LSA 220
Morphology, syntax, and semantics of modals
Syllabus

Kai von Fintel & Sabine Iatridou

1 Coordinates

- Monday and Wednesday, 1:30pm – 3:15pm
- Classroom: 101 Moffitt

2 Instructors

- Kai von Fintel, fintel@mit.edu, +1.857.234.2662
- Sabine Iatridou, iatridou@mit.edu, +1.617.201.4616

3 Prerequisites

- Basic background in syntax and semantics

4 Course Requirements

To receive a grade and credit for this class, you have to do A or B:

A: Write a paper on a modality-related topic

B: Pick a language that is spoken by somebody at this Institute. The language cannot be English. Investigate the following questions about modals in this language:

i. Make a list of the necessity modals (epistemic, deontic, goal-oriented) and the possibility ones (epistemic, deontic, goal-oriented).

ii. Do the epistemic necessity modals display the properties discussed for English *must* in Session I?

iii. What are the scopal properties of the epistemic and deontic universal and existential modals with respect to sentential negation (see Session II)?

iv. Does this language have a sufficiency modal construction like the ones discussed in Sessions II-III?

v. Does the language convey the meaning of *ought* by using counterfactual morphology on a necessity modal (see Session III-IV)?

vi. How does the language convey modals about the past and modals in the past (see Session V)?

vii. Does this language form Type II IaDs with a formally imperative verb in the first conjunct (see Session VI)?

viii. Pick your answer to one of the above questions and elaborate further on it.

Due Date: Sunday August 16 @5pm

5 Required Readings

von Fintel, Kai. 2006. Modality and language. In Donald M. Borchert (ed.), *Encyclopedia of philosophy – second edition*. Detroit: MacMillan Reference USA. URL http://mit.edu/fintel/fintel-2006-modality.pdf.

von Fintel, Kai & Anthony S. Gillies. 2009. *Must* ... stay ... strong! URL http://mit.edu/fintel/fintel-gillies-2009-mss.pdf. Ms, MIT and Rutgers University, submitted to *Natural Language Semantics*. Sections 1–6, 8.

von Fintel, Kai & Sabine Iatridou. 2007. Anatomy of a modal construction. *Linguistic Inquiry* 38(3). 445–483. doi:10.1162/ling.2007.38.3.445. URL http://web.mit.edu/fintel/anatomy.pdf.

von Fintel, Kai & Sabine Iatridou. 2008. How to say *ought* in Foreign: The composition of weak necessity modals. In Jacqueline Guéron & Jacqueline Lecarme (eds.), *Time and modality* (Studies in Natural Language and Linguistic Theory 75), 115–141. Springer. doi:10.1007/978-1-4020-8354-9.

Many other readings will be listed in the continuously updated course bibliography.

LSA 220
Morphology, syntax, and semantics of modals

Kai von Fintel Sabine Iatridou

July 27–August 12 2009

1 The plan for our six sessions

- Some Semantic Basics
- Epistemic Modality and Evidentiality
- Some Syntax/Morphology
- Anatomy of a Modal
- Ought
- Modality & Tense
- Covert Modality, Imperatives

2 First look at (epistemic) modals

What is added by the modal?

It is raining vs. *It must be raining*

Kant

"The modality of judgments is a very special function thereof, which has the distinguishing feature that it does not contribute to the content of the judgment."

— Kant (1781, 74)

Frege

"What distinguishes the apodeictic from the assertoric judgment is that it indicates the existence of general judgments from which the proposition may be inferred — an indication that is absent in the assertoric judgment. By saying that a proposition is necessary I give a hint about the grounds for my judgment. But, since this does not affect the conceptual content of the judgment, the form of the apodeictic judgment has no significance for us."

— Frege (1879, 5)

Some Linguists

> "[Epistemic modality] is the speaker's assessment of probability and predictability. It is external to the content, being a part of the attitude taken up by the speaker: his attitude, in this case, towards his own speech role as 'declarer'." (Halliday, 1970, 349)
>
> "[Epistemic modality indicates] the status of the proposition in terms of the speaker's commitment to it." (Palmer, 1986, 54–55)
>
> "Epistemics are clausal-scope indicators of a speaker's commitment to the truth of a proposition." (Bybee & Fleischman, 6)

More Linguists

> "In its most normal usage, epistemic *must* conveys the speaker's confidence in the truth of what he is saying, based on a deduction from facts known to him (which may or may not be specified)" (Coates, 1983, 41).
>
> "*May* and *might* are the modals of epistemic possibility, expressing the speaker's lack of confidence in the proposition expressed" (Coates, 1983, p. 131).

Two levels

- The prejacent proposition:
  - *It's raining*
- The additional signal:

- the grounds for believing the prejacent are based on indirect information

The Frege-Geach problem

Pascal and Mordecai are playing Mastermind. After some rounds where Mordecai gives Pascal hints about the solution, Pascal asks

(1) $\left\{\begin{array}{r}\text{Do there have to}\\ \text{Must there}\end{array}\right\}$ be two reds?

Embedding under negation

(2) a. There don't have to be two reds.
b. *Der Code muss nicht zwei rote Stifte enthalten.*
the code must not two red pins contain
"There don't have to be two red pins in the code."

Modality in the proposition

- *It must be raining* expresses the proposition that it follows from the available information that it is raining.
- *Must it be raining?* asks the question whether it follows from the available information that it is raining.
- *It doesn't have to be raining* says that it doesn't follow from the available information that it is raining.

Must vs. Might

- *Must p*:
  - *p* follows from the available information
- *Might p*:
  - *p* is not contradicted by the available information

Factoring modality

- Modal Force
  - *must* = necessity
  - *might* = possibility
- Modal Base
  - epistemic = available information
  - deontic = relevant law/principles
  - goal-oriented/teleological = salient goal(s)

Types of modality

- epistemic: *He has to be home by now*
- deontic: *You have to call your mother more often*
- goal-oriented: *To find good cheese, you have to go to Little Italy*
- **NB**: one modal (*have to*) can be used in all three meanings

Ambiguity vs. Context-Dependency

- Kratzer: the multiplicity of uses of many modals is not an accident
- Basically, they just indicate modal force (necessity, possibility)
- What particular kind of modality a particular modal expresses depends on the context

3 Possible worlds semantics for modals

Sentences express propositions = sets of possible worlds

Asserting a sentence claims that the evaluation world is in the set of worlds expressed by the sentence

Modals express a relation between the prejacent set of worlds and a modal base set of worlds

The modal base is determined by properties of the evaluation world

Classically: a modal makes a claim about a set of accessible worlds

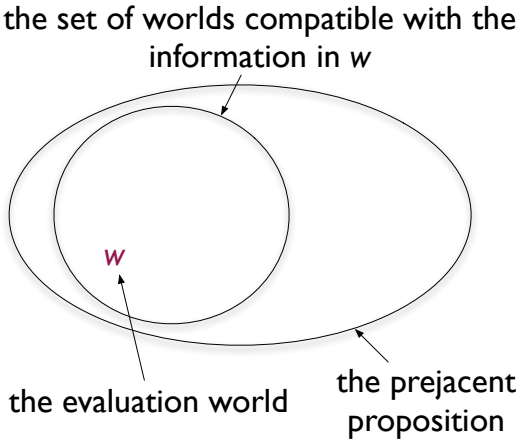
The quantificational account of modality

- Necessity (*must*): prejacent is true in all relevant worlds
- Possibility (*may/might*): prejacent is true in some relevant worlds

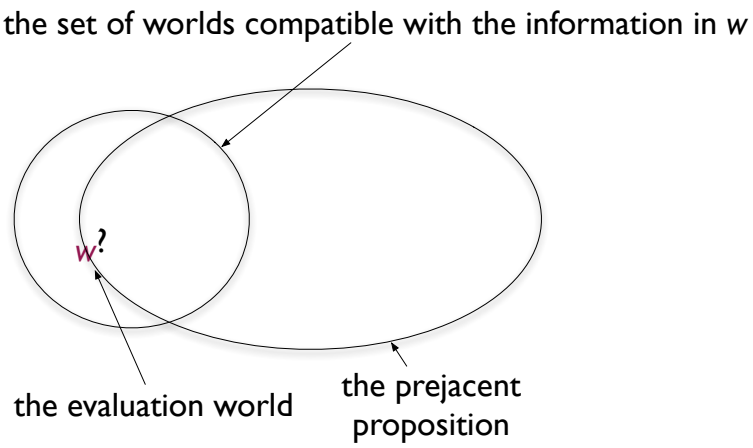
Multiplicity of meaning

- The multiplicity of meanings for modals come from the fact that what worlds are relevant for a particular occurrence of a modal is determined in context.
- ⇒ Topic for further discussion:
  - epistemic vs. deontic modals (may) differ in their syntax
  - languages often specialize their modals
  - perhaps, in fact, multiplicity of meaning is not the normal case (Nauze, 2008)

The picture for *must*



The picture for *might*



4 Karttunen's Problem and the mantra

A prediction

If something must be true, it is true.

Lack of confidence

Which of the following answers conveys more confidence and inspires more confidence?

(3) Where are the keys?
   a. They are in the kitchen drawer.
   b. They must be in the kitchen drawer.

Karttunen's Problem

"Intuitively, (4b) makes a weaker claim than (4a)":

(4) a. John left.
   b. John must have left."

— Karttunen (1972)

Mantra

(5) a. John must be at home.

b. John is at home.

"A statement like (5a) is weaker than (5b) . . . (5b) expresses more conviction on the part of the speaker than (5a) does."

— Groenendijk & Stokhof (1975, 69)

Mantra, Mantra

(6) a. She climbed Mount Toby.
b. She must have climbed Mount Toby.

"It has often been observed that I make a stronger claim in uttering (6a) than in uttering (6b)."

— Kratzer (1991)

Mantra, Mantra, Mantra

"Although it might appear that a statement is strengthened by putting the proposition that it expresses within the scope of the operator of epistemic necessity, this is not so, as far as the everyday use of language is concerned. It would be generally agreed that the speaker is more strongly committed to the factuality of *It be raining* by saying *It is raining* than he is by saying *It must be raining*."

— Lyons (1977, 808)

Mantra, Mantra, Mantra, Mantra

"[E]pistemic modals are nonveridical with respect to the speaker's epistemic model. If I know that *Frank is ill*, i.e. if he just told me so, then I cannot utter *Frank must be ill*; rather, I should say *Frank is ill.* So, if I say that *Frank must be ill*, it is implied that I don't know for sure that Frank is ill, hence I am not committed to the truth of *Frank is ill*."

— Giannakidou (1999)

Mantra, Mantra, Mantra, Mantra, Mantra

"there is an observation, apparently made at various times in the literature, that an epistemic modal assertion cannot be about a proposition known

by the speaker to be true, or known by the speaker to be false. By that observation, someone who asserts (7), for example, cannot know that John is actually asleep, and they cannot know that John is actually not asleep.

(7) John must be asleep.

At the very least, a speaker of (7) who knew John was asleep would be misleading the hearer as to the speaker's epistemic state"

—Werner (2006, 239)

The Mantra*

Epistemic *must* is weak

- *must p* is *weaker* than *p*
- A fortiori: *must p doesn't entail p*

Mantra Implementations

i. Kant/Frege modernized: weak assertion of prejacent

   Westmoreland (1995, 1998); Drubig (2001)

ii. Veltman: bare prejacent asserts direct evidence

iii. Kratzer: add ordering of worlds in modal base

Kratzer Orders the Worlds

(6) a. She climbed Mount Toby.
    b. She must have climbed Mount Toby.

"In uttering (6b) rather than (6a), I convey that I don't rely on known facts alone. I use other sources of information which are more or less reliable. . . . If the ordering source for the modal in (6b) is, say, a conversational background assigning to every world the set of propositions which represent the normal course of events in that world, then the proposition expressed by (6b) will not imply the proposition expressed by (6a) anymore."

—Kratzer (1991)

Ordering semantics

Three ingredients:

- modal force (necessity, possibility)
- modal base (epistemic, circumstantial)
- ordering source (closeness to an ideal)

Epistemic vs. deontic

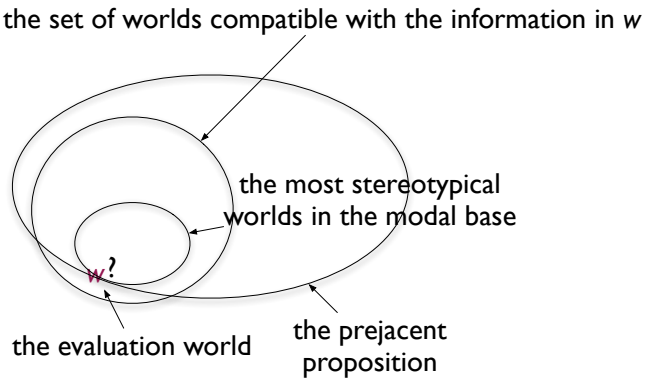
Epistemic modals:

- epistemic modal base + stereotypical ordering source

Deontic modals:

- circumstantial modal base + deontic ordering source

Must à la Kratzer



5 Contra mantra

Must is not always weak (1)

(8) The ball is in A or in B or in C.
It is not in A. It is not in B.
So, it must be in C.

Must is not always weak (2)

(9) A: They said it was going to rain. I wonder whether it has started.
B: I don't think so, it was still dry when I came in 5 minutes ago.
A: Look, they're coming in with wet umbrellas. There is no doubt at all. It must be raining now.

Must is never weak (1)

If *must* $p \not\Rightarrow p$ then we'd expect sentence with the form "*must* p but perhaps not-p" to be perfectly happy
But they're horribly unhappy:

(10) a. #It must be raining, but perhaps it is not.
b. #Perhaps it isn't raining but it must be.

Must is never weak (2)

You know that just outside the building there is a Hollywood shoot going on. You know that tomorrow they're going to film a scene in the rain and that they already have the necessary equipment around. Now, you see people coming in folding up their wet umbrellas. You are almost certain that rain is the only explanation since you don't think that the movie crew will use their rain equipment until tomorrow. But there's a slight twinge of doubt. What do you say?

(11) a. It's raining.
b. It must be raining.
c. It's probably raining.

Must is never weak (3)

(12) A: It must be raining.
B: [Opens the curtains] It's not. You were wrong.
A: #I was not! Look, I didn't say it was raining. I only said it must be raining. Stop picking on me!

Weakness means *must* isn't at the top of the strength scale – that would mean it should combine easily with *only* . . . but it doesn't

Note: this is just fine with *ought*, so for *ought* we will want a weaker semantics than for *must*. More on this when we talk about *ought* later in the course.

6 Must is strong!

A strong alternative

It must be raining

The prejacent proposition:

- It follows from the available information that it is raining

The additional signal:

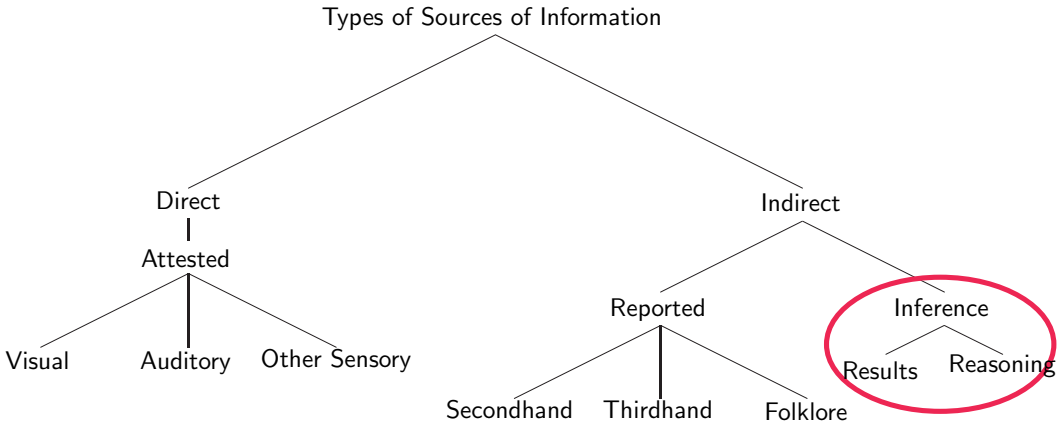
- the grounds for believing the prejacent are based on indirect information

The Idea

Epistemic modals are quantifiers but they are *also* evidential markers

They signal that as far as the *direct* information goes the prejacent isn't settled

Epistemic Modals in Willet's Taxonomy



— Willett (1988)

Must

- So *must* signals that the prejacent isn't directly settled by the *c*-relevant information

- But *must* still asserts its normal strong quantificational meaning

- Putting these together gives us that *must p* is appropriate only if the direct evidence provides indirect but conclusive support for *p* – indirectness without weakness

Rain, direct and indirect

(13) Looking out the window, Billy sees pouring rain.

a. ✓It's raining.
b. !! It must be raining.

(14) Billy sees people coming in with wet rain gear

a. ✓It's raining.
b. ✓It must be raining.

must carries a signal that the evidence for ϕ is indirect, but in (1) the evidence for rain is direct, so (1b) is bad.

Two Issues

- What kind of signal?

- What does it mean for evidence to be indirect?

Cross-Linguistic Stability

Epistemic modals (especially necessity modals) carry this evidential signal reliably across languages.

⇒ The evidential signal should not be a stipulated, arbitrary part of their lexical meaning, so it shouldn't be a lexically specified presupposition or conventional implicature.

[If you have a counter-example, please tell us. You'd be making our day.]

What kind of signal?

- Conversational implicature?
    - Prejacent doesn't signal *directness* so no good competitor
- Conventional Implicature?
    - Most attractive story about CIs says no single item can contribute to both at-issue and CI-dimension of meaning
- Presupposition (?)

A Prediction . . .

Our generalization is that *all* epistemic modals carry the evidential signal. We don't usually see it for possibility modals since the signal is swamped by the quantity implicature (*may* ϕ implicates *may* $\neg\phi$).

If signal = presupposition then we get a prediction:

Epistemic possibility modals pattern with *must* and it becomes visible when they occur under negation

A Prediction . . .

(15) Looking out the window, Billy sees brilliant sunshine.
   a. ✓It's not raining.
   b. !! It can't be raining.

(16) Billy sees people coming in putting away their sunglasses.
   a. ✓It's not raining.
   b. ✓It can't be raining.

7 The Kernel

Izvorski etc.

The modal base for indirect evidentials:

$f(w) = \{p$: speaker considers p indirect evidence in $w\}$

But what is indirect evidence depends on what it is evidence for!

Rain

- direct evidence for rain (no duh!)
- *in*direct evidence for the high pressure system being slower than expected

Intuition

We start from the other end. Structure the evidence that underlies epistemic modality as follows.

- The kernel is made up of those bits of information that are "directly known".
- A proposition is directly settled by the kernel iff either it or its negation are directly known. (First approximation)
- must p presupposes that the truth/falsity p is not directly settled by the kernel

The Context-Dependency of What's in the Kernel

When can you say *it must be raining* even when you are looking straight at the rain (or even getting wet)?

i. Epistemologists on vacation

ii. The Alien

iii. Mozart

8 Conclusion & Outlook

Finally: Weakness?

(4) a. John left.
b. John must have left.

Karttunen 1972, p.13: “The intuitive feeling that (4b) is a weaker assertion than (4a) is apparently based on some general conversational principle by which indirect knowledge — that is, knowledge based on logical inferences — is valued less highly than “direct" knowledge that involves no reasoning.”

Must Is Strong!

- Speakers who say *must p* are just as strongly committed to the prejacent as those who assert *p* by itself.
- There are prejacents for which intuitively direct evidence is more convincing evidence than indirect inferential evidence.
- So, a speaker who chooses nevertheless to use the strong *must p* incurs a higher degree of risk.
- So, we may judge that in many cases, *must p* is more likely to be false than *p* by itself would have been if there had been direct evidence for the prejacent.
- But a sentence being more likely to be false than another is far from an argument that it is weaker!

Outlook

We hope that structuring information states will also lead us to an analysis of other evidential categories. Perhaps, a simple bifurcation of the kernel into propositions supported by direct observation and propositions supported by trustworthy reports will be a good next step.

