

LSA 220 Morphology, syntax, and semantics of modals
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Prelude:

In Session I, we saw that in a fruitful path of research, modals are seen as quantifiers over worlds. As such (and putting many details aside), they will have a certain quantificational force, and they will have a restrictor and a scope.

Here is an example of a deontic necessity (universal) modal:

- a. According to the law, you have to sweep your side-walk once a week
b. $\forall w$ [the law is satisfied in w] [you sweep your side-walk once a week in w]

and a deontic existential modal:

- c. According to the rules of the dorm, you can have a party in your room
d. $\exists w$ [the rules of the dorm are satisfied in w] [you have a party in your room in w]

Here is an example of a necessity goal-oriented modal:

- e. in order to get good cheese, you must go to the North End
f. $\forall w$ [your goal of getting good cheese is satisfied in w] [you go to the North End in w]

And an existential goal-oriented modal:

- g. If you want to get to the island, you can take the ferry
h. $\exists w$ [your goal of getting to the island is satisfied in w] [you take the ferry in w]

So we have a way of semantically identifying modals. What are the morphosyntactic properties of the class of items thus identified?

Modals in Morpho-Syntax: A whirlwind tour of facts and topics for further investigation

In terms of syntactic category, modal elements can be at least (in English but also crosslinguistically):

- Verbal:
 - (1) He **has to** leave.
- Adjectival:
 - (2) It is **possible** to buy a car for under 10K.
- Adverbial:
 - (3) He is **probably** the tallest person in the class.

Modals can also be covert. That is, it is possible to detect a modal meaning in a sentence without there being a visible modal element. Here are some examples from the literature:

Chomsky (1977)

- (4) The man to fix the sink is here.
'The man who is supposed to fix the sink is here.'

Hackl and Nissenbaum (2003)

- (5) Every (the/neither/etc) person for John to play against is in the next room
'Every (the/neither/etc) person that John should play against...'
- (6) A (many/some/three/etc) person for John to play against is in the next room
A (many/some/three/etc) person that Joh should/could play against...

Bhatt (1999)

- (7) He wants to know where to get gas.
'He wants to know where one can/should get gas.'

Izvorski (1998)

Here is one that English doesn't have but other languages do, e.g. Greek, Bulgarian, Hebrew:

- (8) Echo ti na fao. (Greek)
have-1sg what INFL eat
I have something that I can eat.

The topic of covert modality is very interesting. Some of the obvious questions are:

- What is the variation in quantificational force (sometimes existential, sometimes universal) due to?
- Is there a phonetically covert modal or is the effect of modality the result of the combination of elements in the environment?

We will choose one particular case where a covert modal has been posited and explore it in some detail. We will do this in our very last session (Session VI).

Overt modals

Back to overt modals. We will focus primarily on modals in the verbal domain. Across several languages, modal verbs behave like lexical verbs for most, if not all, morpho-syntactic properties.

English modal verbs have certain peculiarities that are well-known:

- Many English modal verbs do not inflect for number and person and they also lack infinitival forms:

Category I: *must, can, may, should*

- But there are some that can carry inflection, as well as appear in infinitival forms:

Category II: *have to, need to*

Category I modal verbs behave as if they are always in the INFL-area, according to common tests such as placement with respect to negation (though, as we will soon see, the issue of interpretation w.r.t. negation is quite a different one):

- (9) Kathy must/can/may/should not leave.

Moreover, when I-to-C movement is called for, Category I modals can move to C:

- (10) Must/can/may/should Kathy leave?

These facts can, of course, be seen as one and the same fact with the lack of infinitival forms of Category I modals: staying below negation and not moving to C, which would trigger *do*-support in both cases, would require an infinitival form.

It is often assumed that Category I modals are generated in Tense or some other INFL-area projection. However, we are not forced to this conclusion. From the ability of Category I modals to move to C, one could also surmise (or at least not exclude) that these modals could also move out of the VP, if they were generated there. So it is possible that Category I modals are generated in VP but because only tensed forms exist, they must always move out of the VP. And since they are overt movers (I-to-C), they move out of the VP overtly.

Category II modals on the other hand, behave like main verbs (in American English) in that they require *do*-support and never leave the VP:

- (11) a. He doesn't have to leave.
b. *He hasn't to leave.
c. *He has to not leave. (except possibly with constituent negation)
- (12) a. Does he have to leave?
b. *Has he to leave?

