por la ventana
the thief has can-PstPrt enter through the window
'The thief was able to enter through the window' (root)
or 'It is possible that the thief entered through the
window.' (epistemic)

As in the case of the English examples involving the past-tense necessity semi-modal had to, these examples seem to involve a derivation where the past tense originates syntactically in a position above the modal on both the root and epistemic readings; the epistemic modal construal presumably involves an LF representation where the modal is moved to a position above the tense.

A slightly different type of case arises in Danish, as discussed by Vikner (1988):

- (19) Der har måske nok kunnet være tale om en fejl
there has maybe probably could be talk about a mistake
'There might have been a mistake'

Vikner comments that 'the perfect, ...although clearly realised on the epistemic modals, really is the perfect of the main verbs.' This is again consistent with our contention that when an epistemic modal co-occurs with past tense in the same clause, it must occur in the LF representation in a position above that of the tense, undergoing movement to such a position if necessary.

I now turn to the question of why past tense should be able to scope above root modals but not above epistemic modals. A theoretical basis for an account of this is provided by Cinque's (1999) theory of functional categories associated with tense and modality. The essential idea is that a modal verb must occur as the syntactic head of a functional category associated with a particular type of modality. Simplifying his proposal somewhat, the idea is that the semantic epistemic/root distinction is a function of the choice of which functional category the modal occurs in, where the functional category giving rise to the epistemic reading is (universally) located higher up in the tree than the functional category giving rise to the root modal reading, with the functional category for (past) tense located in between.

At this point it is necessary to confront an issue concerning the level of representation at which Cinque's universal hierarchy is supposed to hold, bearing in mind the possibility that, in at least some cases, modals appear to undergo movement across past tense in the derivation of LF representations, as suggested above. If the root and epistemic interpretations of (12b),

(18a,b) and (19) are derived from a common syntactic structure (as I have implicitly assumed thus far), with the epistemic modal interpretation involving LF movement of the modal to a position above the past tense, Cinque's universal hierarchy presumably fixes the LF positions of modals and tenses relative to each other. On this view, a modal verb might originate in a verbal projection on either type of interpretation, and then undergo movement to a modal functional projection, perhaps in order to satisfy Minimalist-style feature-checking requirements; the type of modal force (epistemic versus root) would then be fixed by the choice of which functional projection the modal moves to. This immediately raises a technical problem with respect to the locality conditions governing head movement, however, since it assumes that a modal head can move across a tense head (in the case of epistemic modals), in violation of Travis's (1984) Head Movement Constraint or the principle(s) responsible for it. It might be possible to get around this problem by assuming a more complex syntactic derivation, whereby the modal would move across the tense by virtue of phrasal XP movement rather than by head movement, such a derivation would presumably have to involve prior extraction of the verb phrase complement of the modal out of the phrasal category containing the modal (with the later category then undergoing remnant phrasal movement to a position above the tense), but I know of no independent empirical evidence for such a derivation.

An alternative analysis of (12b), (18a,b) and (19), consistent with another interpretation of Cinque's hierarchy and also with

the Head Movement Constraint, is that epistemic and root interpretations of modals are determined by the base positions of the modals, so that root modals originate in a lower position than epistemic modals (with past tense occurring in between). On this view, (18a) would be structurally ambiguous in terms of the base position of the modal root. On the root interpretation, the modal originates in the lower modal position and moves to the head position of the TP to combine with the past tense affix. On the epistemic modal interpretation, the modal originates above the tense in the higher modal position; presumably the tense affix moves to combine with the higher epistemic modal head. The derivation of the root and epistemic modal interpretations of English have-to in (12) would work similarly. Since the scope relation holding between the past tense and the modal would be determined by their source positions on this interpretation of Cinque's hierarchy, such cases would be analogous to structures involving reconstruction.

To extend this analysis to the periphrastic perfect constructions in Spanish and Danish in (18b) and (19), where the counterparts of the auxiliary verb have precede the participial forms of the modals, it is necessary to assume that it is the past participle suffix, rather than the auxiliary verb have, that originates in the head position of the Tense Phrase between the two modal projections. On the root modal interpretation of (18b), the modal originates below the participial affix and undergoes head movement to combine with it; on the epistemic interpretation, the modal originates in the higher modal position above the past

participle affix, which then undergoes head movement to the epistemic projection to combine with the modal.

Another type of case involving an apparent scope reversal between an epistemic modal and a past tense has recently been brought to light by Condoravdi (2001), who cites examples such as those in (20a,b), which she contrasts with cases such as (21):

(20) a. At that point, he could/might still have won the game.

'At that point, it was still possible that he would win the game'

b. In October, Gore still should have won the election.

'In October, it was still likely that Gore would win the election.'

(21) He may/might have (already) won the game.

'It is possible that he has (already) won the game'

Condoravdi notes several important properties of such cases. First, crediting Mondadori (1978) for the essential insight, she observes that the examples in (20) are interpreted as involving a future possibility in the past, as though the (non-finite) perfect were interpreted as a (finite) past tense scoping over the modal; this contrasts with (21), where the epistemic modal has the expected present-tense interpretation and the eventuality time of its complement is past-shifted with respect to the modal time. In a sense, this is the mirror image of what we observed with the past tense semi-modal had to in (12b), where the past

tense is interpreted as though it were a perfect in the complement of the semi-modal. Note, however, that whereas the case in (12b) clearly conforms to the scopal hierarchy placing epistemic modality above past tense, the scope reading in (20) is in apparent conflict with it (though the conflict is only apparent, as we shall see shortly).