Conclusion

The mantra that epistemic *must* is a marker of weakness is an overreaction to a misdiagnosis of the much more interesting fact that epistemic *must* is an evidential marker signalling an indirect inference.

References

Bybee, Joan & Suzanne Fleischman. ???? Modality in grammar and discourse: An introductory essay. In *Modality in grammar and discourse*, 1–14.

Coates, Jennifer. 1983. *The semantics of modal auxiliaries*. London: Croom Helm.

Drubig, Hans Bernhard. 2001. On the syntactic form of epistemic modality. URL http://www.sfb441.uni-tuebingen.de/b2/papers/DrubigModality.pdf. Ms, Universität Tübingen.

von Fintel, Kai & Anthony S. Gillies. 2007. An opinionated guide to epistemic modality. In Tamar Szabó Gendler & John Hawthorne (eds.), *Oxford studies in epistemology: Volume 2*, 32–62. Oxford University Press. URL http://mit.edu/fintel/fintel-gillies-2007-ose2.pdf.

von Fintel, Kai & Anthony S. Gillies. 2009. *Must* ... stay ... strong! URL http://mit.edu/fintel/fintel-gillies-2009-mss.pdf. Ms, MIT and Rutgers University, submitted to *Natural Language Semantics*.

Frege, Gottlob. 1879. *Begriffsschrift, eine der arithmetischen nachgebildete formelsprache des reinen denkens*. Halle: L. Nebert. Translation by Stefan Bauer-Mengelberg, from Jean van Heijenoort (ed.) *From Frege to Gödel: A Source Book in Mathematical Logic, 1879-1931*, Cambridge, MA: Harvard University Press. 1967.

Giannakidou, Anastasia. 1999. Affective dependencies. *Linguistics and Philosophy* 22(4). 367–421. doi:10.1023/A:1005492130684.

Groenendijk, Jeroen A.G. & Martin J.B. Stokhof. 1975. Modality and conversational information. *Theoretical Linguistics* 2(1/2). 61–112.

Halliday, Michael. 1970. Functional diversity in language as seen from a consideration of modality and mood in english. *Foundations of Language* 6. 322–361.

Izvorski, Roumyana. 1997. The present perfect as an epistemic modal. *Proceedings of Semantics and Linguistic Theory* 7. 222–239. URL http://www-rcf.usc.edu/~pancheva/evidentialperfect.pdf.

Kant, Immanuel. 1781. *Critik der reinen Vernunft*. Riga: Johann Friedrich Hartknoch.

Karttunen, Lauri. 1972. *Possible* and *must*. In J. Kimball (ed.), *Syntax and semantics*, vol. 1, 1–20. New York: Academic Press.

Kratzer, Angelika. 1977. What *must* and *can* must and can mean. *Linguistics and Philosophy* 1(3). 337–355. doi:10.1007/BF00353453.

Kratzer, Angelika. 1978. *Semantik der rede: Kontexttheorie – modalwörter – konditionalsätze*. Königstein/Taunus: Scriptor.

Kratzer, Angelika. 1981. The notional category of modality. In H. J. Eikmeyer & H. Rieser (eds.), *Words, worlds, and contexts: New approaches in word semantics*, 38–74. Berlin: de Gruyter.

Kratzer, Angelika. 1991. Modality. In Arnim von Stechow & Dieter Wunderlich (eds.), *Semantics: An international handbook of contemporary research*, 639–650. Berlin: de Gruyter.

Kratzer, Angelika. 2008. What *Must* and *Can* must and can mean. URL http://semanticsarchive.net/Archive/Tc2NjA1M/. Manuscript of a chapter from a book to be published by Oxford University Press.

Kratzer, Angelika. 2009. The notional category of modality. URL http://semanticsarchive.net/Archive/Tc2NjA1M/notional-category-modality.pdf. Manuscript of a chapter from a book to be published by Oxford University Press.

Lyons, John. 1977. *Semantics*. Cambridge: Cambridge University Press.

Nauze, Fabrice. 2008. *Modality in typological perspective*. Ph.D. thesis, Universiteit van Amsterdam. URL http://www.illc.uva.nl/Publications/Dissertations/DS-2008-08.text.pdf.

Palmer, Frank Robert. 1986. *Mood and modality*. Cambridge University Press.

Werner, Tom. 2006. Future and non-future modal sentences. *Natural Language Semantics* 14(3). 235–255. doi:10.1007/s11050-006-9001-8.

Westmoreland, Robert R. 1995. Epistemic *Must* as evidential. *Proceedings of the Amsterdam Colloquium* 10(3). 683–702.

Westmoreland, Robert R. 1998. *Information and intonation in natural language modality*. Ph.D. thesis, Indiana University.

Willett, Thomas. 1988. A cross-linguistic survey of the grammaticalization of evidentiality. *Studies in Language* 12(1). 51–97.

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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. ∀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. ∃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. ∀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. ∃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 interpretetd:)

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 PRO[1].

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 distinction[2].

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

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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 i 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 modals[4].

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 assigners[5] (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 modals[6].

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[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.

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

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"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> alethic[7] 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 available[8]:

(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 example[9] (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

necessity or by syntactic hard-wiring, CS basically give the following answer:

- The order epistemic > deontic follows from conceptual necessity (though their formulation of this is not quite clear).
- The ordering Modal 1 > Modal 2, that is, the fact that there are two positions for modals and they are on opposite sides of sentential negation, is syntax.
- Which specific modals go in Modal 1 and which in Modal 2 is lexical, that is, idiosyncratic.

So, if you chose a deontic Modal 1 and an epistemic Modal 2 (and both these categories exist), you will still not be able to generate a deontic>epistemic order, as this will be ruled out by conceptual considerations.

What definitely seems correct is that lexical specification indeed plays a role, which also appears to be true crosslinguistically. For example, German *müssen* scopes under negation, unlike English *must*, which one might think is its correlate:

(51) Man muss nicht alles verstehen.
One *muss* not everything understand
"One doesn't have to understand everything."

Butler (2003)

Butler's 2003 account differs from Cormack and Smith but shares with them the idea that there are specialized functional projections which land some modals higher, and others lower than negation.

Iatridou and Zeijlstra (in progress)

A different path is attempted in Iatridou and Zeijlstra (in progress).

The first step of this approach is to recognize that the domain of (universal) deontic modals is one where *both* NPI and PPI specifications hold. That there are NPIs is evidenced by (52-54), which contain modals that are good only with sentences containing negation.

(52)	Sue need *(not) leave.	*(Neg) >Modal
(53)	Je hoeft dat *(niet) te doen.	(Dutch)
(54)	Du brauchst dass *(nicht) zu tun.	(German)
	You need.NPI that (NEG) to do	

Since NPIs surface in the domain of deontic modality, we should also expect there to be

Positive Polarity Items (PPIs), as any domain that has one of these classes also exhibits the other class (quantifiers over individuals, adverbs, etc.). 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 C^0 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/*bracht to get
no new toys for a while

These facts immediately follow from the presented analysis that takes modals such as English *have to* and German *brauchen/muessen* to be interpreted in their base position.

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* 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 that scopally ambiguous (wrt negation) modals are statable 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 shown[1].

(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.

Anatomy of a Modal Construction

Kai von Fintel
Sabine Iatridou

Languages can express the existence of an easy way of achieving a goal in a construction we call the *sufficiency modal construction* (SMC), which combines a minimizing/exclusive operator like *only* or *ne . . . que* and a goal-oriented necessity modal like *have to* or *need to*, as in *To get good cheese, you only have to go to the North End*. We show that the morphosyntactic makeup of the SMC is crosslinguistically stable. We show that the semantics of the construction poses a severe compositionality problem. We solve the problem by giving the negation and the exclusive operator differential scope. For *only*, this means decomposing it into negation and an exclusive *other than* component.

Keywords: modality, necessity, sufficiency, exclusive operators, minimizers, *only*, scope, intervention, negative polarity

1 Introduction

Imagine that you come to visit us in Boston. You want to make some tiramisu for us but you complain that you cannot get good mascarpone, nor for that matter any other good cheese, in Boston. Incensed, we exclaim, ''What do you mean you can't get good cheese in Boston??!!'', followed by (1).

(1) To get good cheese, you only have to go to the North End!

What do we convey with (1)? We somehow manage to say at least this: going to the North End is (part of) a way of getting good cheese and going to the North End is relatively easy. Furthermore, we are leaving it open whether there are other places (in Boston) to get good cheese; that is, with (1) we are not claiming that the North End is the only place to get good cheese.

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At first glance at least, (1) seems to say that going to the North End is *enough* or *sufficient* to get good cheese, so we will call the construction in (1) the *sufficiency modal construction* (SMC).[1]

As we will show, the SMC raises a serious compositionality puzzle revolving around the interaction of negation, exclusives/*only*, and modals. In the end, we will have explored novel ideas about all of these elements. In the remainder of this introduction, we sketch briefly how the SMC is constructed crosslinguistically. In section 2, we show why the construction presents a compositionality puzzle. In section 3, we proceed gradually toward a compositional analysis. In section 4, we tie up some loose ends and explore whether the SMC really expresses sufficiency, how easiness enters into its meaning, and whether there is reason to use ''more than'' in its semantics.

1.1 The Sufficiency Modal Construction Crosslinguistically

In (1), the SMC morphosyntax consists of the modal verb *have to* and the element *only*. Crosslinguistically, the SMC consists of the following ingredients:

- a modal verb (*have to* in (1), but also other modals, as we will show)
- and one[2] of
  - –an element like *only*[3] (the ''*only* languages'': English, German, Finnish, Spanish, and more), or
  - –negation and an exceptive phrase (the ''NEG + EXCEPTIVE languages'': Greek, French, Spanish, and more).

We already gave an example from English, an *only* language. In (2)–(4), we give examples from Greek, French, and Irish, three NEG + EXCEPTIVE languages.[4]

(2) An thelis kalo tiri, dhen echis para na pas sto North End.
if want.2SG good cheese NEG have.2SG EXCEPT NA go.2SG to.the North End
'If you want good cheese, you only have to go to the North End.'

(3) Si tu veux du bon fromage, tu n'as qu'à aller au North End.
if you want of.the good cheese you NE-have QUE-to go to.the North End
'If you want good cheese, you only have to go to the North End.'

[1] We use the term *modal* in its semantic sense and not to refer to the narrow morphosyntactic class of modal auxiliaries in English. We thank the *LI* reviewer for raising this point.

[2] Some languages (e.g., Spanish) fall into both categories; that is, they can use either *only* or the NEG + EXCEPTIVE form.

[3] Related elements like *just*, *merely*, and the somewhat archaic *but* can also serve this purpose in English.

(i) You just/merely have to go to the North End.

(ii) You have but to go to the North End.

Something similar to the SMC can also be expressed with *at most*.

(iii) You at most have to go to the North End.

Given the productivity of ways of expressing the SMC, we would want to insist on a compositional analysis, rather than some kind of lexical stipulation.

[4] French data are from Valentine Hacquard (pers. comm.). Irish data are from Jim McCloskey (pers. comm.).

(4) Más cáis atá uait, níl agat ach a dhul go Co. Chorcaigh.
if + COP cheese C + is from.you NEG + is at.you but go[− FIN] to County Cork
'If it's cheese you want, you only have to go to County Cork.'

At first blush, it seems intuitive that *only* can do the same job as NEG + EXCEPTIVE. After all, the following are equivalent:

(5) Only John came.

(6) Nobody came except John.

However, it will turn out that, as always, things are not as simple as they seem.

The SMC does not just occur in Indo-European languages. Here is an example from Tagalog (courtesy of Norvin Richards (pers. comm.)):

(7) Kung gusto mong bumili ng mainam na keso, kailangan mo lang pumunta sa
if want you.COMP buy tasty cheese need you only go to
North End.
North End

Here is one from Finnish (from Liina Pylkkänen (pers. comm.)):

(8) Jos haluat hyvää juustoa, sinun on vain mentävä North End:iin.
if want.2SG good.PART cheese.PART you.GEN is only go.PART North End.ILLAT

Here is one from Hebrew (from Danny Fox (pers. comm.)):

(9) Ata rak carix lalexet larexov hasamux kedeʔ limco gvina tova.
you only need to.go to.the.street the.nearby in.order to.find cheese good
'In order to find good cheese, you only need to go to the nearby street.'

And finally an example from Arabic (from Abbas Benmamoun (pers. comm.)):

(10) Yla bʏiti lḥut ma-xəSSə/lazəm təmʃi ʔilla ltəmma.
if want fish NEG-need/should go except there
'If you want fish, you only need to go there.'

1.2 Some Frames in Which the Sufficiency Modal Construction Appears

We have found three environments in which the SMC tends to appear:

- In construction with a purpose clause:

  (11) To get good cheese, you only have to go to the North End.

- In what have been called *anankastic* conditionals (see Sæbø 2001, von Fintel and Iatridou 2004, Huitink 2005, Nissenbaum 2005, von Stechow, Krasikova, and Penka 2006):

  (12) If you want good cheese, you only have to go to the North End.

- In what we would like to call *causal conjunction* (see von Fintel and Iatridou 2005 and work in progress):

(13) You only have to go to the North End and you will get good cheese.

In this article, we will mostly be using examples with purpose clauses, although comparison with the causal conjunction cases will prove crucial at a certain point.

2 The Compositionality Puzzle

Ideally, we would just reach for existing off-the-shelf analyses of the crucial components of the SMC, and once assembled according to standard composition principles, they would result in the sufficiency meaning that the SMC clearly has. Unfortunately, if we follow that recipe, we will not get the right result, as we will demonstrate in this section. We will look first at the modal component of the SMC and then at the exceptive/exclusive element.

2.1 The Modal in the Sufficiency Modal Construction

What kinds of modals appear in the SMC? Let's look at a sentence very much like our paradigm sentence (1), but lacking the exceptive/exclusive element. This should give a sense of what the modal component of the SMC is.

(14) To get the best cannoli, you have to go to Sicily.

We will assume a more or less standard possible-worlds semantics for modals like *have to*. In particular, we assume that *have to* is a necessity modal that effects universal quantification over a set of worlds (its *modal base*). In our paradigm examples, the modal base is given by the interplay of a *circumstantial* accessibility relation (using terminology from Kratzer 1981, 1991) and the infinitival purpose clause.

The worlds we are quantifying over are those where the facts (circumstances) about cuisine, culture, intercontinental trade, the quality of American supermarkets, and so on, are the same as here in the actual world. This set of worlds is then further restricted by the purpose clause to those worlds where you get the best cannoli. (14) therefore conveys that given the circumstances, all of the worlds where you get the best cannoli are such that you go to Sicily. In other words, going to Sicily is a *necessary* condition for getting the best cannoli.

We note that (14) clearly conveys that getting the best cannoli is a goal or desire and therefore the sentence expresses a kind of *goal-oriented* (or *teleological*) modality. However, we should emphasize that it is not the modal *have to* that is the source of the goal orientation; instead, it is the infinitival purpose clause that signals that getting the best cannoli is a goal. This will be important when we look at the causal conjunction cases, where no goal orientation is implied.[5]

Our SMC examples so far have only showcased the possessive modal *have to*.[6] But other modals can be involved in the expression of goal-oriented modality. In particular, there are other

[5] The fine details of the semantics of the modals involved here are explored further in von Fintel and Iatridou 2004.

[6] By *possessive modal* we mean the modal verb that is pulled morphologically from the morphosyntax that expresses possession in the language. Languages expressing possession with 'have' often use 'have' as a modal. Languages expressing possession with 'be to' often use 'be to' as a modal. See Bhatt 1997.

modals with (quasi-)universal force such as *need to*, *must*, *ought to*, and *should*. Which ones can participate in the SMC?

In English, the modal *need to* can also be the verbal element in the SMC, in all environments that we find it in.

(15) a. To get good cheese, you only need to go to the North End.
b. If you want good cheese, you only need to go to the North End.
c. The skies need only to darken a little bit and my dog runs under the table.

But other goal-oriented modals with universal force cannot.[7]

(16) *If you want good cheese, you (only) must (only) go to the North End.

(17) *If you want good cheese, you (only) ought (only) to go to the North End.

(18) *If you want good cheese, you (only) should (only) go to the North End.

And no modal with existential force like *can* or *may* can yield the SMC reading, even though at least *can* has a goal-oriented reading.[8]

(19) If you want good cheese, you can go to the North End.

(20) *If you want good cheese, you (only) can/may (only) go to the North End.

In short, in English, a modal verb can be an ingredient of the SMC only if it has universal force; yet not all universals will do. Indeed, in all languages that we have looked at, no modal verb with existential force is to be found in the SMC. And as in English, not all modals with universal force will do either.

In Greek, we find a similar situation in that the modal glossed as 'must' cannot participate in the SMC, even though it is fine in the plain goal-oriented reading.

(21) An thes kalo tiri, prepi na pas sto North End.
if want.2SG good cheese must NA go.2SG to.the North End
'If you want good cheese, you must go to the North End.'

(22) *An thes kalo tiri, dhen prepi para na pas sto North End.
if want.2SG good cheese NEG must EXCEPT NA go.2SG to.the North End

But as in English, the universal modal glossed as 'need' can occur in the SMC.

(23) An thes kalo tiri, dhen chriazete para na pas sto North End.
if want.2SG good cheese NEG need EXCEPT NA go.2SG to.the North End
'If you want good cheese, you only need to go to the North End.'

[7] Some of these sentences have a reading where what you ought to do is go to the North End and nowhere else. What is important here is that there is no SMC reading of these sentences.

[8] Once we have our semantic analysis fully in place, it will be clear why (20) does not have an SMC reading. There are good readings of (20), of course, where it says that the only thing that is compatible with the goal is going to the North End, or that it is compatible with the goal that you go to the North End and nowhere else.

Similarly, Hindi has two modals with universal force, one that we will gloss as 'be-to' (this is Hindi's possessive modal) and one that we will gloss as 'should'.[9]

(24) agar tum sacmuch yeh exam paas kar-naa caah-te ho, to tumhen
if you truly this exam pass do-INF want-HAB.MPL be.PRES.2PL then you.DAT
kaRii mehnat kar-nii caahiye.
hard.F hardwork.F do-INF.F should
'If you truly want to pass this exam, you should work hard.'

(25) agar tum sacmuch yeh exam paas kar-naa caah-te ho, to tumhen
if you truly this exam pass do-INF want-HAB.MPL be.PRES.2PL then you.DAT
kaRii mehnat kar-nii ho-gii.
hard.F hardwork.F do-INF.F be-FUT.F
'If you truly want to pass this exam, you will have to work hard.'

However, only 'be-to' can be used in the SMC.

(26) ram-ko ghar aa-naa-hii thaa ki baccoN-ne ro-naa shuruu kar di-yaa.
Ram-DAT home come-INF-only be.PAST that children-ERG cry-INF start do give-PFV
'Ram had only to come home and the children started crying.'

(27) *ram-ko ghar aa-naa-hii caahiye thaa ki baccoN-ne ro-naa shuruu kar
Ram-DAT home come-INF-only should be.PAST that children-ERG cry-INF start do
di-yaa.
give-PFV

The modal verbs *have to*, *need to*, Greek 'have to', Greek 'need', and Hindi 'be-to' pattern together in being able to participate in the SMC, while *must*, *ought to*, *should*, Greek 'must', and Hindi 'should' pattern together in not being able to. Why would this be? What else splits the universal modals in a similar way?

It appears that their scope properties with respect to negation do. The modals that can occur in the SMC take scope *under* negation.

(28) a. He doesn't have to go there. NEG ≻ modal (deontic)
b. He doesn't have to have done that. NEG ≻ modal (epistemic)
c. If you want good cheese, you don't have to go to the North End. NEG ≻ modal (goal-oriented)
d. He doesn't need to do that. NEG ≻ modal
e. He need not do that. NEG ≻ modal

(29) Dhen chriazete na figis.
NEG need NA leave
'You don't need to leave.' NEG ≻ modal (deontic)

[9] Our Hindi data were provided by Rajesh Bhatt (pers. comm.).

(30) tumhen Dilli nahiiN jaa-naa hai.
you.DAT Delhi NEG go-INF be.PRES
'You don't have to go to Delhi.' NEG ≻ modal
[You don't have an obligation to go to Delhi.]