Beyond English...

Putting English aside, modal verbs in many languages behave like other infinitive-embedding verbs from quite a few points of view. As such, they inflect for person, number, tense and aspect. In particular, the effect of tense and aspect on modals is very interesting.

We will discuss the question of Tense on Modals in our second to last session (Session V).

Here, let us take a look at an interesting phenomenon that arises in the domain of aspect on modals (Bhatt 1999, Hacquard 2006 and references therein):

In languages like Hindi and Greek, which have grammatical aspect morphology, one has to make a choice as to which aspect (perfective or imperfective) to use on every verb. This choice also exists for modal verbs. When the imperfective is used, the modal retains what one would consider its normal use:

- (13) O Yanis boruse na kolimbisi apenandi (ala dhen to ekane) (Greek)
 John could-IMP swim across (but didn't do it)

However, when the perfective is used, we get what Bhatt called an “actuality entailment”:

- (14) O Yanis borese na kolimbisi apenandi (ala dhen to ekane)
 John could-PRF swim across (#but didn't do it)

The obvious question is what the effect of the perfective is on the modal. While we have some understanding of these facts due to the aforementioned authors, the phenomenon still remains largely unsolved.

Syntax-related Issues that have received some attention in the literature:

I. Raising versus Control

(and addressing the issue of where modals appear in the tree and where they are interpreted:)

II. The Relative Ordering of Modals

III. Negation and Modals

I. Raising versus control

In a tradition going back to Jackendoff (1972), it has been widely assumed that deontic and epistemic modals differ in certain basic syntactic properties.

One should keep in mind that this is an important issue, especially if one wants to adopt or develop a system like Kratzer's (1978, 1981, 1991), in which modals differ only in contextual parameters. Under an idealized such account, there should be no syntactic differences between epistemic and deontic modals, for example.

Specifically, the idea is/was that deontics are instances of a control structure, while epistemics are raising predicates:

- (15) a. John must be there at 5pm (Deontic)
 b. [John must [PRO be there at 5pm]]

- (16) John must be there already (Epistemic)
 [ec must [John be there already]]
 [John_k must [t_k be there already]]

The idea behind this intuition was pretty straightforward: Deontics assert that the subject has a certain property, namely the property of having a particular obligation (or permission). Therefore, the modal assigns a theta-role to the subject. The lower thematic subject, of course, also exists; in the absence of Case, it is instantiated as PRO¹.

Epistemics, on the other hand, are propositional predicates. They say nothing about the subject or any particular argument inside the clause. At most, they mediate a relationship between a proposition and the belief system of an individual (the speaker). Therefore, the subject does not receive a theta-role from the epistemic modal. Rather, the modal has a thematic relationship with the entire CP/IP.

Linguists subsequently further refined their understanding of deontics, taking from the philosophers the distinction between *ought to do* and *ought to be* deontic modality. Brennan (1993), probably the first linguist to make this connection, based an interesting syntactic proposal on this distinction².

The idea here is that in *ought-to-do* modality, a particular individual has a certain obligation. For Brennan, *ought-to-do* modals are control predicates, as they assign a theta-role to their subject (and are infinitive-embedding).

- (17) Ought-to-do:
 John ought to/ has to/should hand this in before 5pm.
 John should PRO hand this in before 5pm.

On the other hand, *ought-to-be* modality does not assert obligation of any particular person.

For Brennan, *ought-to-be* modals are raising predicates, as evidenced also by the fact that

¹ Alternatively, in a theory without PRO, (15b) would be as follows:
 (15) b'. [John must [be there at 5pm]]

² Brennan (1993) cites Feldman (1986) as having influenced her work but the idea started earlier. However, Castañeda (1970) gives an early description of the notion, citing even earlier sources:

“Deontic concepts like ought, right, obligation, forbidden, and permissible have benefited from the philosophically exciting work in the semantics of modal concepts done by Kanger, Hintikka, Kripke, Montague and others. Their semantics illuminates both the topic and the contribution of the standard axiomatic approach to deontic logic: the topic is what philosophers used to call the Ought-to-be. On the other hand, the non-standard approach represented by early axiomatic deontic systems of ours deals with the Ought-to-do.”

they can support expletive subjects.