Second, the interpretation in (20), unlike that in (21), is necessarily counterfactual; the eventuality denoted by the complement of the modal, though possible or likely at the past time in question, did not in fact occur. Condoravdi plausibly accounts for the counterfactuality as arising from a pragmatic inference induced by the speaker's choice of a past-tense modal rather than a present-tense modal; her account is substantially similar to the theory of imperfect conditionals in Italian developed independently by Ippolito (this volume).

Third, the type of modal force in (20) differs from that in (21), though both are often traditionally classified as 'epistemic'; whereas the epistemic modality in (21) is evidential, in (20) it is 'metaphysical' (in her terminology). In (21), the actual state of affairs concerning the eventuality has already been determined at the time of the modal evaluation, so the only uncertainty involves the speaker's lack of evidence and/or knowledge about the actual state of affairs that obtains. As Condoravdi points out, this is true for any epistemic modal whose complement has an eventuality time that is interpreted as being simultaneous with, or past-shifted with respect to, the modal evaluation time. In contrast, in (20), where the complement

of the modal has a future-shifted interpretation, the state of affairs in the actual world has not yet been fixed at the time of the modal evaluation. Thus the type of epistemic modal force is dependent on the temporal relation between the modal and its complement. This dependency is also illustrated by the fact that epistemic must, which does not allow its complement to have a future-shifted interpretation, as noted by Enc (1986), has only an evidential (as opposed to 'metaphysical') interpretation, as Condoravdi observes.

This distinction between the two types of 'epistemic' modality resolves the apparent conflict between the scopal interpretation of (20) and Cinque's hierarchy. Cinque, like Condoravdi, distinguishes between two types of epistemic modality--evidential versus 'alethic'--a distinction that I ignored in my simplified outline of his theory presented above. Cinque's notion of alethic modality should probably be equated with Condoravdi's notion of metaphysical modality (though the two authors explain the distinction in somewhat different ways and attribute somewhat different properties to them). Cinque actually proposes that modals conveying alethic force differ from evidential modals in allowing past tense to scope over them, so the scope relation that Condoravdi argues for in (20) is actually consistent with this more articulated tense/modal hierarchy. In fact, Condoravdi notes that (20a) (her (7b)) "is not just about epistemic uncertainty at that past point (though of course since the outcome had not [yet --TS] materialized one couldn't know it either)".

More generally, the type of apparent scope reversal seen in (20) is never possible for evidential modal interpretations. This suggests 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). This leads us to expect that modal-perfect combinations such as should-have, ought-to-have, etc., might allow for a root-modal deontic interpretation on Condoravdi's scope reversal reading. Though the relevant semantic judgments are extraordinarily delicate and difficult to distinguish from their other potential root-modal reading (where the root modal has a present-tense interpretation and its complement is past-shifted with respect to it), my intuition is that the relevant reading is in fact possible:

- (22) a. You should have bought that book when you had the chance.
- b. Max ought to have kept his mouth shut at the meeting.

It strikes me as more plausible to suppose that in (22) the relevant deontic obligation held at the past times in question, rather than obtaining at the utterance time (obligating the subject at the utterance time to have arranged things in the past in a particular way).

A fourth observation that Condoravdi makes is that the apparent scope-reversal reading in (20) is possible only for non-

present-tense modals such as might, could, should, and ought; it is not possible for present-tense modals such as may, can('t), shall, and must. In other words, the distinction between the modals that allow the apparent scope reversal and those that do not precisely coincides with the distinction between the modals that allow a simultaneous 'sequence-of-tense' construal when they occur in the clausal complement of a past-tense intensional verb and those that force a double-access reading in the same environment, as discussed above. Recall further that the two groups of modals also differ in terms of their ability to trigger sequence-of-tense effects in finite clauses that they c-command, as in (16).

In Stowell (1995), I suggested that the so-called present and past morphemes in English are not actually present and past tenses per se (where tenses are understood as temporal ordering predicates in the sense of Zagana (1990)) but rather polarity markers on time-denoting heads designating a particular scope relation with a higher (true) past tense. A time-denoting phrase containing past must occur under the scope of a true past tense at LF, whereas a time-denoting phrase containing present may not. If this analysis is adopted, and if we further assume that the two groups of modals are actually morphologically complex, composed of a modal root combining with either present or past, then we have an immediate explanation for Condoravdi's fourth observation (and also support for her basic analysis of (20): the reason that the present-tense modals never allow a scope-reversal reading of the sort seen in (20) is that the present tense

morpheme that they contain may not occur under the scope of a higher past 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.

Although should and ought, like must, allow a future-shifted construal of their complements on the root-modal interpretation, even when the complement is stative, as in (23b), they appear not to allow a future-shifted perfect interpretation in (23c), unlike must in (23d). Thus the root deontic sense of should-have and ought-to-have seems to actually require the perfect to scope over the modal, as in (22).

- (23) a. You ought-to/should/must leave.
b. You ought-to/should/must be at the station at 2 PM.
c. ??You ought-to/should have left by the time we arrive.
d. You must have left by the time we arrive.

This would follow if we assume that should and ought, though containing the polarity marker past, may not occur as the complement of an actual null past tense: to license the polarity marker past, the perfect would have to scope above the modal.

This is just the speculative outline of an explanation, since it fails to explain either why the null past tense may not co-occur with these modals or why no problem for the polarity marker arises in (23a,b), but it perhaps hints at the direction that an account of (22) vs. (23c) might take.

As a final comment on Condoravdi's modal-perfect reversal cases, I should observe that they seem to be in more direct conflict with Travis's (1984) Head Movement Constraint than the apparent tense-modal reversal cases I discussed earlier, since the perfect can be separated from the preceding modal by an adverb such as still. At this point I do not see a clear solution for this incompatibility, though given the evidence supporting the validity of the scope reversal analysis, it seems that the solution must involve either some kind of phrasal movement or an abandonment of the head Movement Constraint in its strictest form.

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