On the other hand, the universal modals that cannot occur in the SMC take scope *over* negation.

(31) You should not leave. modal ≻ NEG (deontic)

(32) He should not be there now. modal ≻ NEG (epistemic)

(33) He must not leave. modal ≻ NEG (deontic)

(34) He must not be there now. modal ≻ NEG (epistemic)

(35) You ought not to leave. modal ≻ NEG (deontic)

(36) Dhen prepi na ine eki.
NEG must NA be there
'He must not be there.' modal ≻ NEG (epistemic)

(37) Dhen prepi na to kanume afto.
NEG must NA it do this
'We must not do this.' modal ≻ NEG (deontic)

(38) Prepi na min ine eki.
must NA NEG be there
'He must not be there.' modal ≻ NEG (epistemic)

(39) tumhen Dilli nahiiN jaa-naa caahiye.
you.DAT Delhi NEG go-INF should
'You should not go to Delhi.' modal ≻ NEG

The same results hold for all the languages that we have investigated in this regard.

So here is our generalization on this matter:

(40) Universal modal verbs can participate in the SMC only if they take scope under negation.

We have found no counterexample to this.[10]

Which modals take scope under negation in a given language depends on many factors and seems very idiosyncratic (see, e.g., Picallo 1990, Cormack and Smith 2002). For example, English *must* takes scope over negation, as just noted, while German *müssen* takes scope under it.

(41) Du musst das nicht machen.
you must that not do
'You don't have to do that.' NEG ≻ modal (deontic)

[10] It should be noted, though, that this is a necessary but probably not sufficient condition. That is, there may be necessity modals that take scope under negation but cannot give rise to an SMC interpretation. We have some suggestive data from Hebrew and Norwegian but cannot pursue this topic here.

But even in the face of such capriciousness, the generalization in (40) seems to hold absolutely. For example, unlike English *must*, German *müssen* can appear in the SMC.

(42) Du musst nur ins North End gehen.
you must only in.the North End go
'You only have to go to the North End.'

Finally, note that languages sometimes have modals that appear specialized for occurrence under negation, sometimes called *negative polarity item (NPI) modals*. An example is German *brauchen*.

(43) Du brauchst das nicht machen.
you need that not do
'You don't have to do that.'

(44) *Du brauchst das machen.

This item can be used in the SMC, as expected by now.

(45) Du brauchst nur ins North End gehen.
you need only in.the North End go
'You only have to go to the North End.'

In summary: we have shown that the modal in the SMC has to be a goal-oriented necessity modal that can take scope under negation.[11]

2.2 The Exclusive/Exceptive Marker in the Sufficiency Modal Construction

Next, we need to look at the other characteristic ingredient of the SMC, the exceptive/exclusive marker, crosslinguistically an element like *only* or a NEG + EXCEPTIVE combination.

The benchmark analysis of *only* goes back to Horn 1969, where Horn argues for two distinct components. Sentence (46), for example, *asserts* that nobody other than John was in the room and *presupposes* that John was in the room.

(46) Only John was in the room.

In general, given a sentence ϕ (the so-called *prejacent*), *only* ϕ will assert that no alternative to ϕ is true and will presuppose that the prejacent ϕ is true. For (46), the prejacent is (47).

[11] A few crosslinguistic observations are in order. Apparently, in Norwegian, bare verbs can form an SMC, as pointed out by Tarald Taraldsen (pers. comm.). Many thanks for discussion of this and related points to Anders Holmberg, Øystein Nilsen, and Peter Svenonius. A relevant example is this:

(i) Hvis du vil til Oslo, er det bare aa sette seg paa toget.
if you want to Oslo is it only to sit REFL on the.train
'If you want to go to Oslo, you only have to get on a train.'

We have shown that the verbal element in the SMC is a universal goal-oriented modal that takes scope under negation. This is actually somewhat of a problem because in some languages (at least Greek, Italian, French, Romanian, Bulgarian, and Hindi), the plain possessive modal lacks the goal-oriented meaning. See von Fintel and Iatridou 2005:sec. 5.1 for more on this point.

(47) John was in the room.

The set of relevant alternatives is as usual contextually determined. Rooth (1985) argues that the focus structure of a sentence helps to signal what the relevant alternatives are. For (46), alternatives could be *Mary was in the room*, *Susan was in the room*, and so on.

Looking at the NEG + EXCEPTIVE languages, we will take the proposition without NEG + EXCEPTIVE to be the prejacent. Just as with *only*, the truth of the prejacent is also conveyed in the NEG + EXCEPTIVE construction. Consider the Greek sentences (48a) and (49a) and their prejacent propositions (48b) and (49b), which are clearly presupposed or entailed.

(48) a. Dhen irthe para mono o Yanis.
NEG came EXCEPT only the Yanis
'Nobody came except Yanis.'
b. Irthe o Yanis.
came the Yanis
'Yanis came.'

(49) a. Dhen idha para mono ton Yani.
NEG I.saw EXCEPT only the Yanis
'I didn't see anyone except Yanis.'
b. Idha ton Yani.
I.saw the Yanis
'I saw Yanis.'

2.3 The Prejacent Problem

With these assumptions in place, let us consider our paradigm example in an *only* language.

(50) To get good cheese, you only have to go to the North End.

We will proceed the way we would with any sentence containing *only*. We have to identify the set of relevant alternatives that *only* is operating on (for the assertion), and we have to identify the prejacent (for the presupposition). To identify the set of alternatives, we need to determine the focus of *only*. It would appear that the natural focus in such examples is on the infinitival complement of the modal. So, we would expect the alternatives to be propositions like *you have to go to Milan*, *you have to go to Reykjavik*, *you have to order from amazon.com*, and so forth.

Given such a set of alternatives, (50) would then assert that none of these alternatives is true. That is, to get good cheese, you do not have to go to Milan, you do not have to go to Reykjavik, and you do not have to order from amazon.com. This prediction seems to be just right: the SMC does convey that other ways of achieving one's goal may exist but are not necessary.

As for identifying the prejacent, for (50) this would be (51) (basically (50) without *only*).

(51) To get good cheese, you have to go to the North End.

And here is where the problem lies. In the previous section, we noted that the standard analysis

of *only* includes the truth of the prejacent as a presupposition. But in the SMC, the prejacent is not automatically understood to be true. We can correctly utter (50) in a situation where there are other places in the Boston area to get good cheese, as long as going to the North End is relatively easy. But then (51) is not true because according to it the only place to get good cheese in the Boston area is the North End.

We will call this the *Prejacent Problem*, and we take it to be the central problem for the compositional analysis of the SMC.

The Prejacent Problem arises regardless of the morphosyntax of the SMC. We can also set up the equivalent of the Prejacent Problem in languages that use NEG + EXCEPTIVE in the SMC. Following the assumptions in the previous section, the prejacent of (52) is (53) (i.e., (52) without NEG and the exceptive).

(52) Ya na vris kalo tiri, dhen chriazete para na pas sto North End.
to NA find good cheese NEG need EXCEPT NA go to.the North End
'To get good cheese, you only need to go to the North End.'

(53) Ya na vris kalo tiri, chriazete na pas sto North End.
to NA find good cheese need NA go to.the North End
'To get good cheese, you need to go to the North End.'

The problem again is that (52) does not entail or presuppose (53), since according to the latter you need to go to the North End to get good cheese. That is, according to (53) the only place where you can get good cheese in the Boston area is the North End, while (52) is fully compatible with there being many such places.

In short, the Prejacent Problem surfaces no matter how the SMC is constructed morphosyntactically. It is a problem of compositionality. Any analysis of the SMC will have to deal with this issue.

Here are some quick attempts at solving the problem that will show this is not easy. One might think that perhaps the problem lies with the assumption that sentences with *only* and NEG + EXCEPTIVE presuppose (or entail) their prejacent. What if at least in the SMC, the prejacent presupposition is canceled in some way? One might say that any appearance of a prejacent entailment is due to some kind of defeasible implicature and for some reason or other, the implicature does not arise in the SMC. Our paradigm sentence would then simply claim that to get good cheese, you do not have to go to Milan, you do not have to go to Reykjavik, you do not have to order from amazon.com, and so on. There would be no presupposition that to get good cheese, you have to go to the North End.

The problem is that we would now have no obvious way of deriving that going to the North End is in fact a way of getting good cheese (the component of meaning we called *sufficiency*). Imagine that both Milan and Reykjavik are very good places to get good cheese, but that the North End is not. Then the SMC sentence would—as it now stands—be incorrectly predicted to be true, since you don't *have to* go to Milan (you can go to Reykjavik) and you don't *have to* go to Reykjavik (you can go to Milan). This is not good.

Another possibility would be to claim that the presupposition triggered by *only* and NEG + EXCEPTIVE is weaker than we thought. In fact, in his 1996 paper Horn proposes that the presupposi-

tion carried by *only*-sentences is weaker than he had originally suggested in his 1969 paper. The idea is that *only* ϕ asserts that within a given set *C* no alternative to ϕ is true and presupposes that there is an element in *C* that *is* true (without saying that it is ϕ that is true).

Note that—as is—this makes no new and improved predictions for unembedded cases of *only*. If something is true and no alternative to ϕ is true, then it must be ϕ that is true. Indeed, Horn's arguments for his new analysis all hinge on embedded occurrences of *only*, which doesn't appear to be what we have in the SMC. Again, no luck.

Clearly, then, playing with the prejacent presupposition of *only* and NEG + EXCEPTIVE does not obviously lead to solving the compositionality puzzle.

At this point, one might wonder what our options are, given that we combined what seemed like independently motivated existing analyses of the apparent key components of the construction. Abstractly speaking, enlightenment could come from playing with any or all of the following:

1. the nature of the underlying modal (e.g., maybe it is not a necessity modal after all),
2. the semantics of *only* and of NEG + EXCEPTIVE (e.g., maybe we need to rethink the exact nature of the prejacent presupposition after all, although we just pointed out that there are obstacles),
3. the logical structure of the construction (e.g., maybe the components are not what we thought they were or maybe they do not take scope quite the way we thought they did).

The puzzle we are faced with is not one that has previously been treated.[12] Our solution will combine aspects of options 2 and 3. We propose that the solution can be found by looking closely at the NEG + EXCEPTIVE type of SMC.

2.4 Precursors

Before we develop our analysis of the SMC, we would like to draw attention to an intriguing passage in a paper by Beck and Rullmann (1999:261), which briefly touches on the notion of sufficiency (we reproduce their numbering).

> We suggest that (30) means (31a) or equivalently (31b):
>
> (30) Four eggs are sufficient (to bake this cake).
>
> (31) a. It is not necessary (given the rules for your cake baking) that you have more than four eggs.
>
> b. It is possible (given the rules for your cake baking) that you have only four eggs.
>
> We will derive this semantics via the lexical meaning of *sufficient*. We will take as our guideline the paraphrase in (31b). We will assume that semantically the argument of *sufficient* is propositional in nature. *Sufficient* then contributes modal possibility as well as a meaning component amounting to *only*.

Note also that Beck and Rullmann's example could easily be rephrased as an SMC sentence.

[12] An exception is recent unpublished work by von Stechow (2004), where he cites relevant passages from Bech 1955/57 and where he ends up resorting to a noncompositional solution to our puzzle.

(54) You only need (to have) four eggs.
(Sigrid Beck, pers. comm.)

What Beck and Rullmann are doing in the quoted passage is unpacking the notion of sufficiency into two complex paraphrases:

1. negation ≻ necessity ≻ *more than* (Beck and Rullmann's (31a))
2. possibility ≻ *only* (Beck and Rullmann's (31b))

Beck and Rullmann adopt the second structure, where possibility takes scope over *only*, as their working analysis of the notion of sufficiency. We do not think we can work with this structure as an analysis of the SMC, for two reasons: (a) in the SMC, *only* appears to have scope *over*—not under—the modal, not just because of its surface position but also because, as shown earlier, the SMC is restricted to modals that take scope under negation, a crosslinguistically stable fact;[13] and (b) the SMC clearly contains a necessity modal and not a possibility modal, again a crosslinguistically stable fact.

So, contrary to Beck and Rullmann, we have come to the conclusion that something like the three-part structure in their option 1 lies behind the mystery of the SMC. We will develop this proposal in what follows. Again, we should emphasize that Beck and Rullmann intended their discussion to be about the hidden logical structure of the lexical item *sufficient* and not about the compositional structure of *only have to* or NEG + *have to* + EXCEPTIVE.

3 The Semantic Composition of the Sufficiency Modal Construction

3.1 Ne . . . que *under the Microscope*

3.1.1 Basic Assumptions Recall that in French, the SMC looks like this:

(55) Tu n'as qu'à aller au North End.
you NE-have QUE-to go to.the North End
'You only have to go to the North End.'

We propose to analyze this type of SMC as containing three elements: negation taking scope over a necessity modal, which in turn takes scope over an ''exceptive quantifier.'' We will show that with some work, this gives an adequate compositional analysis for the SMC. After that, we will return to the *only* type of SMC and try to argue that it too involves three elements.

In what follows, we will sometimes use French as perhaps the most familiar kind of example, but it should be clear that we are talking about the NEG + EXCEPTIVE construction as found not just in French but also in Greek, Irish, and so on. We will use *QUE* to represent the relevant notion for both French and other languages.

[13] We assume here that the scope of *only* with respect to modals mirrors that of negation. We will develop this in a surprising way later in the article.

First, we need to put some working assumptions about NEG + EXCEPTIVE in place.[14] Consider a simple nonmodal example.

(56) Je n'ai vu que Jean.
I NE-have seen QUE Jean
'I only saw Jean.'

Our basic idea is that semantically the QUE-phrase introduces an existential quantifier over individuals ''other than'' Jean.[15] There is a syntactic question here as to whether there is a covert quantifier ''something''/''anything'' hosting (i.e., being modified by) the QUE-phrase, or whether the entire quantifier meaning is all wrapped up in the meaning of the QUE-phrase. For simplicity, we will adopt the latter answer.[16]

[14] Dekydtspotter (1993) provides an extensive discussion of *ne . . . que*. We will not adopt his proposal in any detail. See also Azoulay-Vicente 1988. We are not familiar with detailed semantic work on the NEG + EXCEPTIVE construction in languages other than French.

[15] Readers familiar with the existing work on exceptives in formal semantics, especially von Fintel 1993, will realize that we are not treating *que* as a bona fide exceptive in the strict sense. The nonidentity ''other than'' condition it expresses is very weak compared with the conditions expressed by English exceptives like *but* or *except*. To some degree, the difference is actually masked in the case where the operator modifies an existential quantifier in the scope of a negation. It has always been a puzzle why exceptives can modify NPI *any* as in *I didn't see anyone but John* (see Gajewski 2004 for a recent attempt at solving that puzzle). Here, we just note that if the exceptive in its NPI-like use only expresses a nonidentity condition, there is no need to go to heroic measures like the ones explored by Gajewski. Having said that, there are reasons to at least modify the simple ''other than'' semantics, as will be discussed in footnotes 20 and 22.

[16] Historically, at least, one would expect that there used to be an *overt* host. Jay Jasanoff (pers. comm.) tells us that the *que* of *ne . . . que* comes from Latin *quam* ('than') and not from *quod* (the complementizer 'that'). More specifically, the source would be this:

(i) Non vidi alium (hominem) quam Iohannem.
not saw other (man) than Iohan
'I didn't see any man other than Iohan.'/'I saw only Iohan.'

The innovation that would have had to have happened to yield the Modern French string is the deletion of *alium* (*hominem* was optional, as the adjective could stand on its own in Latin). Since the equivalent of *ne . . . que* occurs in Spanish, Irish, Greek, and other languages, we are faced with the question of its development there as well. One possibility is that the construction appeared in a shared mother language; but given the spread of these languages, it would have to be Proto-Indo-European of circa 4000 BC. And if the *ne . . . que* construction did indeed go back to that time, we would expect to find it in intermediate stages, but this is not so. Latin, for example, lacks any equivalent of *ne . . . que*. This leaves only the possibility that the development happened independently in all these languages. So perhaps this was an areal feature spread from one language to another by imperfect bilinguals serving as the vehicle of transmission. (We are very grateful to Jay Jasanoff and his informants for discussing these points with us.)

Although we do not wish to thoroughly address the question of the syntactic presence of a *covert* host, one might consider the following, possibly weak argument in favor of the position that hostless exceptives are truly hostless—namely, that there is no covert quantificational element like ''somebody other than.''

In languages where there is no doubt what Case we are dealing with, given the form of the noun, we see that the Case on the argument of (the equivalent of) *que* depends on the grammatical role the covert host would have held. In other words, the Case on the argument of *que* can be nominative, accusative, and so on.

(ii) Dhen irthe para o Yanis.
NEG came EXCEPT the Yanis.NOM
'Nobody came except Yanis.'

(iii) Dhen idha para ton Yani.
NEG saw EXCEPT the Yanis.ACC
'I did not see anyone except Yanis.'

So, we will be working with the following meaning for QUE *Jean*:

(57) $[\![\text{QUE Jean}]\!] = \lambda P.\exists x(x \neq \text{Jean} \ \& \ P(x) = 1)$

We will further assume that the QUE-phrase stands in an NPI-like licensing relation to the negation NEG—to capture the fact that it is only under negation that exceptive QUE-phrases are grammatical. Later on, we will give more arguments for the NPI nature of QUE-phrases.[17]

When we combine the meanings of negation and the QUE-phrase, (56) therefore means that it is not the case that there is someone other than Jean that I have seen, which appears to be adequate at first glance. But we will soon enough have reason to refine this analysis.

3.1.2 A Possible Concern Before we go on to apply this analysis to the SMC, we address a concern regarding French negation.[18] We are treating the exceptive *que* as devoid of negative force and attributing the negative meaning to the negative element *ne*. But this is not obviously correct. The complication is that in French, plain sentential negation also has two parts that straddle the verb: *ne* Verb *pas*. In spoken French, *ne* is often dropped.

(58) Il (ne) lit pas *Le Monde*.
he (NE) reads PAS *Le Monde*
'He does not read *Le Monde*.'

One might therefore be tempted to treat only *pas* as the contentful item. If this analysis were correct, it would have several repercussions for the NEG + EXCEPTIVE construction in French, since *ne* can also be dropped there, as it can in all similar environments.

(59) Il (ne) lit que *Le Monde*.
he (NE) reads QUE *Le Monde*
'He reads only *Le Monde*.'/'He does not read anything except *Le Monde*.'

(60) Il (ne) lit rien.
he (NE) reads RIEN
'He reads nothing.'/'He doesn't read anything.'

(iv) Dhen milisa para me ton Yani.
NEG talked EXCEPT P the Yanis.(PREP)ACC
'I did not speak to anyone except Yanis.'

This differs from hosted exceptives, which always come with their own Case; for example, Greek *ektos* 'except' always comes with (prepositional) accusative (or genitive, depending on the dialect). Compare (v) with (ii).

(v) Oli i andres irthan ektos apo ton Yani.
all the men.NOM came EXCEPT from the Yanis.ACC
'All the men came except Yanis.'

It seems, then, that the argument of *para* has direct access to the Case assignment process that the covert quantificational element would have undergone if it existed. One could stipulate that the covert host is still there and that there is some sort of unusual concord going on, but it is, of course, simpler to hypothesize that the *para*-phrase itself stands in the relevant Case position and there is no covert host.

[17] See Giannakidou 2002 for another use of the Greek NPI *para*.

[18] We thank Jean-Yves Pollock for discussion of the issues addressed in this section.

(61) Il (ne) lit plus.
he (NE) reads PLUS
'He does not read anymore.'

(62) Il (ne) lit jamais.
he (NE) reads JAMAIS
'He doesn't ever read.'/'He never reads.'

If the omissibility of *ne* means that it is *pas* that carries the semantic force of negation, then by analogy one would have to say that *que* does as well in (59), *rien* in (60), and so on. This would mean that *rien* means 'nothing', *plus* 'no more', and *jamais* 'never'. Such conclusions might be acceptable, but things are more complicated in the *ne . . . que* case, as now *que* would have to mean 'only'. However, this conclusion overgeneralizes, as it wrongly predicts (63) to be grammatical.