- (18) Ought-to-be:
There ought to/have to/should be laws against things like this.

In short, for Brennan, epistemic modals are raising predicates but deontic modals come in two varieties: Control (17) and Raising (18).

In effect, the difference between *ought-to-do* and *ought-to-be* modals is whether the obligation is understood to be borne by somebody. The idea was that when there is a bearer of the obligation, and hence an *ought-to-do* modal, the carrier of the obligation would be the thematic subject of the *ought-to-do* modal. With *ought-to-do* modality, there is no bearer of obligation. In other words, either the bearer of obligation is the theta-marked subject, or there is no bearer of obligation.

However, it turns out that there are deontic sentences that have a bearer of obligation that is not the syntactic subject.

From Bhatt (1998):

- (19) John has to eat an apple today.
(said as an instruction to John's caretaker at the day-care, who is therefore the carrier of the obligation)
- (20) Bill has to be consulted by John on every decision.
(*John* is the bearer of the obligation)

From Wurmbrand (1999):

- (21) The traitor must die.
(22) The old man must fall down the stairs and it must look like an accident.

From Claire Halpert (p.c.):

- (23) The security guard must not see you as you break into the museum.

Given such data, the idea that the bearer of the obligation is a theta-role assigned under structural conditions to the subject becomes difficult to maintain. An overt non-subject can be the bearer of the obligation, as in (20) (argument of by-phrase) and (23) (object of the verb). In addition, the bearer of the obligation can also be absent syntactically, as in (19), (21), and (22).

Furthermore, as Bhatt points out, (24) is structurally like an example of Brennan’s *ought-to-be* modality and thus is not expected to have a carrier of the obligation at all. However, when said to the caterer, it becomes an *ought-to-do* modality, with the caterer being the carrier of the obligation.

- (24) We are expecting fifty guests tonight. There have to be 50 chairs in the living room room by 5p.m.

What both Bhatt and Wurmbrand conclude is that there is no structurally assigned theta-role ‘carrier of the obligation’. It is claimed that there are no syntactic differences in the representations of *ought-to-do* and *ought-to-be* deontic modals; all deontic modals are raising constructions. That is, deontic modals never come with a theta-role of obligation (or permission). However, there is an inference mechanism that can identify the carrier of the obligation, who can appear in various syntactic positions (see (20) and (23)), or absent altogether, as in (19), (21-22) and (24).

In addition, both Bhatt and Wurmbrand bring to the fore several syntactic arguments that deontic modals pattern like raising predicates and not like control.

One of their arguments comes from Case. Bhatt discusses Hindi, but the argument there is a bit more complicated than we can do justice here. Wurmbrand’s argument from Icelandic Case is easier to convey in a few words.

In Icelandic, while most verbs take nominative subjects, there are verbs that take accusative subjects (the verb meaning ‘lack’) and verbs that take dative subjects (the verb meaning ‘like’). When these verbs are embedded under a control predicate, the higher subject gets the Case associated with the higher verb. When they are embedded under a raising predicate, the subject appears in the Case associated with the embedded predicate:

- (25) NP_{nom} V_{Control Pred} PRO lack/like DP
 (26) NP_{acc/dat} V_{Raising Pred} t lack/like DP

When verbs with quirky subjects are embedded under a modal, the case of the subject of the modal depends on the embedded predicate.³

- (27) NP_{acc/dat} Modal lack/like DP

Here are Wurmbrand’s actual Icelandic data:

³ Unlike Thráinsson and Vikner (1995), who say that such sentences receive epistemic readings, Wurmbrand says that deontic modals have the same pattern.

- (28) a. Harald / *Haraldur vantar peninga.
Harold-ACC / *Harold-NOM lacks money
'Harold lacks money'
- b. Haraldi / *Haraldur líkar vel í Stuttgart.
Harold-DAT / *Harold-NOM likes well in Stuttgart
'Harold likes it in Stuttgart'
- (29) a. Haraldur / *Harald vonast til að vanta ekki peninga.
Harold-NOM / *Harold-ACC hopes for to lack not money
'Harold hopes not to lack money'
- b. Haraldur / *Haraldi vonast til að líka vel í Stuttgart.
Harold-NOM / *Harold-DAT hopes for to like well in Stuttg.
'Harold hopes to like it in Stuttgart'
- c. Harald virðist vanta ekki peninga.
Harold-ACC seems lack not money
'Harold seems not to lack money'
- (30) a. Haraldi / *Haraldur verour að líka hamborgarar.
Harold-DAT / *Harold-NOM must to like hamburgers
'Harold must like hamburgers' (in order to be accepted by his
new American in-laws)
- b. Umsaekjandann veraur að vanta peninga.
The-applicant-ACC must to lack money
'The applicant must lack money' (in order to apply for this grant)

Note that the fact that nominative is impossible shows that raising is not just an option with these Icelandic modals, but is the only choice.

These and other syntactic arguments convinced a fair amount of people that all deontic modals are raising predicates, just like epistemic modals⁴.

This conclusion also fits Kratzer's proposal, since a common syntactic representation is more easily compatible with the view that epistemics and deontics differ only in conversational backgrounds and ordering source.

However, the conclusion that deontic modals are uniformly raising predicates may be too

⁴ Though we do not have time to go into this issue here, the same question arises for other modals, e.g. dynamic and ability ones. For these, see Hacquard (2006) and Hackl (1998).

strong for the general case. Bhatt and Wurmbrand have shown for sure that some deontic modals must be raising predicates. However, there is no apparent conceptual reason why there couldn't be deontic modals that are control predicates.

Recently, Nauze (2008) revives the position that English deontic modals are control predicates. However, his position is that the syntactic and semantic properties of modals differ significantly crosslinguistically. (Interestingly, this is in combination with a rejection of Kratzer's proposal that deontic/epistemic, etc., distinctions among modals are only contextually determined.)

Nauze puts faith in what he considers Brennan's strongest argument for the status of English deontic modals as theta-role assigners⁵ (Nauze p. 148, (16a,b), repeated below as (31)).

Sentences (31a) and (31b) are equivalent:

- (31) a. The president shook hands with John.
b. John shook hands with the president.

Epistemic predicates, which are propositional arguments for Brennan, retain this equivalence:

- (32) a. The president may/must have shaken hands with John.
b. John may/must have shaken hands with the president.

However, deontics do not (Nauze 149, (20a,b)):

- (33) a. The president must shake hands with John.
b. John must shake hands with the president.

Brennan/Nauze say that as *ought-to-be* modality (e.g. as said to the president's campaign director or John's secretary) the two sentences are equivalent. However, as *ought-to-do* modality (33a,b) are not equivalent. For Brennan and Nauze this is the result of the deontic modal assigning a theta-role to 'the president' in (a) but to 'John' in (b).

Is this a necessary conclusion? Once we have our inference mechanism (which we need anyway for sentences like (19-24), we can use it to choose either 'the president or 'John' as the bearer of the obligation to shake hands with the other. Nothing would have to follow about the syntax of the two modals⁶.

⁵ He does not provide arguments against the position that all English deontics are raising predicates but does acknowledge the existence of that position in fn 78 on page 126, where he cites Wurmbrand (1999) and Barbiers (2006).

⁶ To be fair to Nauze, he does seem to acknowledge a path to this possibility in fn 27 on p. 149:

However, as we said earlier, even if we manage to show that all deontic modals in English and in Icelandic are raising predicates, there is no conceptual reason given as to why deontics could only be raising –unlike epistemics, whose status as propositional predicates seems quite clear.

To conclude this section:

- There has been a debate about the syntactic status of deontic and epistemic modals: do they assign a theta-role to their syntactic subjects (making them control predicates) or do they not (making them raising predicates)? Epistemics are uncontroversially taken to be raising predicates. The actual debate mostly centers on deontics. While there may be reason to expect that all epistemics will be raising predicates crosslinguistically, it may well turn out to be the case that deontics can go either way.
 - These questions should be extended to other modals (ability, dynamic etc), as well as to other languages.
 - In addition, one should keep in mind that if one wants a theory like Kratzer's, where modals differ only in contextual parameters, possible syntactic differences like raising versus control will have to be addressed seriously.
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II. The relative ordering of modals

There has been a lot of work on the relative ordering of (functional) categories. The same question has been asked about modals: **if there is more than one modal in a tree, what order do the modals come in?**

There are two aspects of the question to address here:

- What are the facts?
- Why are the facts the way they are?

So what are the facts?