(63) *Que Jean aime Marie.
QUE Jean loves Marie
Attempted: 'Only Jean loves Marie.'

It seems, then, that even though *que* does not have to follow overt *ne*, it does have to follow the position in which *ne* might have appeared. From this we conclude that French *que* is not the sole carrier of the semantic force of the construction, even though its partner is not always overtly there. This means that French *que* is still an NPI exceptive and that it does not mean 'only'.

We could follow Pollock (1989) in taking *ne* to be the overt head of a projection of negation (NegP), which could also contain a covert head. For Pollock, the element *pas* is the specifier of NegP. He also argues that the other partners of *ne* in (59)–(62) are specifiers of projections that have overt or covert *ne* as head, though these are projections lower in the tree than the one that contains sentential negation. In short, the omissibility of *ne* is not truly a complication for our approach, once we adopt Pollock's framework. For Pollock, even in plain sentential negation, *ne . . . pas*, *ne* carries the semantic force and *pas* is a ''reinforcer'' of sorts (Jean-Yves Pollock, pers. comm.).[19]

We conclude that our analysis, which splits the negative force off from the exceptive *que*, is compatible with the general facts about French negation.

3.1.3 Splitting the Sufficiency Modal Construction Now, in the SMC, a necessity modal intervenes between the negation and the QUE-phrase.

(64) NEG ≻ necessity ≻ QUE

[19] Pollock also points out that this view is supported by the fact that in his speech it is *pas* that can be dropped with certain modals.

(i) Je ne {peux, saurais} dire qui a eu cette idée pour la première fois.
I NE {can, would know} say who has had this idea for the first time
'I {cannot, would not be able to} say who had this idea for the first time.'

The QUE-phrase here would be an existential quantifier over verb phrase meanings ''other than'' going to the North End. We expect the following interpretation:

(65) (To get good cheese), it is not necessary that you do something other than going to the North End.

Or in other words ($\neg \Box \exists \equiv \Diamond \neg \exists$), as in (66).

(66) In some worlds where you get good cheese, there is nothing you do other than going to the North End.

This sounds right.[20] Time to wrap up? Unfortunately, not yet.

3.1.4 The Prejacent Problem, Again We still need to consider the presuppositional part of the meaning of *only*/NEG + EXCEPTIVE. Consider again the simple sentence (56), repeated here:

(56) Je n'ai vu que Jean.

With what we have said so far, this sentence would mean that I saw nobody other than Jean. But (56) says more than that. The sentence reliably conveys that I saw Jean, not just that I saw nobody other than him (which might have left it open whether I saw him or not). In this, (56) behaves just like an analogous *only*-sentence.

(67) I only saw John.

As we showed earlier, the part of the meaning of (67) that conveys that I, in fact, saw John (not just that I didn't see anybody other than him) is attributed to a presuppositional component of the meaning of *only*. We should then try to apply the same move to (56) to get this sentence to convey that I saw Jean. But once we have that result, we will need to see whether the Prejacent Problem is still present. That is, once the exceptive triggers a presupposition, is the fact that we have a split structure enough to prevent the Prejacent Problem from arising?

We will look at two options from the literature about the relevant presupposition of *only*: Horn's (1969) and (1996) analyses, already touched on in sections 2.2 and 2.3. We will apply each in turn to the NEG + EXCEPTIVE construction and to the SMC.

Option A is strong presupposition, as proposed in Horn 1969.

(68) (QUE Jean) P
A(ssertion): $\exists y(y \neq \text{Jean} \ \& \ P(y) = 1)$
P(resupposition): $P(\text{Jean}) = 1$

[20] To make sure this is indeed right, we have to be clear about what it means for something to be ''other than'' going to the North End. First of all, it is logically impossible to go to the North End without incurring some other properties as well, such as changing position. As is familiar from the semantics of *only* (see, e.g., von Fintel 1997 for a summary), such entailed properties do not count as ''other.'' But beyond that, going to the North End to get good cheese may also involve entering one of the many stores there, something that is not entailed by going to the North End but would still count as ''part of'' going there and thus shouldn't count as ''other'' either. We suspect that the notion of lumping, which has proved useful in the semantics of *only* (again see von Fintel 1997), could be appealed to here as well. We leave the obvious moves to the reader's imagination. (We discuss similar issues in footnote 22.)

Under this analysis, (56) presupposes that I saw Jean and asserts that I didn't see anybody other than Jean. This sounds right. But the question now is what happens to the presupposition in the SMC, where we have a modal to complicate matters.

To answer that question, we need to establish what happens to presuppositions under modals in general. Consider an example involving the existence presupposition triggered by a definite possessive phrase.

(69) To attend this dinner, you don't have to bring your campaign donation (you can mail it in afterwards).

To the naïve ear, it sounds as if (69) either (a) presupposes that the addressee will give a donation anyway or (b) presupposes that to attend the dinner, it is part of the requirements that the addressee make a donation. Most theories of presupposition will deliver one or both of those readings. A straightforward analysis in the Karttunen/Stalnaker/Heim tradition, for example, will deliver the second presupposition, but will make space for additional inferences yielding the first presupposition.

By analogy, then we would predict that the structure in (70)

(70) NEG $\succ$ necessity $\succ$ QUE (go to the North End)

will either (a) presuppose that you do go to the North End (anyway) or (b) presuppose that to achieve the goal you *have to* go to the North End.

That is not a good prediction. It is clear that the sentence can be uttered without presupposing that you go to the North End anyway. And the second presupposition is also undesirable, another instance of the Prejacent Problem: we don't want to derive that going to the North End is a necessary condition, as this is clearly not what (70) conveys.[21]

[21] Is there wiggle room within option A (Horn 1969)?

Perhaps the presupposition that you go to the North End is *accommodated* into the restriction of the modal; that is, it becomes part of the understood domain restriction of the modal. Incorporating a presupposition into the restrictor of an operator is a process often referred to as ''local'' or ''intermediate'' accommodation and is discussed in some detail in Berman 1991 and Kratzer 1995. What would we get if we incorporated the presupposition that you go to the North End into the restrictor of the modal? We would get that the worlds quantified over are assumed to be just the worlds where you go to the North End, narrowing the claim. (55) would then be interpreted as follows:

(i) In the worlds where you go to the North End, to get good cheese, you don't have to do anything other than going to the North End.

If we could incorporate the presupposition into the restrictor of the modal, deriving (i), we could have our cake and eat it too, so to speak, because the assertion would be that you don't have to do anything other than going to the North End in the worlds where you go to the North End. Our problem is that we do not feel comfortable with this process of incorporating the presupposition into the restrictor of an operator—not just for the case of the SMC but in general.

In fact, local accommodation into a quantifier restriction has been a matter of dispute (see, e.g., Geurts and Van der Sandt 1999, Beaver 2001, von Fintel 2004, for discussion). Here is a simple example, taken from von Fintel 2004, that shows what can go wrong with incorporating presuppositions into the restrictor of an operator. Consider the following sentence:

(ii) Every man loves his wife.

This sentence presupposes that we quantify over a domain in which all men are married; otherwise, the sentence suffers from presupposition failure. In other words, (ii) makes sense only if we can make it be about married men only. Under

So let's try *option B*: weaker presupposition as proposed in Horn 1996. As discussed briefly in section 2.3, in this newer proposal the presupposition of *only p* is not that the prejacent *p* is true but that there is some relevant alternative (not necessarily *p*) that is true. Transposed to NEG + EXCEPTIVE, this would give the analysis in (71).

(71) (QUE Jean) P
A: $\exists y(y \neq \text{Jean} \ \& \ P(y) = 1)$
P: $\exists x(P(x) = 1)$

As we noted before, in unembedded cases, this weaker presupposition makes no new predictions. The assertion and the weaker presupposition together entail that the prejacent is true.[22]

(72) Je n'ai vu que Jean.
A: I did not see anybody other than Jean.
P: I saw someone.
⇒ I saw Jean.

But significantly different predictions arise when embedding operators are present. Consider what we predict for the SMC.

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the process of local accommodation (whereby presuppositions are incorporated into the restrictor), (ii) would be equivalent to (iii).

(iii) Every man who has a wife loves his wife.

But are (ii) and (iii) in fact equivalent? They are not. Contrast the following two pairs:

(iv) a. Not every player on the team is married.
b. #But everyone loves their spouse.

(v) a. Not every player on the team is married.
b. But everyone who is married loves their spouse.

If (ii) and (iii) were equivalent, as the process of local accommodation would have it, then we would predict, contrary to fact, that there should be no difference in the discourses in (iv) and (v). Since there is a clear difference, (ii) and (iii) are not equivalent. For reasons like these, we cannot appeal to the process of local accommodation in the SMC with a clear conscience. We would prefer to do without this mechanism. This means that we cannot appeal to Horn's (1969) presupposition of *only* to derive what we want, since we would need local accommodation to obtain our goal.

[22] This is not entirely true as it stands. Take a sentence like (i).

(i) I didn't see anybody other than John and Peter.

This together with the presupposition that the speaker saw someone does not entail that the speaker saw John *and* Peter—instead, it entails only that the speaker saw John *and/or* Peter. The problem lies in the fact that we have to understand ''other than'' as really meaning nonoverlap and not nonidentity. Otherwise, *I didn't see anybody other than John and Peter* would entail that the speaker didn't see John and didn't see Peter, which would obviously be absurd. But this then means that *I didn't see anybody other than John and Peter* is actually compatible with the speaker's seeing just Peter—perhaps not the best kind of prediction. We might solve this problem by adding considerations about quantity implicature to the mix. A speaker who has only seen John should say *I didn't see anybody other than John* rather than *I didn't see anybody other than John and Peter* because the former is a stronger statement than the latter. We'll live with this fix and leave it open whether implicature considerations could be used in place of presuppositions in other places in our analysis—a topic that is of course the focus of much work on *only*.

(73) Tu n'as qu'à aller au North End.
A: In some of the good-cheese worlds, you don't do anything other than going to the North End.
P: In all of the good-cheese worlds, you do something.

Now we have finally avoided the Prejacent Problem. We no longer predict that you have to go to the North End. The presupposition is the weak (and surely trivial) claim that to get good cheese, you have to do something.[23]

So, what we are left with is the assertion that in some worlds where you get good cheese, you do something—but not anything other than going to the North End (i.e., not anything that is not part of going to the North End). In other words, going to the North End is a sufficient but not necessary way of getting good cheese.

Let us spell this out one more time. We assume that a sentence like *He didn't see anyone other than John* presupposes that he saw someone and asserts that there is nobody distinct from John that he saw. Taking the presupposition and the assertion together, we can infer that he saw John. Now, the SMC claims that *you don't have to do anything other than go to the North End*. This presupposes that you have to do something and asserts that it is not the case that in all of the worlds you do something other than going to the North End. From this, it cannot be inferred that in all of the worlds you go to the North End. The prejacent cannot be inferred. The reason is that we have split the scope of NEG and QUE across the universal modal.

So it seems that by accepting Horn's (1996) presupposition for *only* and transposing it to NEG + EXCEPTIVE, we get exactly what we want in the SMC.[24] But we are not done yet. We still

[23] The *LI* reviewer asks whether this characterization of the presupposition (that you have to do something to get good cheese) is in fact adequate in light of examples such as these:

(i) To make your way up in this organization, you only have to sit perfectly still and do absolutely nothing.

(ii) To be eligible for this job, you only have to have an IQ of 40 and an intimate personal relationship with the boss.

The reviewer's idea is that (i) explicitly asserts that you don't have to do anything. We reply that you are told that you have to sit still, which is doing something, albeit not something very dynamic. In (ii), the notion of ''doing'' is perhaps even less obviously applicable. In any case, using the concept of ''doing'' is a possibly misleading artifact of our informal paraphrase of the official semantics. Formally, the presupposition is truly trivial: that in all of the worlds where the goal is achieved, *you have some property or other*.

[24] Not all exceptives can appear in the particular form of the SMC we have been using. Greek has two exceptives, *para* (which is what we have been using so far) and *ektos*. If we replace *para* with *ektos* in our examples, ungrammaticality results.

(i) . . . *dhen echis ektos na pas sto North End.
NEG have EXCEPT NA go to.the North End

Similarly in French, the exceptives *sauf* and *à part* cannot replace *que*.

(ii) a. . . . *tu n'as sauf aller au North End.
b. . . . *tu n'as à part aller au North End.

The same question arises for all the other languages that we have seen employing NEG + EXCEPTIVE in the SMC. That is, all of these languages have more than one exceptive word, yet only one of them is used in the SMC. Why would this be? The answer, it turns out, is the same for all languages for which it arises: the exceptives that are good in the forms

need to talk about the languages that form the SMC with *only*. We'll get to that soon. First we need to address another possible concern.

3.1.5 Intervention Note that we have split the SMC into three different operators: NEG ≻ necessity ≻ ''something other than.'' We would not have derived the desired result if we had treated the NEG + EXCEPTIVE construction as an indivisible logical element meaning 'nothing other than'. In our analysis, the negation and the existential ''exceptive'' are separable.[25] But we also said that the relation between negation and QUE is an NPI-like licensing relation. One might think that there is a contradiction here. The NPI-licensing relation is known to be subject to intervention effects, originally captured in Linebarger's (1980) Immediate Scope Constraint.

Consider (74), for example.

(74) Mary didn't wear any earrings at every party.

Reading 1: There is no particular earring Mary wore at every party. (NEG ≻ NPI ≻ every)

Reading 2: At every party Mary wore no earrings. (every ≻ NEG ≻ NPI)

Reading 3: Not at every party were there any earrings Mary wore. (*NEG ≻ every ≻ NPI)

Note that while the relative scope of *every* and NEG + NPI is variable in (74), reading 3 (where

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of the SMC we have considered so far can all occur ''hostless.'' The host of an exceptive is the quantifier that the exceptive operates on (von Fintel 1993). In (iii), the italicized item is the host.

(iii) a. *Every boy* except John left.
b. *No boy* except John left.

The Greek exceptive *ektos* and the French exceptives *sauf* and *à part* can never be hostless, unlike *para* and *ne . . . que*.

(iv) Dhen irthe para o Yanis sto parti.
NEG came EXCEPT the Yanis to.the party
'Nobody came to the party except Yanis.'

(v) Dhen irthe *(kanenas) ektos apo ton Yani sto parti.
NEG came *(anyone) EXCEPT from the Yanis to.the party

(vi) Je n'ai vu que Jean.
I NE-have seen QUE Jean
'I have not seen anyone except Jean.'

(vii) Je n'ai vu *(personne) à part/sauf Jean.
I NE-have seen *(anyone) except Jean

This obviously raises the question whether we can construct an SMC with an exceptive that requires a host. This is indeed possible once we add a host.

(viii) An thes kalo tiri, dhen chriazete na kanis tipota alo ektos apo to na pas sto North End.
if want good cheese NEG need NA do anything other EXCEPT from the NA go to.the North End
'If you want good cheese, you do not need to do anything other except go to the North End.'

And it is possible even for English.

(ix) To get good cheese, you do not have to do anything other than go to the North End.

In other words, once we place more lexical material in the sentence, thereby permitting the appearance of a wider selection of exceptives, more languages can be put in the NEG + EXCEPTIVE category, though some residual issues remain. See von Fintel and Iatridou 2005 for more details on this.

[25] This is a crucial difference between our assumptions and those made by Dekydtspotter (1993).

the scope of negation and the NPI is split) is unavailable; that is, there is no reading where a scopal element takes scope in between negation and the NPI.

While Linebarger herself does not go into the question of why the Immediate Scope Constraint should hold, Guerzoni (to appear) argues that the constraint is an intervention effect at LF, similar to so-called Beck effects (Beck 1996). In particular, NPI licensing is a relation that needs to be checked locally, either by quantifier-raising the NPI to its licenser or by covertly moving a feature from the NPI to its licenser. Logical operators such as the universal quantifier *every party* act as barriers for feature movement, which means that the NPI needs to quantifier-raise to its licenser. This explains why in examples such as (74), NEG + NPI acts as one semantic unit.

Now it should be clear that our analysis might look problematic. We crucially assume that the necessity modal in the SMC has logical scope between negation and the existential exceptive QUE-phrase. One might have thought that this contradicts the Immediate Scope Constraint. However, we would like to show that modal operators do not behave as interveners for the NPI-licensing relation. Consider:

(75) You didn't have to bring anything.

Note that (75) means that it was not necessary for you to bring something. It does not mean merely that there was nothing that it was necessary for you to bring. The latter could have been true while it was also true that you had to bring something (without it mattering what in particular you brought). In other words, (75) does have the stronger meaning that results from the scopal order negation $\succ$ necessity $\succ$ *anything*.

So, modals do not block the NPI-licensing relation and our conclusion in this section is not imperiled by concerns about the Immediate Scope Constraint.[26]

3.2 The Only *Languages*

3.2.1 Decomposing Only In the previous sections, we investigated the SMC in what we have called the NEG + EXCEPTIVE languages. Now it is time to turn to what we have called the *only* languages, exemplified here with English.

[26] In Guerzoni's terms, this means that feature movement is possible across a modal from an NPI to its licenser, without the NPI having to take scope over the modal.

It is interesting to explore for a moment whether modals serve as ''Beck interveners'' or not. We suspect that they don't there either. In fact, Pesetsky (2000) discusses a relevant set of examples (his (99), p. 61).

(i) *Intervention effect with* not—*nonsubjects*
a. Which issue should I not discuss ____ with which diplomat?
b. ??Which diplomat should I not discuss which issue with ____ ?
[cf. *Which diplomat should I discuss which issue with* ____ ?]

For Pesetsky, the crucial point here is that negation in (ib) blocks the pair-list reading for the example, because it prevents the in-situ *wh*-phrase from raising at LF. He presents a minimal contrast without negation to show that the pair-list reading emerges without any problem. What is important here is that the example without an intervention effect still contains a deontic *should*, which obviously does not induce an intervention effect, even though it is a quantificational element under standard semantic analyses.

We refrain from speculating about what the fact of the nonintervening nature of modals has to contribute to existing analyses of intervention effects.

(76) If you want good cheese, you only have to go to the North End.

In linguistics, it's thrilling to be able to claim that two groups of languages are basically alike in areas where they look dissimilar at the surface. So let's try to see if we can make it happen here.

Recall that in the NEG + EXCEPTIVE languages, the SMC contains the following scopal order of three elements:

(77) NEG $\succ$ modal $\succ$ ($\exists$ other than)

On the other hand, the *only* languages contain only two elements: the modal and *only*. We noted earlier that only the modals that take scope under negation can appear in the SMC. Presuming that *only* is affective enough (in Klima's (1964) sense), this would mean that the scopal order of *only* and the modal would have to be as follows:

(78) only $\succ$ modal

But still, (78) is a far cry from (77). Moreover, simply being ''affective'' is not enough to bring about an SMC reading, since not all affective elements can pull it off. The following cases lack an SMC reading, even though the modal appears in environments where NPIs are licensed:

(79) a. Everybody who has to go to the North End . . .
b. You can get good cheese without having to go to the North End.

So (78), as it stands, doesn't quite do the job. What we will propose is that *only* should be decomposed into two elements: a negation and the quantificational element ''$\exists$ other than.'' Such a decomposition clearly fits the garden-variety environments of *only*.

(80) Only John was in the room.
P: Someone was in the room.
A: It's not the case that there was someone other than John in the room.

Decomposing *only* in this way will bring us a bit closer to assimilating the *only* languages to the NEG + EXCEPTIVE languages, since now we will have three elements to play with. That is, instead of (78), we have (81).

(81) (NEG + $\exists$ other than) $\succ$ modal

Unfortunately, we still face one of our biggest hurdles, namely, the Prejacent Problem. Consider our initial SMC, repeated in (82). With the decomposition of *only* that we are contemplating, (82) would be equivalent to (83), given the scopal order in (81).

(82) . . . you only have to go to the North End.

(83) . . . there is nothing other than [go to the North End] that you have to do.

But the Prejacent Problem raises its not-so-pretty head again, since (83) entails that you have to go to the North End—a meaning component that is wrong for the SMC, given that the SMC says that going to the North End is a sufficient, not a necessary, condition to get good cheese.

So what do we need to do? The answer is, in a way, simple: we need to make the *only* languages look exactly like the NEG + EXCEPTIVE languages. That is, it's not enough to decompose *only* into two elements; we also have to split its scope. We have to turn (78)/(81) into (84).

(84) NEG $\succ$ modal $\succ \exists$ other than

This will make the *only* languages identical to what the NEG + EXCEPTIVE languages wear on their sleeve, and it will make the Prejacent Problem go away.

But is it possible to decompose an element and split its scope? We address this question next.[27]

3.2.2 Negative Split Since Jacobs 1980, there has been discussion of a phenomenon widely known as *negative split*. The general idea is that a negative determiner like *no* splits into two elements, negation and an existential quantifier, with negation always taking wider scope than the quantifier.

(85) no = NEG + $\exists$

The reason it is even suspected that *no* should be decomposed like this is that sometimes the two elements can be seen as taking scope across another scopal element, which means that the scope of *no* has ''split.''

(86) NEG $\succ$ scopal element $\succ \exists$

Much of the literature on negative split focuses on Dutch and German.[28] To illustrate the phenomenon, we start by borrowing from the discussion by Rullmann (1995), whose work represents the ''lexical decomposition'' approach to negative split.[29]

According to Rullmann, Dutch has an incorporation rule of the type proposed by Klima, as in (87).

(87) niet (NEG) + $\text{Det}_{\text{indef}} \Rightarrow$ geen

[27] We should note that while we show in what follows that it makes sense to allow *only* to split, there are some open issues. First, note that splitting will have to be obligatory with goal-oriented modals, since our paradigm sentence cannot be read as requiring one to go to the North End, if one wants good cheese. Second, splitting will have to be impossible with deontic modals, as we show in von Fintel and Iatridou 2005:sec. 5.5.

[28] Only limited negative splitting has been reported in English (Larson, Den Dikken, and Ludlow 1997, Potts 2000; see also Heim 2001, although Heim does not end up endorsing a split-based analysis). Here is an English example where the scopal element in question would be a modal.

(i) I need no secretary. (ambiguous)

(ii) I need to have no secretary.

(iii) NEG I need [$\exists$ (secretary) λx.PRO to have x]

If we are right about the proper analysis of the SMC in *only* languages involving a scope split of *only*, we can add another item to the catalogue of negative split phenomena, one that English fully participates in.

[29] See Geurts 1996 and de Swart 2000 for approaches based on higher-type entities, and Penka and von Stechow 2001 for an approach based on an abstract negation. Also see Penka and Zeijlstra 2005.

Rullmann is not explicit about the specifics of this incorporation, but he says that at LF the two elements can be separated from each other again. When the two elements go their separate ways at LF, we get negative split. We will be glossing *geen* with English *no*, without making any claims about the splittability of English *no*.

Negative split can happen and result in negation taking scope over a modal element, with $\text{Det}_{\text{indef}}$ taking scope under this same modal element. Consider, for example, the Dutch universal modal *hoeven*, which must take scope under negation, because of its NPI-like nature (for this reason we gloss it with *need*, the closest that English has to an NPI modal). As a result, (88) cannot mean (89).

(88) Ze hoeven geen verpleegkundige te onstlaan.
they need no nurse to fire

(89) It is necessary that they fire no nurse.

One way to get *hoeven* to take scope under negation is the reading in (90).

(90) For no nurse *x* does the following hold: it is necessary that they fire *x*.

This is indeed a possible reading of (88), and it can be truthfully uttered in a context where it was claimed that there might be a specific nurse who has to be fired. According to reading (90), there is no such specific nurse. But by far the most salient reading of (88) is the one that asserts this:

(91) It is not necessary that they fire a nurse.

In this reading, the scopal relations are negation $\succ$ modal $\succ$ $\text{Det}_{\text{indef}}$. For this reading to be possible, *geen* must have undergone negative split.

Another type of negative split example possible in Dutch and German depends on the fact that in these languages (as in English), sentential negation that surfaces to the right of a universally quantified subject can take scope over the subject (under the right conditions; see Büring 1997). Here is an example from German:

(92) Jeder Arzt ist nicht anwesend.
every doctor is not present
'Not every doctor is present.'

We can now set up examples with negative split where negation takes scope over the universally quantified subject while the indefinite determiner takes scope below it.

(93) Jeder Arzt hat kein Auto.
every doctor has no car
'Not every doctor has a car.'

We would like to remain agnostic about the actual mechanics of negative split. What is important here is that the phenomenon exists and that another negative-like element—namely, *only*—can reasonably be described as undergoing it.

3.2.3 Negative Split of Only In section 3.2.1, we proposed that the scope of *only* splits, as evidenced by this element's behavior in the SMC. This move also permitted us to assimilate the *only* languages to the NEG + EXCEPTIVE languages. We suggested that this was part of a larger phenomenon, often referred to as ''negative split.'' In section 3.2.2, we presented some of the basic relevant data and gave an example of one type of approach that has been suggested. In this section, we return to discussing in more detail the ''splitting-*only* hypothesis.''

Can we find more evidence that *only* splits in the way we suggest? One problem with finding incontrovertible evidence is that in many environments, *only* and its associate can take sentential scope with the same meaning that splitting *only* would yield. Consider for example the modal element *may*, which is ambiguous between an epistemic and a deontic reading.

(94) a. He may be home by now. (epistemic)
b. He may go to the movies. (deontic; permission)

On its epistemic use, *may* takes scope over negation, while on its deontic use, it takes scope under negation.

(95) a. He may not be home. may ≻ not
b. He may not go to the movies. not ≻ may

When we place *only* in a sentence with *may*, then if *only* did split, we would predict the following scopal orders:

(96) a. When *may* is epistemic: may ≻ not ≻ other than
b. When *may* is deontic: not ≻ may ≻ other than

This is indeed what we find.

(97) a. Epistemic: He may only have one arm. may ≻ NEG ≻ other than
b. Deontic: He may only have one cookie. NEG ≻ may ≻ other than

Unfortunately, we cannot take this as uncontroversial evidence that *only* splits. The reason is that *only one* could be raising at LF. It would be able to raise above deontic *may*, yielding (98).

(98) only one λ*n* may (he have *n*-many cookies)

However, it would not be able to raise above epistemic *may*, with which it could therefore create only (99).

(99) may (only one λ*n* he have *n*-many arms)

Obviously, these are the same readings that the splitting-*only* hypothesis predicts and so we cannot take their existence as evidence for the hypothesis. One could push the splitting hypothesis by saying that in order to account for the contrast in (97) without splitting *only*, we would have to postulate an additional stipulation that unsplit *only* + Det cannot take scope over epistemic *may*, whereas the splitting hypothesis would just reduce that restriction to the fact that negation cannot take scope over epistemic *may*. So the argument would boil down to the question of whether we

can restrict the movement of unsplit *only* over epistemic *may* by virtue of *only*'s ''negative content at large'' or whether the very existence of the restriction is the result of *only* splitting into negation (which, we know independently, cannot take scope over epistemic *may*) and an additional element. Since we do not consider this occasion appropriate to pursue either approach, we will limit ourselves to the position that the facts in (97) are certainly compatible with the hypothesis that *only* splits, but do not constitute uncontroversial evidence for it.[30]

On the other hand, there appear to be some outright difficulties for the splitting-*only* hypothesis. We noted earlier that elements like German *kein* and Dutch *geen* can split and take scope over a universal quantifier in subject position.

(100) Jeder Arzt hat kein Auto.
every doctor has no car
'Not every doctor has a car.'

If *only* and its counterparts split, then we would expect *maar* and *nur* to split in the following cases and bring about a reading where negation takes scope over the universal quantifier and ''other than'' takes scope under it.

(101) Iedereen heeft maar één auto.
everyone has only one car

(102) Jeder Arzt hat nur ein Auto.
every doctor has only one car

That is, we would expect the scopal order negation $\succ$ universal $\succ$ ''other than,'' which means that (101)/(102) would be predicted to mean (103).[31]

(103) Not everyone/every doctor has other/more than one car.

The problem is that this reading is not available. The Dutch and German sentences have only the nonsplit reading according to which everyone/every doctor has only one car. Is this fatal for the splitting-*only* hypothesis?

To answer this, we must first go back to the NEG + EXCEPTIVE languages, where the elements making up *only*, so to speak, are separate items. In both Greek and French, negation can take scope over a universal quantifier in the subject when we are dealing with plain sentential negation.

(104) Oli i anthropi dhen echun aftokinito.
all the people NEG have car
'It's not the case that all people have cars.' NEG $\succ$ universal

(105) Tout le monde n'a pas une voiture.
all the world NE-has PAS a car
'Not everyone has a car.'

[30] Of course, if there were reasons to doubt the possibility of *only* and the numeral taking scope outside the sentence together as one unit, then our splitting hypothesis would provide a good way to account for the facts.

[31] Note that when *other than* compares numbers, it means the same as *more than*.

(106) Tout le monde ne veut pas partir.
all the world NE wants PAS leave
'Not everyone wants to leave.'

However, when we are dealing with the negation that is part of the Greek *dhen . . . para* construction or the French *ne . . . que* construction, negation cannot take scope over a quantifier in subject position.

(107) Oli i anthropi dhen echun para ena aftokinito.
all the people NEG have EXCEPT one car
'All the people have only one car.' universal ≻ NEG

(108) Kathe kathigitis dhen echi para enan voitho.
every professor NEG has EXCEPT one assistant
'Every professor has only one assistant.' universal ≻ NEG

(109) Tout le monde n'a qu'une voiture.
all the world NE-has QUE-one car
'Everyone has only one car.' universal ≻ NEG

(110) Tout le monde ne voit que des oiseaux.
all the world NE sees QUE of.the birds
'Everyone sees only birds.' universal ≻ NEG

(111) Tout le monde ne veut que partir.
all the world NE wants QUE leave
'Everyone only wants to leave.'/
'Everyone wants only to leave.' universal ≻ NEG

If negation could have scope over the subject quantifier, then sentence (109), for example, could have the reading 'It is not the case that everyone has more/other than one car'. And (110) could mean 'It is not the case that everyone sees more/other than birds'. But these readings are clearly unavailable.

So here is where we are: We proposed the splitting-*only* hypothesis. But then we saw that *only* does not split in environments where negative split (or just wide scope of negation) is easily available. However, it turns out that in NEG + EXCEPTIVE languages, even though negation can in general take scope over a quantified subject, negation cannot take scope over a quantified subject when it (negation) is part of the NEG + EXCEPTIVE construction. This means that the fact that *only* cannot split across a quantified subject is not an argument against the splitting-*only* hypothesis, since ''naturally decomposed'' *only*—namely, NEG + EXCEPTIVE—cannot split across a quantified subject either, even in languages where negation otherwise can take scope over a quantified subject. In short, the facts are not fatal to the splitting-*only* hypothesis.

Let us see what else we can learn from this picture. Why would negation not be able to be separated from the exceptive phrase? That is, why is (112) impossible?

(112) *NEG ≻ quantifier ≻ QUE

Note that this question is the same for both the *only* and the NEG + EXCEPTIVE languages.

Actually, we have already seen the explanation for the impossibility of (112): in section 3.1.5, we proposed that the reason is that the QUE-phrase is (or contains) an NPI ($\exists_{NPI}$ ''other than'') and that (112) is unacceptable because of an intervention effect (an instance of Linebarger's (1980) Immediate Scope Constraint).

The natural extension of what we said about NEG + EXCEPTIVE then is that the reason that *only* does not split across a universal subject is that one of the elements that *only* splits into (namely, $\exists_{NPI}$ ''other than'') is an NPI. For this reason, it cannot be separated from its licensing negation by the intervening universal quantifier.

An additional argument that *only* does not split across a quantified subject because of an intervention effect on NPI licensing comes from the following facts, which do not involve splitting. We have shown many times so far that negation can take scope over a quantified subject. It turns out that this is not possible when the VP contains an NPI.

(113) a. Everyone didn't leave. NEG $\succ$ universal
b. ?Everyone didn't eat anything. universal $\succ$ NEG

(114) a. Everyone has not been to Paris. NEG $\succ$ universal
b. ?Everyone has not ever been to Paris. universal $\succ$ NEG

In fact, for quite a few speakers the effect is even stronger in that the (b) variants are degraded sentences. This presumably means that for these speakers, sentential negation really prefers to take scope over the quantified subject, and when this conflicts with the licensing of an NPI, the sentence becomes unacceptable.

The same facts hold in German.

(115) Jeder Student ist nicht gekommen.
every student is not come
'Not every student came.' NEG $\succ$ universal
(universal $\succ$ NEG also possible)

(116) Jeder Student hat nicht mit der Wimper gezuckt.
every student has not with the eyelash twitched
'Every student failed to bat an eyelash.' universal $\succ$ NEG

In other words, even in environments where negation can take scope over a quantifier subject, a quantifier cannot separate negation from the NPI. So the fact that *only* cannot split across a universal quantifier subject is not evidence that *only* does not split; rather, it is the result of the fact that one of the elements that *only* splits into is an NPI. As we showed, the very same facts hold in NEG + EXCEPTIVE languages.[32]

[32] Recall from section 3.1 that the relation between NEG and the NPI QUE-phrase is not disrupted by modals. In other words, modals do not create intervention effects for NPI licensing, including the NEG-QUE relation.

We would like to add to this the reinforcing observation that again the two groups of languages behave alike since in the NEG + EXCEPTIVE languages as well, a modal can separate negation and the *que/para*-phrase.

(i) NEG $\succ$ modal $\succ$ *que/para*

We are now done presenting our proposal that *only* splits in the SMC and that therefore the *only* languages and the NEG + EXCEPTIVE languages do the same job the same way at LF.[33] We are thus also done with solving the compositionality puzzle for both kinds of languages.[34]

4 Sufficiency, Easiness, and More

Having presented our solution to the compositionality puzzle raised by the SMC, we will now address three points that arise.

In the proposal we are developing, the difference would have to mean that unlike quantifiers, modals do not cause intervention effects for NPI licensing. And this is indeed so:

(ii) You do not need to bring anything to my party. NEG ≻ need ≻ NPI

(iii) O Yanis dhen chriazete na fai tipota.
the Yanis NEG needs NA eat anything
'Yanis does not need to eat anything.' NEG ≻ need ≻ NPI

(iv) Du brauchst nicht mit der Wimper zu zucken.
you need not with the eyelash to twitch
'You don't need to bat an eyelash.' NEG ≻ need ≻ NPI

(v) Du brauchst nichts zur Party mitbringen.
you need nothing to.the party with.bring
'You don't need to bring anything to the party.' NEG ≻ need ≻ NPI

(vi) Jeder Student hat nichts mitgebracht.
every student has nothing with.brought
'Every student brought nothing.' *NEG ≻ every ≻ NPI

Sentences (v) and (vi) show that negation and NPI ''anything'' can be amalgamated into *nichts*, which can split across a modal but not a quantifier, which is exactly what we argue to be the case for *only* as well. We cannot pursue the interesting typology of split constructions further, but would like to sum up by saying that because of the differential intervention effects, we will have to distinguish the NPI-licensing-type splitting of *only* and *nichts* from the more liberal splitting of *kein*/*geen*.

[33] The *LI* reviewer points out a possible connection between our *only*-splitting proposal and Paul Postal's unpublished recent work on the representation of NPIs in general (Postal splits a negation off the NPI and raises that negation covertly; see Szabolcsi 2004 for a précis of Postal's work). The reviewer also points out that our analysis leaves it open exactly how *only* + XP triggers negative inversion in English (as in *Only one book has he read: the Bible*). We agree that these are interesting connections and issues to explore.

[34] We have discussed two methods of forming the SMC: with NEG + EXCEPTIVE–type elements and with *only*. Some languages (e.g., Spanish) can use both methods. Some languages choose one method and some the other. We have not found a language that has NEG + EXCEPTIVE but does not use it in the SMC. On the other hand, we have found languages (at least Greek, French, and Romanian) that are unable to use *only* in the SMC even though they have elements that at least apparently translate as *only*. Why would a language be unable to form the SMC with its counterpart of *only*? Cleo Condoravdi (pers. comm.) suggests that the crucial difference between Greek, which does not use its *only* to construct an SMC, and English, which does, is that the Greek counterpart of *only* is not truly scalar, whereas English *only*, itself, is. This difference can be seen in the following sentences; the English one is acceptable but the Greek one is not.

(i) #O Yanis arjise na ksekinisi ke ji' afto eftase mono stis 11 m.m.
the Yanis was late start and for this arrived only at 11 p.m.
'Yanis was late getting started and that's why he only arrived at 11 p.m.'

In the English sentence, the use of *only* conveys that 11 is late. On the contrary, no such thing happens in Greek. The Greek sentence is somewhat nonsensical, as it conveys that the only time at which Yanis arrived was 11 p.m.

There is a topological parallel.

(ii) O Yanis erchete apo tin Kalifornia me to treno. Ala aftin tin stigmi ine mono sto Chicago. Dhen
the Yanis comes from the California with the train but this the moment is only in.the Chicago NEG
tha ftasi eggeros ya ton gamo.
FUT arrive on.time for the wedding

4.1 Sufficiency?

We have called our construction the sufficiency modal construction, but a careful look at our semantics will reveal that we do not seem to give it a sufficiency semantics, in the customary logical sense of *sufficiency*.[35] In logical parlance, ϕ is a sufficient condition for ψ iff whenever ϕ is true, ψ will also be true.

So let us look again at our paradigm example. We say that *To get good cheese, you only have to go to the North End* means that in *some* of the worlds where you get good cheese, nothing other than you going to the North End happens. This is a far cry from saying that whenever you go to the North End, you get good cheese. In the following subsections, we will explore the fact that our semantics falls short of logical sufficiency, and we will suggest that our semantics does in fact capture the meaning of the SMC correctly (and also that it is not completely misleading to call it a sufficiency construction).

4.1.1 Additional Requirements First of all, our semantics captures the obvious fact that just going to the North End won't do for getting good cheese. You will have to enter a store, pick out some cheese, pay for it, and so on. This is covered by treating those additional required actions as not ''other than'' going to the North End—that is, as natural parts of going to the North End. We submit that it is right that our semantics does not deliver logical sufficiency here.

We would like to point out that even examples that use expressions that explicitly introduce the notion of sufficiency do not convey logical sufficiency. We find that the following variants of our sentence still do not convey that going to the North End is by itself logically sufficient for getting good cheese:

(117) To get good cheese, it is enough to go to the North End.

(118) To get good cheese, it suffices/it is sufficient to go to the North End.

'Yanis is coming from California by train. At this point, he is only in Chicago. He will not arrive in time for the wedding.'

Greek appears to have evaluative uses of its *only*, but Condoravdi points out that this is possible only with items that are scalar by themselves ('She is only 4 years old', 'He is only a soldier', etc.). Condoravdi's suggestion may well point to the crucial difference between languages that build an SMC with *only* and those that cannot.

But things are even more mysterious because at least in Greek, while its *only* cannot form an SMC with the possessive modal, it can do so with the equivalent of *need*. And there is a further complication that appears when an SMC is constructed in a relative. Greek, as noted earlier, cannot form an SMC with the possessive modal and *mono* 'only'.

(iii) * . . . echis mono na pas sto North End.
have.2SG only NA go to.the North End

However, in a DP, this attempt succeeds with no problem.

(iv) . . . to mono (pragma) pu echis na kanis ine na pas sto North End.
the only (thing) that have.2SG NA do is NA go to.the North End
' . . . the only thing you have to do is go to the North End.'

Since we cannot explore the SMC in DPs in the current context, we will have to leave the contrast between (iii) and (iv) as a mystery for now, as well.

[35] This feature of our analysis was highlighted as a potential problem by Janneke Huitink. We thank her for her comments.

In the end, this should not be surprising. Natural language expressions rarely correspond in their meanings to the stripped-down meanings that simple logical systems traffic in. Since these explicit expressions of sufficiency have the same meaning as our SMC, we conclude that we did not misname the sufficiency modal construction, even though the meaning it carries does not convey logical sufficiency.