An early conclusion, and one that seems still fairly widely accepted, is that epistemics are

“Notice that in Kratzer's theory, this analysis of ought-to-do/ought-to-be deontic modals in terms of VP/S-operators can be accounted for by different conversational backgrounds: one expressing the president's duties, the other expressing the secretary's duties, respectively” This might mean that Nauze might accept as additional conversational background one expressing John's duties. In that case, we would have again no basis for a syntactic distinction.

higher than deontics. Here is an example:

- (34) He must have to take the garbage out every day.
For all we know, it must be the case (epistemic) that he has the obligation (deontic) to take the garbage out every day.

So the order epistemics>deontics is possible. What about the reverse? Several people have claimed that the reverse order (deontic>epistemic) is not possible, an issue we'll return to later.

Cinque (1999) asks the question of modal ordering for quite a few modals (among many other functional heads). In addition to examining the different flavors of modals, he also asks the question of whether universal modals are ordered differently from existential ones.

Here is what Cinque describes as the ordering in a number of different languages:

epistemic> alethic⁷ necessity> alethic possibility> volition > deontic necessity> ability/ deontic possibility

The possibility that the universal modals are generated in different positions from the existential ones is also raised in Cormack and Smith (2002) and Butler (2003). According to Butler, all the epistemic modals are generated higher than the deontic ones, with the two groups separated by Tense. Moreover, within each category, the universal ones are higher than the existential ones.

Butler (Cormack and Smith is similar, as we will see shortly):

epistemic universal> epistemic existential> tense > deontic universal > deontic existential

In other words, the deontic modals are VP-level operators for Butler, whereas the epistemic ones are at a (Rizzi-like) left periphery above the TP.

One of Butler's arguments for placing the deontics and epistemics where he places them comes from how subjects scope with respect to the different modals. He follows Diesing (1992) in the position that at LF, strong determiners are outside the VP and weak determiners are inside the VP. As a result, he makes the following predictions about the placement and interpretation of subjects with respect to the modals: epistemics should outscope both strong and weak determiners and deontics should scope under strong

⁷ Cinque (1999, p.78) characterizes alethic modality as being concerned with "*necessary* truths (i.e., propositions that are true in all possible worlds) and with *possible* truths (i.e., propositions that are *not necessarily false*, being true in at least one possible world)." Alethic modality contrasts with epistemic modality, which is based entirely on speaker opinion or deduction.

determiners but over weak determiners.

With respect to epistemics, he is partly right and partly wrong (See von Fintel and Iatridou 2002).

With respect to deontics, he is predicting:

- (35) a. modal > weak determiner
- b. strong determiner > modal
- c. *modal > strong determiner
- d. *weak determiner > modal

Here are some of his sentences:

- (36) Some philosophers must go to these seminars.

Modal>Weak Determiner

- (35)a. “It is required that some philosophers go to those seminars, as a condition on our being given money to run them.”

Strong Determiner>Modal

- (35)b. Quine, Carnap and Socrates are required to go to these seminars.

Indeed then (35a,b) seem to be correct. It also seems that (35d) is not available. However, contra Butler, (35c) does seem to be available⁸:

- (37) Two of these books must be returned by Monday (but the library doesn't care which two).

In the above sentence, the determiner is presuppositional, yet it scopes under the modal (if it scoped over it the sentences would mean that, e.g., *Anna Karenina* and *Girl with a Pearl Earring*, which I checked out many days ago, have to be returned).

One of Butler's arguments for placing universals over existentials (the other one involves

⁸ This issue, in a way, may be a problem Butler inherits from Diesing (1992). Diesing argued that VP-border elements like German *ja doch* must be preceded by Strong determiners and must be followed by Weak determiners. Several people pointed out that *ja doch* was close to, but not quite at, the border, as it could be followed by Strong determiners as well. Similarly Butler's deontic modals seem to be close to--but not at--the VP.

negation, to which we will return) is roughly the following: Wh-words scope under the universal epistemics but over the existential ones. Below are the relevant sentences with Butler's judgments. We have not been able to confirm these judgments; our informants accepted (38a) without problem.