4.1.2 Causal Conjunction By the way, we have found that the causal conjunction variant of the SMC seems to convey something much closer to logical sufficiency. Consider the following contrasts:

(119) If you want to learn what Morris is working on, you only have to go to the Stata Center.

(120) To find out what Morris is working on, you only have to go to the Stata Center.

(121) You only have to go to the Stata Center and you will find out what Morris is working on.

There is a difference in meaning between (119)/(120) on the one hand and the causal conjunction in (121) on the other. In (119)/(120), you can go to the Stata Center without necessarily finding out what Morris is working on—because you would have to take some obvious additional steps, asking someone about Morris for example. On the other hand, in the causal conjunction (121), going to the Stata Center will bring about the inescapable result of learning what Morris is working on. The sentence conveys that by the very fact of setting foot inside the Stata Center, you will learn what Morris is working on—because everybody is talking about it or because there is a huge sign on the wall or for some other reason. That is, going to the Stata Center will immediately cause you to learn what Morris is working on.

We have to admit that we do not know precisely how the causal conjunction variant of the SMC acquires this meaning, a meaning that is so much closer to logical sufficiency than the other variants. We leave this to (our) future research on the conjunction variant.

4.1.3 That's Enough There remains a concern. Our semantics seems to fail to match the intuitive meaning of the SMC because it seems to be compatible with there being worlds where you go to the North End *and* do all the other obvious actions but still don't get good cheese. Saying that some good-cheese worlds are worlds where you go to the North End (and do the obvious right things) does not entail that *all* of the worlds where you go to the North End (and do the right things) are worlds where you get good cheese. But the latter does seem to be what the SMC conveys.

Actually, we would like to argue that our semantics does deliver the stronger meaning, against first appearances. The reason is that the worlds we are quantifying over are all supposed to be the same as far as the relevant circumstances are concerned. That is, all the relevant conditions in these worlds are the same as in the evaluation world. So, if in some of the worlds going to the North End (and doing the right things) leads to getting good cheese, then it will do so in all of the worlds. In other words, for this kind of modality, existential and universal force collapse into the same meaning.

Let us illustrate this point. Imagine that to get to a certain island, one can either take a ferry, or swim across the channel, or cross the new and very convenient bridge. So, we would be likely to say that these days *to get to the island, you only have to cross the new bridge*. According to our semantics, this claims that in some of the accessible worlds (where therefore the geographical circumstances and so on are the same as in the actual world) where you get to the island, you do nothing other than taking the new bridge. Is it now conceivable that there are worlds where you cross the bridge but do not get to the island? No, as long as geography (etc.) remains constant, crossing the bridge does take you to the island.

This line of thought predicts that one could express the meaning of the SMC with an existential teleological modal. We think that this is correct. Consider:

(122) If you want good cheese, you can (just) go to the North End.

We submit that (122) has the same meaning as our paradigm sentence.

A thorough and more formal investigation of these issues must await a future occasion.

4.2 Easiness

At the outset of the article, we noted that one of the components of the meaning of the SMC is ''easiness.'' Consider our paradigm example again:

(123) To get good cheese, you only have to go to the North End.

Roughly, (123) is uttered in order to convey that getting good cheese in Boston is easy. How is this achieved? We will argue that the easiness of the ''suggested means'' (going to the North End) is derived morphosyntactically and that the easiness of the ''stated goal'' (getting good cheese) is achieved indirectly: if p is a way of achieving q and p is easy, this means that q is easy. That is, if the means to achieve a goal are easily accessible, then the goal is easily achieved. This means that if going to the North End enables you to get good cheese and if going to the North End is easy, perforce getting good cheese is easy.

Both the NEG + EXCEPTIVE and *only*-constructions have ''diminishing'' functions outside the SMC; that is, they are associated with a scale and their focus is low on the relevant scale. To illustrate with English, French, Greek, and Irish:

(124) He is only a soldier.

(125) Il n'est que soldat.
he NE-is QUE soldier

(126) Dhen ine para stratiotis.
NEG is EXCEPT soldier

(127) Níl ann ach saighdiúir.
NEG + is in.him but soldier
'He is only a soldier.'/'He is nothing but a soldier.'

So it is not surprising that items like NEG + EXCEPTIVE and *only* create an easiness implicature

when they appear in the SMC, by picking an element low on a scale—let us say, a scale of effort.[36]

What are the elements on this scale of effort? Is it the stated goal as compared with other goals? Is it the suggested means as compared with other means to achieve the stated goal? Is it the suggested means as compared with other possible actions in the world (i.e., not just compared with actions that achieve the same goal)?

The semantic composition we are proposing dictates that the easiness/effort scale ranks the suggested means compared with other possible actions in the world and not compared with other actions that achieve the stated goal. In our analysis, we assign the following compositional structure:

(128) (To achieve stated goal), NEG have to do ∃ *P* other than suggested means.

The suggested means is available as early as the lowest component of the analysis (namely, the ''other than'' component) comes in. If easiness were sensitive to the stated goal, the easiness effect would have to be associated in a mysterious way with the entire construction.

So we argue that the SMC marks the suggested action as easy per se and not just as relatively easy compared with other ways of achieving the goal. To see this, consider the following example:

(129) To get the Nobel Prize, you only have to find the cure for cancer.

Let us assume that finding the cure for cancer is, in fact, a way of getting the Nobel Prize. Let us also assume that among the different ways there are to get the Nobel Prize, finding the cure for cancer is the easiest. So, if the SMC just required the sufficient action to be *relatively* easy, (129) should be unremarkable. But it certainly feels ''funny,'' precisely because we all know that finding the cure for cancer *isn't* easy. So, we take this to mean that the sufficient action is marked as easy per se by the construction. At the same time, we would probably not judge (129) as false in the scenario we sketched. Thus, easiness is not a truth-conditional entailment of the SMC but something like an implicature.

One more argument for this position (that easiness is not just comparing the suggested action with other actions that aim for the same goal) is this. A scale has to contain more than one item, as it provides a comparative ranking. So, constructions that rely on a nontrivial scale will ''complain'' if there is only one member in the scale. Thus, we find sentences like *You are my tallest son*, spoken to a single offspring, anomalous. Now, imagine that there is only one way to achieve a particular goal. That is, imagine for (130) that there is no other way to enter the room and for (131) that there is no other way to reach the island.

(130) If you want to get into that room, you only have to open that door.

[36] In fact, we might suspect that it is the common ''other than'' ingredient that creates the easiness effect. Note that the effect seems to persist in a periphrastic version of the SMC.

(i) If you want good cheese, you don't have to do anything other than go to the North End.

(131) To get to that island, you only have to take a half-hour ferry ride.[37]

In the above contexts (when there is no other way to enter the room or to reach the island), these sentences are still fine. They are fine because the scales contain opening a door and taking a short ferry ride among the many other things that one can do in the world. If they contained single-element scales of comparison, they would be odd—therefore, we know that the scales in fact do not contain the one way to get to the room or the one way to get to the island.[38]

4.3 More Than

The analysis we have developed here is this:

(132) (To get good cheese,) you NEG have to QUE go to the North End.
P: In all of the worlds where you get good cheese, you do something.
A: In some of the worlds where you get good cheese, it is not the case that you do something other than going to the North End.

For a number of reasons, one might think that instead of using ''other than'' in the semantics of NEG + EXCEPTIVE, we could or should use ''more than.'' For one thing, the SMC seems to rate the ways of achieving the goal and zero in on the easiest, least-effort-involving way. For another, Spanish uses exactly the words 'more than': *màs que*.

(133) No tienes màs que ir al North End.
NEG have.to.2SG more than go to.the North End

Similarly, an English paraphrase with *more than* does not seem appreciably different in meaning from the SMC.

(134) (To get good cheese,) you don't have to do more than go to the North End.

While French *que* certainly does not correspond to ''more'' in an obvious way, it is tempting to think that it is in fact the same ''than'' morpheme that appears in *plus que* 'more than'.[39]

[37] With a simple change, this example can be turned into one that makes the same point as the Nobel Prize example.

(i) To get to that island, you only have to take a three-day ferry ride.

[38] Pranav Anand and Valentine Hacquard, independently, have urged us to consider scenarios like this one. Imagine that we live in a town where good bread, made in artisanal bakeries, is outrageously overpriced, at say $10 per loaf. Now, in the grand scheme of things $10 is not a large amount of money. But *for bread*, it is a lot. Now consider:

(i) To get good bread in this town, you only have to pay $10.

It seems that (i) is odd, even though paying $10 is not that hard in general. So, somehow the stated goal appears to be available in the rating of the suggested means, contrary to what we have been suggesting in this section. What we would like to point out is that just as (i) is odd, so is (ii).

(ii) [Returning from the bakery:] I only paid $10.

We suspect that the ''goal'' can be pragmatically available even though it is not compositionally available (unless we resort to an ellipsis analysis and argue that the sentence is really *I only paid $10 for the bread*).

[39] Similar considerations might apply to Greek *para*.

So, should we reframe the SMC as involving ''more than'' in its semantics? What we would be considering is a semantics like this:

(135) (To get good cheese,) you NEG have to EXCEPTIVE go to the North End.
P: In all of the worlds where you get good cheese, you do something.
A: In some of the worlds where you get good cheese, it is not the case that you do something *more than* going to the North End.

To evaluate the proposal, we need to be clear about what it would mean for something to be ''more than'' going to the North End. The obvious idea is that what we are comparing are amounts of effort. Something is more than going to the North End iff it involves more effort. With that assumption in place, what does (135) amount to?

Note that for now, we are assuming that the presupposition of ''more than'' would be the same existential presupposition that we posited for ''other than.'' But then the assertion is too weak to ensure that going to the North End is a way of getting good cheese. Imagine (counterfactually, thankfully) that there is no good cheese in the North End and imagine (truthfully, according to *Boston* magazine) that the best cheese shop in the Boston area is the Whole Foods Market in Cambridge. Since going to the North End involves more effort than going to the Whole Foods Market a few blocks from our house, it will be true that in some of the worlds where you get good cheese (namely, the ones where you go to Whole Foods), you don't do anything more than going to the North End—in fact, you do something *less than* going to the North End. In this situation, then, (135) would be predicted to be true. That's not good. The SMC certainly claims that going to the North End is a way of getting good cheese and shouldn't come out true when it isn't.

The diagnosis, in other words, is that the semantics in (135) says that going to the North End is a measure of effort that is at least as high as the easiest way of getting good cheese. It does not at all demand that going to the North End itself is a way of getting good cheese.

What could we do to fix this serious shortcoming of (135) as an analysis of the SMC? We could go back to positing a stronger presupposition: namely, that ''you do something more than go to the North End'' presupposes that you go to the North End. Then, we could combine this with the intermediate-accommodation proposal we considered in footnote 21 to produce the following analysis:

(136) (To get good cheese,) you NEG have to EXCEPTIVE go to the North End.
P: In all of the contextually selected worlds where you get good cheese, you go to the North End.
A: In some of the worlds where you go to the North End and get good cheese, it is not the case that you do something *more than* going to the North End.

This proposal has at least two problems: (a) it relies on the dubious mechanism of intermediate accommodation, and (b) it is not obvious that ''more than'' carries such a strong presupposition. We already gave reasons for not relying on intermediate accommodation in footnote 21. Let us therefore elaborate on the second problem.

Imagine two friends arguing about their workload during the preparations for a big event.

(137) A: Look! I did a lot of work. I got all the catering figured out.
B: OK, but I did more than figuring out the catering. I got us two very recalcitrant keynote speakers.

There does not seem to be any problem here: B is not claiming (or presupposing) that he got two speakers *in addition to* doing the catering; he's just saying that his contribution involved more effort than the catering. So, ''more than'' doesn't seem to come with the strong presupposition that was assumed in (136).[40]

We could therefore conclude that using ''more than'' as an alternative to ''other than'' in the semantics for the SMC is not feasible. But there is one further consideration: why does Spanish use *màs que* in the SMC and why does the English paraphrase with *more than* at least *sound* like an adequate rendering of the SMC?

We suspect that in the end, it may turn out that ''more than'' here means exactly the same as ''other than'': namely, that for *p* to be more than *q*, it has to be the case that *p* is not part of *q*. In a part-whole hierarchy of actions, one could say that ''other than'' and ''more than'' amount to the same notion.

As support for this suggestion, consider (138).

(138) No vio màs que à Juan.
NEG saw.1SG more than PARTICLE Juan
'I saw only Juan.'

This sentence has no meaning that I saw nobody heavier than Juan, or any other, more run-of-the-mill comparative meaning. *Màs que* here simply has the normal exceptive meaning, and we suspect it does in the SMC as well.

5 Conclusion

An unremarkable-sounding sentence (*To get good cheese, you only have to go to the North End*) has turned out to involve an intricate interaction among negation, exceptives, and modals. We have argued that only an analysis that splits *only* into two ingredients and assigns those differential scope with respect to the goal-oriented modal will be able to give the construction a compositional semantics. The fact that this finally quite complex construction appears in so many languages continues to be puzzling. We hope that future research will further our understanding of this phenomenon.

[40] It might be possible to wriggle out of this quandary. Perhaps ''more than'' has two meanings, the one in (137) where it has at most the weak presupposition that something was done and another one where it has a stronger presupposition. But we will not pursue this further.

References

Azoulay-Vicente, Avigail. 1988. La syntaxe de *ne . . . que*. *Lingvisticæ Investigationes* 12:205–233.

Beaver, David. 2001. *Presupposition and assertion in dynamic semantics*. Stanford, Calif.: CSLI Publications.

Bech, Gunnar. 1955/57. *Studien über das deutsche Verbum Infinitum*. Copenhagen: Det Kongelige Danske Akademie av Videnskaberne.

Beck, Sigrid. 1996. Quantified structures as barriers for LF movement. *Natural Language Semantics* 4: 1–56.

Beck, Sigrid, and Hotze Rullmann. 1999. A flexible approach to exhaustivity in questions. *Natural Language Semantics* 7:249–298.

Berman, Steve. 1991. On the semantics and logical form of *wh*-clauses. Doctoral dissertation, University of Massachusetts, Amherst.

Bhatt, Rajesh. 1997. Obligation and possession. In *Papers from the UPenn/MIT Roundtable on Argument Structure and Aspect*, ed. by Heidi Harley, 21–40. MIT Working Papers in Linguistics 32. Cambridge, Mass.: MIT, Department of Linguistics and Philosophy, MITWPL.

Büring, Daniel. 1997. The great scope inversion conspiracy. *Linguistics and Philosophy* 20:175–194.

Cormack, Annabel, and Neil Smith. 2002. Modals and negation in English. In *Modality and its interaction with the verbal system*, ed. by Sjef Barbiers, Frits Beukema, and Wim van der Wurff, 133–163. Amsterdam: John Benjamins.

Dekydtspotter, Laurent Pierre Aimé. 1993. The syntax and semantics of the French *ne que* construction. In *Semantics and Linguistic Theory (SALT) 3*, ed. by Utpal Lahiri and Adam Zachary Wyner, 38–56. Ithaca, N.Y.: Cornell University, CLC Publications.

von Fintel, Kai. 1993. Exceptive constructions. *Natural Language Semantics* 1:123–148.

von Fintel, Kai. 1997. Bare plurals, bare conditionals, and *only*. *Journal of Semantics* 14:1–56. Preprint available at web.mit.edu/fintel/www.only.pdf.

von Fintel, Kai. 2004. Comments on Beaver: Presupposition accommodation and quantifier domains. In *Context-dependence in the analysis of linguistic meaning*, ed. by Hans Kamp and Barbara Partee, 405–410. Amsterdam: Elsevier.

von Fintel, Kai, and Sabine Iatridou. 2004. What to do if you want to go to Harlem: Notes on anankastic conditionals and related matters. Ms., MIT, Cambridge, Mass. Available at web.mit.edu/fintel/www/harlem/pdf.

von Fintel, Kai, and Sabine Iatridou. 2005. Anatomy of a modal. In *New work on modality*, ed. by Jon Gajewski, Valentine Hacquard, Bernard Nickel, and Seth Yalcin, 63–121. MIT Working Papers in Linguistics 51. Cambridge, Mass.: MIT, Department of Linguistics and Philosophy, MITWPL.

Gajewski, Jon. 2004. Raising exceptions. In *WCCFL 23*, ed. by Vineeta Chand, Ann Kelleher, Angelo J. Rodríguez, and Benjamin Schemeiser, 209–222. Somerville, Mass.: Cascadilla Press.

Geurts, Bart. 1996. On *no*. *Journal of Semantics* 13:67–86.

Geurts, Bart, and Rob van der Sandt. 1999. Domain restriction. In *Focus*, ed. by Peter Bosch and Rob van der Sandt, 268–292. Cambridge: Cambridge University Press.

Giannakidou, Anastasia. 2002. *Until*, aspect, and negation: A novel argument for two *until*s. In *Semantics and Linguistic Theory (SALT) 12*, ed. by Brendan Jackson, 84–103. Ithaca, N.Y.: Cornell University, CLC Publications.

Guerzoni, Elena. To appear. Intervention effects on NPIs and feature movement: Towards a unified account of intervention. *Natural Language Semantics*.

Heim, Irene. 2001. Degree operators and scope. In *Audiatur vox sapientiae: A festschrift for Arnim von Stechow*, ed. by Caroline Féry and Wolfgang Sternefeld, 214–239. Berlin: Akademie Verlag.

Horn, Laurence R. 1969. A presuppositional approach to *only* and *even*. In *Papers from the Fifth Regional*

Meeting of the Chicago Linguistic Society, ed. by Robert I. Binnick, Alice Davison, Georgia M. Green, and Jerry L. Morgan, 98–107. Chicago: University of Chicago, Chicago Linguistic Society.

Horn, Laurence R. 1996. Exclusive company: *Only* and the dynamics of vertical inference. *Journal of Semantics* 13:1–40.

Huitink, Janneke. 2005. Anankastic conditionals and salient goals. In *Proceedings of Sinn und Bedeutung 9*, ed. by Emar Maier, Corien Bary, and Janneke Huitink, 140–154. Available at www.ru.nl/ncs/sub9/sub9proceedings.pdf.

Jacobs, Joachim. 1980. Lexical decomposition in Montague Grammar. *Theoretical Linguistics* 7:121–136.

Klima, Edward S. 1964. Negation in English. In *The structure of language*, ed. by Jerry Fodor and Jerrold J. Katz, 246–323. Englewood Cliffs, N.J.: Prentice-Hall.

Kratzer, Angelika. 1981. The notional category of modality. In *Words, worlds, and contexts: New approaches in word semantics*, ed. by Hans J. Eikmeyer and Hannes Rieser, 38–74. Berlin: Walter de Gruyter.

Kratzer, Angelika. 1991. Modality. In *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*, ed. by Arnim von Stechow and Dieter Wunderlich, 639–650. Berlin: Walter de Gruyter.

Kratzer, Angelika. 1995. Stage-level and individual-level predicates. In *The generic book*, ed. by Gregory N. Carlson and Francis Jeffry Pelletier, 125–175. Chicago: University of Chicago Press.

Larson, Richard K., Marcel den Dikken, and Peter Ludlow. 1997. Intensional transitive verbs and abstract clausal complementation. Ms., SUNY at Stony Brook and Vrije Universiteit Amsterdam. Available at semlab5.sbs.sunysb.edu/~rlarson/itv.pdf.

Linebarger, Marcia. 1980. The grammar of negative polarity. Doctoral dissertation, MIT, Cambridge, Mass.

Nissenbaum, Jon. 2005. Kissing Pedro Martinez: (Existential) anankastic conditionals and rationale clauses. In *Semantics and Linguistic Theory (SALT) 15*, ed. by Effi Georgala and Jonathan Howell. Ithaca, N.Y.: Cornell University, CLC Publications.

Penka, Doris, and Arnim von Stechow. 2001. Negative Indefinita unter Modalverben. In *Modalität und Modalverben im Deutschen*, ed. by Reimar Müller and Marga Reis, *Linguistische Berichte*, Sonderheft 9. Also available at vivaldi.sfs.nphil.uni-tuebingen.de/~arnim10/Aufsaetze/Nwoerter.pdf.