- (38) a. *Where must he have been going?
Scope: *wh>epistemic necessity
- b. Where might he have been going?
Scope: wh> epistemic possibility

Finally, Nauze (2008) argues that across 6 languages chosen from 6 different language families, the ordering of modals is the following:

epistemics > participant external (deontics, goal-oriented) > participant internal (ability)

In addition, Nauze claims that participant external modals cannot be stacked.

He does not discuss ordering w.r.t. quantificational force.

As to the question of why the ordering of modals should be one way or another, just about all researchers agree that it would be best not have to have a syntactic stipulation to this effect. Instead, they propose that the ordering is dictated by the semantics of the modals.

In particular, the ordering epistemics>deontics has been investigated under this light. While the different authors differ on the specifics, the general idea is that epistemics can only take a certain type of argument, let's say A_E , and deontics a different type of argument, let's say A_D . Moreover, once a clause contains an epistemic modal, that clause cannot function as A_D anymore. However, the existence of a deontic modal does not prevent its clause from functioning as A_E . As a result, epistemics can scope over deontics, but deontics can't scope over epistemics. The most articulated such proposal can be found in Nauze (2008).

As for the claim that universal modals scope higher than existential ones (Cinque, Cormack and Smith, Butler), there does not seem to have been an attempt to find a reason behind it, though it is possible to imagine a working hypothesis that would reduce universal modals to (presuppositional) strong determiners and existential ones to (non-presuppositional) weak ones and thereby attempt a Heim (1982)/Diesing-like ordering.

So it is clear what the research program will be, once it has been determined what the actual orderings are.

However, it is far from clear that the "violating" orderings in the scopal hierarchies above

are, in fact, non-existent.

For example, according to Nauze, participant-external modals cannot stack (and he claims to be able to account for this). However, they do stack and in either order.

Goal-oriented > deontic:

- (39) a. In order to impress him, you need to/have to have to report directly to the Queen twice a day.
- b. In order to stay popular, a teenager must be allowed to go out three times a week.

Deontic >goal-oriented:

- (40) A teenager shouldn't have to smoke to be popular.

As for Nauze's *participant-internal>participant-external, here is a potential counterexample due to Claire Halpert:

- (41) Jane can/is able to be permitted to ride that ride.
(In an amusement park where you must be 5ft tall to go on a ride,
ability > deontic)

And even the deontic>epistemic ordering, which just about everybody thinks should not be possible, might be after all.

Kratzer (1976, 13-15) claimed that deontic>epistemic was possible and gave this example⁹ (42) in the following context:

The tyrant Philophys was inordinately interested in the science of the snail species *Paryphanta Hochstetteri*. But he told scientists to be careful in their reports. He would say "I decree that the reports have to be such that *Paryphanta Hochstetteri* may have sucker feet:

- (42) Und auch in Zukunft muß diese Schnecke im Hinblick auf alle mir zu Augen oder Ohren kommenden Informationen Saugfüße haben können.
"And even in future, this must possibly have suction feet."
(translation in Nauze p. 176, also rendered by him on p. 177 as follows:)
"It must be so that, according to the information provided, the snail might have suction feet."

⁹ Kratzer 1976 is in German. The example did not make it into the English version of the paper, which appeared in 1977 in L&P with the title "What must and can must and can mean".

Here are some English examples that make the same point:

An insurance company will only pay for an expensive test if there is a possibility that the patient may have Alzheimer's.

(43) For the test costs to be reimbursed, it has to be (DEONTIC) possible (EPISTEMIC) that the patient has Alzheimer's."

Or:

We are visiting an English mansion and it so happens that a murder happens while we are there. The police determines that the culprit is either a certain crazy tourist that was there that day or the victim's ex-lover. You are disappointed that while you find yourself in a real-life English mansion with a real-life murder, the usual detective-story suspect, the butler, is already exonerated and you say:

(44) It ought to (DEONTIC) be possible (EPISTEMIC) that the butler did it.

Nauze actually discusses the Kratzer example as a possible counterexample to the claim that deontic>epistemic orderings do not exist, but dismisses it. The reason he gives for discounting it is the following (p. 177): "The second modal does not stand for the uncertainty of an agent (neither that of the speaker or that of the addressee of the obligation) as a typical epistemic modal would. I will thus not consider this type of examples as a counterexample to the scope order of modality."

It is not clear that this property of example (42) makes it less of a counterexample, but at any rate, examples (43) and (44) do not have this property and therefore should probably count as counterexamples.