Penka, Doris, and Hedde Zeijlstra. 2005. Negative indefinites in Dutch and German. Ms., University of Tübingen. Available at ling.auf.net/lingbuzz/000192.

Pesetsky, David. 2000. *Phrasal movement and its kin.* Cambridge, Mass.: MIT Press.

Picallo, M. Carme. 1990. Modal verbs in Catalan. *Natural Language and Linguistic Theory* 8:285–312.

Pollock, Jean-Yves. 1989. Verb movement, Universal Grammar, and the structure of IP. *Linguistic Inquiry* 20:365–424.

Potts, Christopher. 2000. When even *no*'s neg is splitsville. Available at ling.ucsc.edu/Jorge/index.html (*Jorge Hankamer WebFest*).

Rooth, Mats. 1985. Association with focus. Doctoral dissertation, University of Massachusetts, Amherst.

Rullmann, Hotze. 1995. Geen eenheid. *TaBu: Bulletin voor Taalwetenschap* 25:194–197. Preprint available at odur.let.rug.nl/~zwart/docs/tabu95_4.pdf.

Sæbø, Kjell Johan. 2001. Necessary conditions in a natural language. In *Audiatur vox sapientiae: A festschrift for Arnim von Stechow*, ed. by Caroline Féry and Wolfgang Sternefeld, 427–449. Berlin: Akademie Verlag. Preprint available at vivaldi.sfs.nphil.uni-tuebingen.de/~arnim10/Festschrift/Saeboe-8-komplett%20fertig.pdf.

Stechow, Arnim von. 2004. Modale und Konditionale. Lecture notes from a course given at the University of Vienna. Available at www2.sfs.uni-tuebingen.de/~arnim10/Handouts/Modalitaet.pdf.

Stechow, Arnim von, Sveta Krasikova, and Doris Penka. 2006. Anankastic conditionals again. In *A festschrift for Kjell Johan Sæbø—in partial fulfilment of the requirements for the celebration of his 50th birthday*, ed. by Torgrim Solstad, Atle Grønn, and Dag Haug, 151–171. Oslo: University of Oslo. Available at folk.uio.no/torgriso/fs/files/stechowetal.pdf.

Swart, Henriëtte de. 2000. Scope ambiguities with negative quantifiers. In *Reference and anaphoric relations*, ed. by Klaus von Heusinger and Urs Egli, 118–142. Dordrecht: Kluwer. Preprint available at www.ilg.uni-stuttgart.de/vonHeusinger/publications/ftp/rar_pdf/swart.pdf.

Szabolcsi, Anna. 2004. Positive polarity—negative polarity. *Natural Language and Linguistic Theory* 22: 409–452.

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How to Say *Ought* in Foreign: The Composition of Weak Necessity Modals

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Abstract In this article[1], we draw attention to the fact that what English expresses by the use of the weak necessity modal *ought*, many other languages express by

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[1] This paper has been presented at the workshop "Time and Modality: A Round Table on Tense, Mood, and Modality", Paris, December 2005, at a CUNY linguistics colloquium in May 2006, and at the 6th Workshop on Formal Linguistics in Florianópolis, Brazil, August 2006. We thank the audiences at those presentations, in particular Orin Percus, Tim Stowell, Marcel den Dikken, Anna Szabolcsi, Chris Warnasch, Roberta Pires de Oliveira, Renato Miguel Basso, and Ana Müller. We thank Noam Chomsky, Cleo Condoravdi, and Irene Heim for very helpful conversations about this material. We thank Bridget Copley for sharing with us her recent manuscript "What *Should* Should

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combining a strong necessity modal with the morphology that appears in the consequent of a counterfactual conditional. On the hypothesis that there should be a compositional form-to-meaning mapping, we explore the semantics of weak necessity modals and propose how to derive this semantics from the combination of a strong necessity modal and counterfactual marking. Specifically, building on the semantics for weak necessity modals proposed by Sloman, we propose that weak necessity modals are the result of the promotion of a secondary ordering source of a strong necessity modal. This meta-linguistic operation is signaled or effected by counterfactual marking. The fact that it is a strong necessity modal that is counterfactually marked crosslinguistically, shows that even with weak necessity modals the quantificational force is universal.

Key words: Modals, epistemic, deontic, goal-oriented, counterfactuals, wishes, ordering source

> Of all the differences between man and the lower animals, the moral sense or conscience is by far the most important. . . . [I]t is summed up in that short, but imperious word *ought*, so full of high significance.
>
> Charles Darwin, *Descent of Man*

1 A Basic Contrast

Consider the following sign, posted at a summer camp on Cape Cod:

(1) After using the bathroom, everybody ought to wash their hands; employees have to.

From (1), we see that there is a distinction to be made between *ought* on the one hand and *have to* on the other. How can *ought* and *have to* contrast like this? What distinguishes them? Or for that matter, what distinguishes *ought* from *must*, which patterns like *have to*, as (2) shows?

Mean" (Copley, 2006), which was written independently of our work on *ought*. We have already learned a lot from her paper and we plan to address some of her observations and proposals in a future version of this paper. We are also grateful to all of our informants, who are individually acknowledged in the text. Thanks to Noam Chomsky for suggesting the epigraph and thanks to Larry Horn for drawing our attention to the *New Yorker* cartoon*. Any comments are welcome. Mistakes are each other's.

*Cartoon from the *New Yorker* of July 31, 2006, printed with permission of the *New Yorker*.

(2) Everybody ought to wash their hands; employees must.

An intuition that many researchers have tried to capture is that *ought* (as well as its near equivalent *should*, about which we remain officially agnostic for the purposes of this paper[2]) is somehow weaker than *have to/must*. Some evidence for this relative weakness comes from the fact that (3) is not a contradiction while the examples in (4) are[3]:

(3) You ought to do the dishes but you don't have to.[4]

(4) a. #You have to do the dishes but you don't have to.
b. #You must do the dishes but you don't have to.

A second piece of evidence for the relative weakness of *ought* comes from sequences like these:[5]

(5) a. You ought to wash your hands—in fact, you have to.
b. ??You have to wash your hands—in fact, you ought to.

Because of the apparent difference in weakness between *must/have to* and *ought*, *ought* is often referred to as a "weak necessity modal" (as opposed to "strong" necessity modals like *must* or *have to*).

This paper is an investigation into *ought* and the cross-linguistic expressions of this modal concept. Before we turn to the cross-linguistic facts, we will review some possible semantic analyses of weak necessity modals.

2 Weakness

As is customary in most linguistic work on modality, we adopt the basic framework proposed by Kratzer (1981, 1991). Modals quantify over a set of worlds that is calculated from a modal base of accessible worlds and an ordering source which ranks the worlds in the modal base. Different flavors of modality (epistemic, goal-oriented, deontic, etc.) come from the interplay and contextual resolution of modal base and ordering source. Let us call the worlds in the modal base that are most highly ranked by the ordering source the *favored worlds*. Let us also introduce the

[2] *Should* shows considerable similarities to *ought* but also some differences:

(i) It's strange that he should/*ought to do that.

[3] We are of course not the first ones to observe data like these. See for example, Wertheimer (1972: Chapter 3, "The Meaning of the Modals"), Jones and Pörn (1986), McNamara (1996, 2006).

[4] The use of *have to* instead of *must* is required in this context because only *have to* scopes under negation.

[5] We take this kind of example from Copley (2006).

term *prejacent*, first used by our medieval colleagues, to designate the proposition embedded under the modal.

How can the difference between strong and weak necessity modals be captured in this framework? One straightforward idea, inspired by Horn,[6] is that while strong necessity modals require the prejacent to be true in *all* of the favored worlds, weak necessity modals say that the prejacent is true in *most* of the favored worlds. We will not pursue this idea, for a couple of reasons.[7] First, we have some qualms about being able to "count" possible worlds in such a way as to make sense of saying that *most* of the worlds in a particular set have a certain property. More importantly, we don't think that the "most" analysis truly captures the meaning of weak necessity modals. We think that a sentence like *You ought to do the dishes* means not that among the favored worlds, most are worlds where you do the dishes. Rather, it means that among the favored worlds, all the very best ones are worlds where you do the dishes. That is, the *ought*-claim makes a further distinction as to how good particular worlds among the favored world are.

So, the central idea we would want to capture in a semantics for *ought* is this: *ought p* says that among the favored worlds, *p*-worlds are better than *non-p*-worlds.[8] That is the intuition we pursued in our paper on anankastic conditionals (von Fintel and Iatridou, 2005) for goal-oriented uses of strong and weak necessity modals. There, we were inspired by an early proposal by Sloman (1970), who wrote:

> For instance *If you want to get to London by noon, then you ought to go by train* picks out the best means without excluding the possibility of others, whereas *If you want to get to London by noon then you have to (must, will be obliged to etc.) go by train* implies that no other means exists. [p. 390f.]

In other words, Sloman proposes that *ought* says what is best, or better than all alternatives. On the other hand, *must* picks out the only candidate. For example, (6) says that in all the worlds in which your goal of going to Ashfield is achieved, you have used Route 2:

(6) To go to Ashfield you have to/must use Route 2.

This means that there is no other way of satisfying your goal of going to Ashfield.

On the other hand, when we use *ought*, what is conveyed is that there are several ways of going to Ashfield but that by some measure, Route 2 is the best:

(7) To go to Ashfield, you ought to use Route 2.

[6] Copley (2006) attributes the idea to Horn. In Horn's dissertation (Horn, 1972), weak necessity modals are characterized as occupying the same location on the scale of modal strength as *most* does on the scale of quantifiers.

[7] See Copley for another argument against the "most" analysis.

[8] We should note that Kratzer (1991) distinguishes between necessity and weak necessity as well. Her informal characterization is similar to ours: *p* is a weak necessity iff *p* is a better possibility than *not p*. The technical implementation is different from ours and crucially involves not accepting that there is always a set of most favored worlds (what is known as the *Limit Assumption* in the trade). It appears to us that if one makes the Limit Assumption, Kratzer's definitions collapse, leaving no distinction between simple necessity and weak necessity.

The way we proposed to implement Sloman's insight was to suggest that *must/have to* say that all worlds in the modal base where the goal is achieved are worlds where the prejacent is true, while *ought to/should* say that all worlds in the modal base where the goal is achieved *and which are optimal by an additional measure* are worlds where the prejacent is true. The weak necessity modals explicitly signal that a secondary measure was used to make further distinctions among the favored worlds.

Our conception of weak necessity then makes them universal/necessity modals just as much as strong necessity modals are. What makes them weaker semantically is that they have a smaller domain of quantification: strong necessity modals say that the prejacent is true in all of the favored worlds, while weak necessity modals say that the prejacent is true in all of the very best (by some additional measure) among the favored worlds.

In the terms of the Kratzerian framework, we suggested that weak necessity modals are in general sensitive to (at least) two ordering sources. In the goal-oriented case, the first ordering source is simply the goal proposition designated by an *(in order) to*-adjunct or an *if you want to*-anankastic conditional. The second, subsidiary ordering source contains considerations such as how fast, how comfortable, how cheap,... the means for achieving the goal are.

Weak necessity modals are used not just in goal-oriented modal claims, of course. There are epistemic uses and deontic uses:

(8) Morris ought to be in his office. (ambiguous between epistemic and deontic readings)

What are the additional ordering sources in epistemic and deontic cases? We propose that epistemic *ought* differs from epistemic *must/have to* in being sensitive not just to the hard and fast evidence available in a situation but also to a set of propositions that describe what is *normally* the case.[9] And in the deontic case, *ought* might be sensitive to less coercive sets of rules and principles in addition to the laws and regulations that strong necessity modals would be interpreted with respect to.[10,11]

[9] We should note that Kratzer suggested that even the strong epistemic necessity modals are sensitive to shakier assumptions. This was her attempt at explaining the apparent fact that *must p* seems weaker than a plain assertion of *p*. We are not entirely convinced that this is right. Perhaps, *must p* is in fact a strong necessity claim but marks that a deduction has occurred, while only a plain assertion of *p* is compatible with direct observation. This is something that is explored a little bit further by von Fintel and Gillies (2007).

[10] An intuition that deontic weak necessity goes with less coercive rules is laid out by Bybee et al. (1994), who write: "An examination of familiar and well-documented languages suggests that the major distinctions within obligation have to do with gradations of strength of the obligation: that is an obligation may be either strong or weak. If a weak obligation is not fulfilled, the consequences are not too serious; but the consequences of not fulfilling a strong obligation are much more severe. [...] English distinguishes strong obligation, expressed with *must* and *have to*, and weak obligation, expressed with *should*" [p. 186].

[11] It should be noted that the choice of what is a primary ordering source and what is a secondary ordering source is presumably not an accident. In the goal-oriented case we have the designated

There is obviously much more to be done before we would have a satisfactory theory of weak necessity and we won't be able to do much of that here. In this paper, our goal is to find some illumination from the way that many other languages express weak necessity.

3 The Crosslinguistic Picture

Does something like *ought* exist in other languages? (Note: For convenience, we will mostly be using capitalized "OUGHT" for the meaning of English *ought* and its equivalent in different languages. We will reserve "*ought*" for the English lexical item.)

It is not possible to answer the question of the cross-linguistic existence of OUGHT without providing a way to identify OUGHT cross-linguistically, that is, without providing essential ingredients of its meaning. We will try to identify OUGHT in other languages by trying to set up contrasts like those in (1) and (3). We will start with Greek[12]:

(9) **Tha eprepe** na plinis ta piata ala dhen ise ipexreomenos na to
FUT must+Past NA wash the dishes but NEG are obliged NA it
kanis
do
'You ought to do the dishes but you are not obliged to do it'

(10) #**prepi** na plinis ta piata ala dhen ise ipexreomenos na to kanis
must NA wash the dishes but NEG are obliged NA it do
'You must do the dishes but you are not obliged to do it'

(11) Oli **tha eprepe** na plenun ta cheria tus ala i servitori ine
All **FUT must+Past** NA wash the hands their but the waiters are
ipochreomeni na to kanun
obliged NA it do
'All ought to wash their hands but the waiters are obliged to do it'

(12) Oli **tha eprepe** na plenun ta cheria tus ala i servitori prepi
All **FUT must+PAST** NA wash the hands their but the waiters must
na ta plinun
NA them wash
'Everybody ought to wash their hands but waiters have to wash them'

goal and measures of ways of achieving it, in the epistemic case we have hard and fast evidence and guesswork based on unreliable assumptions about the normal course of events, and in the deontic case we have strict laws and less sanctionable codes of behavior.

[12] The item *na* that occurs in most of our examples from Greek is an INFL area particle, present in all the Balkan Sprachbund languages. Its nature is not relevant to us here. We simply gloss it as NA.

What we see as qualifying as OUGHT in Greek is the necessity modal *prepi* in the Past tense in combination with the Future, the undeclinable particle *tha*. In fact, we can see in (12) that the modal *prepi* appears twice, once as OUGHT and once as a strong necessity modal. In the absence of the additional morphology on *prepi* as in (10), the sentence in (9) becomes a contradiction.

This means that at least in Greek, the difference between weak and strong necessity is not marked by the choice between different lexical items but by the presence or absence of the Future + Past morphosyntax on one and the same modal (which in its simple form expresses strong necessity). What is this Future + Past combination? It is the morphology that appears on verbs in counterfactuals, specifically, in the consequent of counterfactual conditionals (from Iatridou (2000))[13]:

(13) An efevge simera tha eftane tin ali evdhomadha
if left today **FUT** arrive/**PAST/IMP** the other week
'If he left today, he would arrive next week'

(14) An ton iche xtipisi to aftokinito tha iche pethani
if him had hit the car **FUT** have+**PAST** died
'If the car had hit him he would have died'

The astonishing conclusion is that Greek OUGHT is *a strong necessity modal meaning 'must' augmented by counterfactual morphology*. (Henceforth, we will often use the abbreviation CF to refer to counterfactual morphology.)

Next let's consider French. Here are the sentences we are considering:

(15) Tu **devrais** faire la vaisselle, mais tu n'es pas obligé
you **must/COND** do the dishes but you not+are not obliged
'you ought to do the dishes but you are not obliged to do them'

(16) #Tu dois faire la vaisselle mais tu n'es pas obligé

(17) Tout le monde **devrait** se laver les mains mais les serveurs sont
everybody **must/COND** REFL wash the hands but the waiters are
obligés
obliged
'Everybody ought to wash their hands but the waiters have to'

The sentence that has OUGHT in its translation is (15). It is not a contradiction, unlike (16). In (15), the modal *devoir* has the morphology that is traditionally described as "conditional mood". This morphology is absent in (16). In (17), with the Conditional morphology, the distinction between OUGHT and strong necessity, namely between *devoir*+COND and plain *être obligé*, can be set up again.

[13] We can see in (14) that the verb in the counterfactual consequent is also carrying Imperfective morphology, a specification that is missing form the verb *prepi* in its guise as OUGHT. Imperfective morphology is indeed required in Greek counterfactuals (and in counterfactuals in many other languages). However, there are some (extremely few) verbs in Greek that are not specified for the Imperfective/Perfective distinction and *prepi* is one of them (the verb meaning *have* is another, as can be seen in (12)). Therefore, we will not consider the neutrality with respect to the imperfective/perfective distinction an impediment to the conclusion reached in the text.

Conditional Mood is what appears in the consequent of counterfactual conditionals in French:

(18) Il n'est pas soûl. Si il etait soûl, il **parlerait** plus fort
He not+is NEG drunk. If he were drunk he **talk/COND** more loud

Iatridou (2000) argues that Conditional mood in Romance is nothing but Past+Future combination, but this is not terribly important for us here. What is important is that the modal that means OUGHT in French carries the same morphology as the verb in a counterfactual consequent.

Spanish behaves just like French and Greek:

(19) **Deberia** limpiar los platos, pero no estoy obligado
Must+COND clean the dishes but not am obliged
'I ought to do the dishes but I am not obliged'

(20) **Tendria** que limpiar los platos, pero no estoy obligado
Have+COND COMPL clean the dishes but not am obliged
'I ought to do the dishes but I am not obliged to'

(21) #Tengo que limpiar los platos pero no estoy obligado
Have COMP clean the dishes but not am obliged

(22) No esta borracho. Si estuviera borracho, gritaria mas
Not is drunk if was/SUBJ drunk yell/COND more
'He is not drunk. If he were drunk he would yell more.'

In (19)/(20), we see that we can set up the by now familiar contrast without generating a contradiction when a necessity modal contains conditional morphology. Sentence (21) shows that in the absence of this morphology we do get a contradiction. Sentence (22) shows that the morphology in question is exactly what appears in a counterfactual consequent. Finally, (23) shows the other way of bringing out the contrast:

(23) Los alumnus de quinto **tendrian que/deberian** conocer la
The students of fifth **have/COND COMPL /must/COND** know the
historia pero los de sexto deben/tienen que conocerla
story but those of sixth must/have COMP know+it
'The students of 5th grade ought to know the story but those of 6th grade have to'.[14]

Outside of Romance and Greek, we find the same pattern in Slavic. First let us consider Russian.[15] In Russian, the morphology on the counterfactual antecedent is Past tense plus the element *byl*, which we will not gloss here.

[14] Karlos Arregi, who is the source of our Spanish data, reports that *deben* here is slightly dispreferred and *tienen* is the preferred option. It is unclear to him why this is so. He reports that overall, including contexts outside ours, he prefers to use *tener que* instead of *deber*.

[15] Russian provided by Tania Ionin.

(24) Esli by on byl p'jan, to on **by shumel**
if byl he was drunk then he **byl make-noise-Past-Imperf**
'If he was drunk, he would be making noise'

This is exactly the morphology we find when we try to set up OUGHT versus *must/have to* contrast. Unlike in the previous languages, here the modal element is participial (or adjectival) and the counterfactual morphology appears on the copula:

(25) Ty dolzhen **byl by** vymyt' posudu, no ty ne objazan
you required **be+PAST by** wash-Perf-Inf dishes but you not obligated
eto delat'
this do-Inf
'You ought to wash the dishes, but you don't have to do it'

And again, (25) is not a contradiction.