In short, when it comes to the ordering of modals with respect to other modals, it is not clear what the facts are and for the facts about which we do have some confidence, we don't quite have an explanation yet.

III. Negation and Modals

The relation between modals and negation has been discussed at least by Picallo (1990), de Haan (1997), Palmer (2001), Cormack and Smith (2002), Butler (2003), Iatridou and Sichel (2008).

As before, there are two aspects to the question:

- What are the facts?
- Why are the facts the way they are?

The picture of the English facts is basically representative of the crosslinguistic situation in that modals can scope over or under sentential negation:

Neg > Modal	Modal > Neg
have to	must
need to	should
can	ought to
may (deontic)	may (epistemic)

(The following data are from Iatridou and Sichel, but the observation is not original to them)

- (45) a. John doesn't have to leave. Neg>Modal
 b. He doesn't need to leave.
 c. He cannot go to this party.
 d. John may not go to this party.
- (46) a. John must not go to this party Modal>Neg
 b. John should not go to this party
 c. John ought not to go to this party

Moreover, the scopal properties remain the same even when the negation is not sentential, but part of a Negative DP (Palmer 2001, Cormack and Smith 2002, Iatridou and Sichel 2008; data from the latter)

NegDP>Modal

- (47) a. No student has to/needs to leave.
 =All are allowed to stay
 Not: It is required that no student leaves

- b. No student can/may leave.
=All are required to stay
Not: It is permitted that no student leaves

Modal>NegDP

- (48) a. No student must leave.
It must be the case that no student leaves.
(= all are required to stay)
Not: all are allowed to stay
- b. No student should/ought to leave.
It should be the case that no student leaves.
(= all should stay)
Not: all can stay

Looking at the split behavior of *may*, one might have thought that epistemics scope over negation and deontics scope under. But this is clearly not the case. There are epistemics that always scope under negation:

- (49) a. Susan doesn't have to have done it. Maybe the butler did it. (Neg> have to)
- b. Mary can't be at home right now. It's only 6pm.

And there are deontics that scope over negation:

- (50) John must/should not go to that party.

So is there any rhyme or reason to the pattern of scopal interaction between negation and modals?

There is one generalization that seems to hold crosslinguistically: deontic existential modals always scope under negation. On the other hand, epistemic existentials can scope over (*may*) or under (*can*) negation. Universal modals (deontic or epistemic) can also scope over or under negation.

Some of the accounts that have been proposed:

Cormack and Smith (2002)

According to Cormack and Smith, there are two positions for modals, Modal 1 and Modal 2, and (sentential) negation scopes in between them. CS do not subscribe to Cinque's rigid conception of one position for epistemics, one position for deontic modals. In addressing the question of whether the ordering of modals is dictated by conceptual

Positive Polarity Items (PPIs), as any domain that has one of these classes also exhibits the other class (quantifiers over individuals, adverbs, etc.). PPI modals are the ones that scope over negation necessarily (*must, should, ought*). This leaves the “neutral” modals, which don’t need negation in a sentence in order to be acceptable (hence they are not NPIs) but they scope under negation when it is present (hence they are not PPIs).

Iatridou and Zeijlstra propose that the reason for this is that all verbs are interpreted in their base position. In other words, what we see here is the effect of obligatory reconstruction. This can easily be seen with German DM *müssen*. This modal is neutral since it does not require negation, yet scopes under negation when there is one:

- (55) Du muss dass tun.
 (56) Du muss dass nicht tun. Neg>Deontic Modal (DM)

As can be seen in (56), however, the V2 configuration that has pulled the DM out of its base position to the C⁰ does not affect its scopal interaction with negation, which remains neg>*müssen*. So for English neutral DMs *have to* and *need to*, nothing more needs to be said, as they are interpreted in the only position in which they ever appear, since these are main verbs and never move out of the VP:

- (57) *Has/needs he to leave? vs. Does he have to/need to leave?

However, if a DM appears to be a PPI, as supposedly English *must* is, then this PPI property forces the DM to raise at LF to a position outscoping negation, in the same way as would be adopted for PPIs.

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:

- (58) Nobody has to/needs drive. Neg > modal
 (59) He has to/needs to do no homework tonight. Neg > modal (pref.)
 (60) In order to see how other people live,
 he has to/needs to get no new toys for a while. modal > Neg

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 (58-60), *brauchen* is fine only in (58) and (59); in (60) the intended reading is impossible to yield with *brauchen*:

- (58') Keiner muss/braucht (zu) fahren Neg > modal
 Noone muss/braucht leave

- (59') Er muss/braucht keine hausarbeiten (zu) machen Neg > modal
 He muss/braucht no homework do
- (60') Um zu sehen, wie andere leben, muss/*braucht er eine Zeitlang
 keine neuen Geschenke (zu) bekommen. modal > Neg
 In order to see how other people live, he muss/*braucht 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.

Finally, it is possible that this analysis naturally extends to existential deontic modals, such as English *can* and *may*. Received wisdom has it that these (and other) modals are generated in I^0 . 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 DMs are moving verbs since they can make it up to C^0 :

- (61) Can/may 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 it is superior to the latter in getting the facts with one fewer special assumption about modals. In addition, for the purposes of Iatridou and Zeijstra, this view permits a position of reconstruction for the neutral modals under negation. Given the (unexplained) fact that there are no existential NPI DMs (as opposed to universal NPI DMs), it *might* be expected as well that no PPI existential DMs exist and that therefore all existential DMs scope under negation, a prediction that may be correct

Despite the existence of some thoughts on the interaction of modals and negation, it is not clear that we have a good handle on the problem.

- A lot is left to lexical specification (which functional projection a modal belongs to, as in Cormack and Smith 2002 and Butler 2003; which modal is marked as NPI, PPI, etc., for Iatridou and Zeijlstra). While lexical specification may certainly be part of the solution, one would also hope that there are other properties that dovetail with this particular one, so that lexical specification will seem less random.

- We do not know why deontic existentials crosslinguistically scope under negation.
- There are modals that appear to optionally scope over or under negation, like the following in Russian (Liuda Nikolaeva, Igor Yanovich, p.c.):

(62) Ty ne dolzhen pomogat' svoemu bratu.
 you not must help self's brother
 'You don't have to help your brother.'
 'You must not help your brother.'

If both readings are indeed an option, how would it fit the existing accounts? For Cormack and Smith (2002) and Butler (2003), it might mean that the scopally ambiguous modal can belong to more than one functional projection, unlike the other modals. For Iatridou and Zeijlstra, it might mean that the ambiguous modal is marked optionally as PPI or neutral. So it may be that scopally ambiguous (wrt negation) modals are storable within existing accounts. However, it may well turn out the case that the existence of such modals undermines the spirit of all the existing proposals.

Whatever the correct account of the interaction of modals and negation proves to be, we will see next a construction where the scope of a modal w.r.t. negation plays a crucial role.

What we will do in the next two sessions (III and IV) is look at two modal constructions that are a bit complex, that have crosslinguistic correlates, and that will involve some of the semantic and morphosyntactic questions that we have addressed in these first two meetings.

Addendum to handout 2:

Often, the means that a language uses to express possession are also used to express modality, as Bhatt 1997 has shown¹.

- (1) HAVE possession languages:
Possessor_{NOM} HAVE Possessed_{ACC}

Kathy has a horse

- (2) BE possession languages:
Possessor_{OBL} BE Possessed_{NOM}

Ram-er ek-ta boi aachhe (Bengali, Bhatt 1997, ex. 7a)
Ram-_{GEN} one-CL book be-_{PRS}
'Ram has a book'

An example of a HAVE possessive modal is found in English. Along (1), there is (3):

- (3) a. Kathy has to leave
b. If she wants to pass the test, she has to study harder
c. Her lights are on. She has to be home.

In the HAVE -category fall also Spanish, Galician, Portuguese (European and Brazilian), Haitian Creole and German, according to Bhatt.

An example of a BE possessive modal can be found in Bengali. Along (2), there is (4):

- (4) Ram-er Dilli je-te ho-be (Bhatt 1997, ex. 7b)
Ram-_{GEN} Delhi go-_{INF} be-_{FUT}
'Ram has to go to Delhi'

In the BE-category fall also Hindi, Punjabi, Gujarati, Marathi and Sindhi, according to Bhatt.

¹ Bhatt shows that possessive modals convey obligation. However, in some languages, like English, they can also be used as goal-oriented modals, and even as epistemic ones.