Next let us take a look at Croatian.[16] The CF-morphology is *bi* + participle:

(26) Da si pijan, više **bi vikao**
if are.2SG drunk more **would.2SG yelled.PCPL**
'If you were drunk, you would yell more.'

When we add the CF-morphology to the necessity modal, we get the meaning of OUGHT and lack of a contradiction in sentences like the following:

(27) **Morao bi** pospremiti sobu, ali na sreću ne moraš
must.PCPL would.2SG clear room but on luck not have.2SG
'You ought to tidy up your room, but luckily, you don't have to.'

In the absence of CF-morphology on the modal there is a contradiction:

(28) #Moraš pospremiti sobu, ali na sreću ne moraš
must clear room but on luck not have.2SG
'You have to tidy up your room, but luckily, you don't have to.'

And we can also set up the by now familiar contrast as in [17]

(29) Pučkoškolci **bi morali** znati algebru, ali
elem.school children **would.3PL must.PCPL** know algebra but
srednjoškolci je moraju znati.
high school children it must know
'Elementary school children ought to know algebra, but high school children have to know it.'

We find the same phenomenon in Germanic. Consider Dutch.[18] The Dutch counterfactual consequent contains the past tense of the verb *zullen*, which by itself (i.e. without the past tense) is used as a future marker. We will be glossing it with 'would', therefore, as this element can be seen as the past tense of *will*.

[16] Croatian provided by Martina Gracanin.

[17] *Bi* is a second position clitic, which results in the reversal in order of the participle and *bi*.

[18] Dutch data provided by Janneke Huitink.

(30) Als ik rijk was, **zou** ik stoppen met werken.
If I rich were, **would** I stop with work
'If I were rich I would stop working'

What happens when this counterfactual morphology combines with the modal necessity modal *moeten*? As expected, we get the meaning of *ought*, which does not cause a contradiction when juxtaposed with a negated necessity modal:

(31) Je **zou** eens Anna Karenina **moeten** lezen, maar het hoeft[19]
you **would** sometime AK **must** read but it must/NPI
niet
not

In the absence of the counterfactual morphology, the sentence is a contradiction:

(32) #Je moet AK lezen, maar het hoeft niet.
You must AK read, but it must/NPI not

And here is the other contrast:

(33) Iedereen zou Anna Karenina moeten lezen, en/maar mijn studenten
Everyone would AK must read and/but my students
moeten het lezen.
must it read
'Everyone should read AK and/but my students have to read it'

This is as good an occasion as any to point out that we are not claiming that all the world's weak necessity modals are formed by CF-marking on strong necessity modals. There are other ways to express weak necessity, in particular through dedicated lexical items, such as English *ought*. Dutch, for example, as pointed out to us by Marcel den Dikken (pc), has a modal *horen* that has as part of its lexical meaning weak necessity and it doesn't need CF-marking to convey that. The item is also lexically restricted to deontic uses, it cannot be used as an epistemic or goal-oriented modal.[20]

Let us add one more Germanic language to the picture, namely Icelandic[21]:

(34) Allir ættu að þvo sér um hendurnar
all.NOM.PL have.cf.3PL to wash.INF themselves at hands.the.ACC.PL
en starfsmenn eru skyldugir að gera það.
but employee.NOM.PL be.3PL obliged.NOM.PL to do.INF it
'Everyone ought to wash their hands, but employees are required to do so.'

[19] The verb *hoeven* is the form of the necessity modal when it scopes under negation. We gloss it there as *must/NPI*.

[20] Another language that uses both CF-marking on a strong necessity modal and a dedicated lexical item appears to be Swedish, as reported to us by Anna-Sara Malmgren (pc).

[21] We thank Jóhannes Gísli Jónsson and Chris Warnasch for providing us with these data.

(35) þú ættir að þvo upp en þú ert ekki
you.NOM have.cf.2SG to wash.INF up but you.NOM be.2SG not
skyldugur að gera það.
obliged.NOM.SG to do.INF it
'You ought to do the dishes, but you're not required to do them.'

(36) #þú átt að þvo upp en þú ert ekki
you.NOM have.2SG to wash.INF up but you.NOM be.2SG not
skyldugur að gera það.
obliged.NOM.SG to do.INF it
'#You have to do the dishes, but you're not required to do them.'

(37) Ef hann hreyfði sig meira þá væri hann ekki
if he.NOM move.cf.3SG himself more then be.cf.3SG he.NOM not
jafn þreyttur.
equally tired.NOM.SG
'If he were more active then he wouldn't be so tired.'

Outside Indo-European, we find the same phenomenon. Consider Hungarian.[22] In a counterfactual, the so-called 'conditional' morphology ***-na/-ne*** appears:

(38) Nem re'szeg. Ha re'szeg len-**ne**-0, hangos-abb-an
not drunk if drunk be-**cond**-pres,3sg loud-comp-adv
kiabal-**na**-0
shout-**cond**-pres,3sg

Then, as before, if we take the CF-morphology and place it on a necessity modal *kell*, we get exactly what we have seen so far.

(39) El **kell-ene-0** mosogat-n-od a ta'nye'r-ok-at, de nem
away **must-cond-3sg** wash-inf-2sg the dish-pl-acc but not
vagy musza'j
be-pres,2sg must
'You ought to / should wash the dishes, but you don't need to / but it's not necessary'

In the absence of the conditional morphology on the necessity modal the sentence is a contradiction:

(40) #El kell-3sg mosogat-n-od a ta'nye'r-ok-at, de nem vagy
away must-3sg wash-inf-2sg the dish-pl-acc but not be-pres,2sg
musza'j
must
'You must wash the dishes, but you don't need to / but it's not necessary'

[22] The Hungarian data were provided by Aniko Csirmaz. According to Anna Szabolcsi (pc), there may be an additional interesting fact in Hungarian: when the complement of OUGHT is stative, the situation is counterfactual, in that it cannot be changed anymore. When the complement is not stative, no such entailment/implicature arises. We were not able to duplicate this judgment with all of our informants, though.

And the other place where we have been seeing the contrast can also be set up:

(41) Az o:to:dik-es-ek-nek tud-ni-uk **kell-ene** ez-t a to:rte'net-et,
the fifth-adj-pl-dat know-inf-3pl **must-cond** this-acc the story-acc
de a hatodik-os-ok-nak musza'j / kell tud-ni-uk
but the sixth-adj-pl-dat must / must know-inf-3pl
'Fifth graders ought to / should know this story, but sixth graders must know it'

We conclude then that it is a cross-linguistically stable fact that the meaning of OUGHT can be conveyed with counterfactual morphology on a strong necessity modal.[23] In the perhaps illusory hope that we can get the semantics of OUGHT compositionally and transparently from the combination of counterfactuality with a strong necessity modal, we will from now on be using the term "transparent OUGHT" to refer to the strong necessity modal + CF-morphology that English *ought* translates into in languages like the above.

The next section addresses the question whether transparent OUGHT has the same range of modal flavors as English *ought* does.

4 Flavors

Which of the common modalities (deontic, epistemic etc.) can *ought*/OUGHT function as?

4.1 Epistemic Modality

Here is an example of *ought* in an epistemic use:

(42) It's 3pm. He ought to be in his office.

Let's say you are on your way to Morris's office, which is down the hall from mine, and ask me whether I think that Morris is in his office. Neither of us knows whether he is, in fact, there. Under those circumstances, I can utter (43).

(43) It's 3pm. Given what I know about Morris's habits, he ought to be in his office. Why don't you go check?

The same fact is also true for transparent OUGHT. Greek:

[23] In fact, historically, English fits this picture too. According to the OED and other sources— many thanks to Jay Jasanoff for discussion of these points—modal *ought* was the past indicative as well as the Past Subjunctive of the verb *owe* ('possess', one more case of a verb meaning "possession" becoming a modal) in the Old English period (700–1100). Later on, *ought* continued as the past subjunctive only, with the past indicative of *owe* continuing as *owed*.

(44) Ine 3. Tha'prepe na ine sto grafio tu. Pigene na dhis
'It is 3. He ought to be in his office. Go see.'

In short, both *ought* and transparent OUGHT can be used epistemically.

4.2 Goal-Oriented Modality

Next we go to *ought* as a goal-oriented modal. It seems uncontroversial that such a use is possible:

(45) To go to Ashfield, you ought to take Route 2.

We already discussed this case earlier. The best way to go to Ashfield is the one where some secondary goal is satisfied as well, e.g. avoiding traffic, or a having a scenic drive.

Here are some cases of goal-oriented transparent OUGHT:

(46) Pour traverser, tu devrais prendre ce bateau-ci
to cross, you must+CF take this boat

(47) Gia na perasis apenandi tha'prepe na chrisimopiisis aftin edho tin varka
in order to cross other side must+CF NA use this here the boat

4.3 Deontic Modality

In order to make certain that we are dealing with deontic *ought*/OUGHT, we can try to make the source of the obligation overt:

(48) ?According to the law, people convicted of stealing ought to go to prison

(49) ?Simfona me ton nomo, I kleftes tha'prepe na pane filaki (Greek)

(50) ?Segun la ley, un ladron deberia ir a la carcel
According-to the law, a thief must-COND go to the jail

How good are these sentences? We feel that there is something funny about them. The law does not speak like that.[24] A theory of *ought*/OUGHT will have to capture and explain the funniness of its use in deontic contexts like the ones above.

There are sentences that possibly come closer to showing that *ought* can appear as a deontic modal:

(51) You ought to do the dishes.

[24] Wertheimer (1972: pp. 116 and 120) makes the same observation.

(52) It ought to be the case that bullying is/be illegal.

Here, the two authors are disagreeing for the time being. One author thinks that she could spin an argument that such cases are not really deontic but goal-oriented, something like "to satisfy rules of politeness, you ought to do the dishes", etc.[25] The other author believes that he can see deontic *ought* as perfectly normal. The crucial point about *ought* is that it signals the existence of a secondary ordering source. When we report the content of one particular set of rules or principles,[26] a kind of megalomania occurs that makes that set of rules the only relevant ordering source and so *ought* becomes unusable. But as soon as we have more than one set of rules interacting, deontic *ought* is fine. We will not resolve this debate here. The reader is free to pick a side.

* * *

To conclude this section: We have seen that transparent OUGHT really seems to be very much the same as English *ought* semantically. The range of uses is entirely parallel, the conveyed meanings appear to be the same. We had a preliminary idea about the meaning of English *ought*: that it expresses weak necessity, plausibly construed along the lines suggested by Sloman. Now, it is time to face the music: if transparent OUGHT has the same meaning of weak necessity, how does that meaning arise from the combination of counterfactual marking and strong necessity?

5 Counterfactuality?

There is much that we could and should say about the morphosyntax, semantics, and pragmatics of CF-morphology, some of which both of us have done in the past (Iatridou, 2000; von Fintel, 1999). For now, we would like to stay at a fairly simple

[25] The idea that OUGHT is primarily a goal-oriented modal is also defended by Finlay in work in progress (Finlay, 2006).

[26] A side-remark on how the content of laws, rules, and regulations is commonly presented: from the perspective of Kratzer's framework, where ordering sources are given as sets of propositions, satisfaction of which is used to measure the position of a particular world on the ordering scale, one might expect something like this:

(i) The following is the law: there is no obstruction of driveways, anyone who obstructs a driveway pays a fine,...

The content of the law is a set of propositions that the world should ideally make true. Instead, what one usually finds is this:

(ii) The following is the law: there must be no obstruction of driveways, anyone who obstruct a driveway must pay a fine,...

That is, the law itself is presented using deontic modals. When you think about it, this is a curious kind of circularity. The solution is presumably that the modals used in the declaration of the law are performatively used. We'll leave this topic to another occasion or for other researchers.

and intuitive level. Counterfactual marking signals that some explicit or implicit assumption has taken us outside the "context set" in Stalnaker's sense. Consider a CF-marked conditional:

(53) If Peter were in the office, Mary would be happy.

The counterfactual marking could be there because it is taken for granted that Peter is not in his office (counterfactuality in the strict sense), or it could be merely because the speaker wants to admit the possibility that it is taken for granted that Peter is not in the office.

Now, in the transparent OUGHT construction, counterfactual marking occurs on a modalized sentence (where the modal is a strong necessity modal). The hope is, of course, that if we compose these two ingredients, the meaning of *ought* will arise. If this was an ideal world (one without compositionality puzzles—but what fun would that be?), every time we have a strong necessity modal with CF-morphology, the meaning of OUGHT would arise.

Unfortunately, or, fortunately, things are not that simple. When you think about it, having counterfactuality on top of an embedded modal should result in the claim that the modal claim holds not necessarily in the actual world but in some, possibly counterfactual, worlds that the higher operator takes us to. So, in our case we would predict that CF + strong necessity should claim that a strong necessity claim holds in some possibly counterfactual world, which is not what we wanted: we wanted as the result that a weak necessity claim holds in the actual world.

Interestingly, we find that English behaves exactly as we would have predicted. English has a strong necessity modal that can inflect and occur in an infinitival form, namely *have to*. This language also has CF-morphology, usually taken to be *would*. What we find now is that adding *would* on top of *have to* does not yield the meaning of a weak necessity OUGHT. Recall the environments in which we diagnosed OUGHT. In those we see that *ought* cannot be replaced by *would have to*:

(54) a. Everyone ought to wash their hands; employees must
b. *#[27] Everyone would have to wash their hands; employees must

(55) a. You ought to do the dishes but you are not obliged to do them.
b. *#You would have to do the dishes but you are not obliged to do them.

The same conclusion holds if we look at goal-oriented modality. Recall that a plain necessity modal like *have to* conveys that there is only one way to achieve one's goal, while *ought* conveys that there is more than one way to achieve the goal but that the suggested means is the best by some measure:

(56) a. To get to the island you have to use this boat.
b. To get to the island you ought to use this boat.

[27] We use the symbol "∗#" to avoid determining the nature of the inappropriateness.

If English had transparent OUGHT, that is, if the combination of necessity + CF always yielded OUGHT, then *would have to* should be able to convey what *ought* does. But it does not:

(57) To get to the island, you would have to use this boat.

(57) conveys that there is only one way to get to the island. That is, it patterns with *have to*, not *ought*.

In other words, English provides us with a case that shows that not every combination of necessity + CF yields OUGHT. It shows precisely the expected interpretation from such a combination. The string *would have to* talks about a necessity that obtains in a counterfactual world.[28] In the actual world, there is no modal advice, suggestion or obligation (we will refer to this meaning as WOULD HAVE TO):

(58) (If Fred had a car) he would have to register it.

(59) (If Fred wanted to get to the island) he would have to use this boat.

(60) (If the law were/was different) Fred would have to give up everything in the divorce.

On the other hand, when we use *ought*, the modal's force holds in the actual world:

(61) He ought to register the car.

(62) He ought to use this boat.

(63) Fred ought to give up everything in the divorce

Now, we come to the surprising phenomenon of transparent OUGHT. In the transparent languages, the exact same string is used in all of (58–60) and (61–63). The following examples are from Greek but the observation holds for the other languages as well:

(64) An o Fred iche aftokinito, **tha eprepe** na to
if the Fred had car, must+CF(=**WOULD HAVE TO**) NA it
dhilosi
register

(65) An o Fred ithele na pai sto nisi, **tha eprepe**
If the Fred wanted to go to-the island, must+CF(=**WOULD HAVE TO**)
na pari aftin tin varka
NA take this the boat

(66) An o nomos itan dhiaforetikos, o Fred **tha eprepe**
If the law were different, the Fred must+CF(=**WOULD HAVE TO**)
na parachorisi ta panda sto dhiazijio
NA give up everything in-the divorce

[28] Counterfactual epistemics have difficulties of their own, so we will stay away from them for now.

(67) o Fred **tha eprepe** na dhilosi to aftokinito
the Fred must+CF(=**OUGHT**) NA register the car

(68) o Fred **tha eprepe** na pari aftin tin varka
the Fred must+CF(=**OUGHT**) NA take this the boat

(69) o Fred **tha eprepe** na parachorisi ta panda sto dhiazijio
the Fred must+CF(=**OUGHT**) NA give up everything in-the divorce

In sentences (64–66), the modal relation holds in a counterfactual world. In (67–69), the modal relation holds in the actual world.

This, then, is the picture that emerges: In some languages (the ones we called "transparent OUGHT languages") the string necessity+CF has two meanings, that of a weak necessity modal in the actual world and that of a strong necessity modal in some counterfactual worlds. For convenience, we will refer to the interpretation in which the modal holds in the actual world as OUGHT. We will refer to the interpretation where the modal holds in the counterfactual world as WOULD HAVE TO.

English, on the other hand, has lexicalized the interpretation where the modal holds in the actual world into the item *ought*. In addition, the English string *would have to* unambiguously refers to the interpretation where the modal holds in a counterfactual world.

It would appear then that in the case of transparent OUGHT, counterfactual marking is not doing its usual job of marking that we are being taken to a counterfactual scenario. Instead, the modal claim continues to be made about the actual world and the effect of the marking is to weaken the strong necessity modal to a weak necessity modal. In the transparent languages, counterfactual marking has two uses in combination with a strong necessity modal: (i) saying that the strong necessity holds in a counterfactual scenario, (ii) saying that a weak necessity holds in the actual world. In English, counterfactual marking on a strong necessity modal only has use (i). To express use (ii), English resorts to the lexical item *ought*.

6 A Consolation and a Precedent

In the previous section we saw that not all combinations of strong necessity + CF yield the meaning OUGHT. For example, English *would have to* fails to yield such a reading. But the closer inspection to which the English case forced us, also made us realize that in the transparent languages one and the same string (strong necessity + CF) is ambiguous between two interpretations. This is a very crucial point as we will need to address the question of where and how this ambiguity manifests itself. That is, does the string necessity + CF yield two separate LFs or is there one (underdetermined) meaning or LF that can yield the two interpretations seen above by way of the context?

In either case, the question arises whether it is English that is weird or the transparent OUGHT languages. As we saw, from a certain point of view, the sin-

gle interpretation that English gives to *would have to* is exactly what we expect, so the fact that in transparent OUGHT languages a second interpretation emerges seems unexpected. On the other hand, the ambiguity we found in transparent OUGHT languages is cross-linguistically very stable and maybe once we find a way to explain it, the absence of the OUGHT reading for English *would have to* will become the unexpected fact.

We will try to answer these questions in what follows. In this section, we will show that there is another set of data where we find that for a certain modal meaning, English chooses a designated lexical item, while other languages choose a "transparent" way of conveying that meaning. This seems to support the view that it is English that is the outlier.

Consider the English verb *wish*. In a variety of languages what are called "counterfactual wishes" are done with *want* + CF-morphology (Iatridou, 2000). That is, where English uses the verb *wish* for counterfactual wishes, other languages use the verb *want* augmented by CF-morphology (Iatridou, 2000):

(70) He wished she had a Honda Odyssey

(71) Il voudrait qu'elle ait une Honda Odyssey

(72) Tha ithele na iche ena Honda Odyssey

In short, English lexicalizes into the verb *wish* what other languages express with the verb *want* + CF, and English lexicalizes into *ought* what other languages express with the verb *must* + CF.

So like before, the question arises whether internal to English, *want* + CF can freely occur instead of *wish* and vice versa. The answer will be 'no' for either direction. The English version of want + CF is *would want to*. This periphrasis cannot substitute for English *wish*:

(73) I wish that I was taller.

(74) *I would want that I were taller.[29]

Neither can *wish* substitute for *want* when the latter is in a counterfactual conditional[30]:

(75) If he were taller, he would want to have a different bed.

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[29] We are disregarding here the archaic *I would that I were taller*.

[30] This test was not presented in the section on OUGHT because we have not managed to find consistent data among the native speakers that we consulted. That is, Section 5 showed that *would have to* cannot appear where *ought* is good. The question also arises whether *ought* can appear where *would have to* is good. This is the same as the question whether *ought* can appear in a CF consequent, satisfying the morphosemantic requirements of the verb in a CF consequent:

(i) All males who are 18 years old have to register with the Selective Service. It's a good thing he is not 18. If he were 18, he **ought** to register with the Selective Service.

Unfortunately, we have found that there is serious disagreement among speakers as to the status of (i) and similar sentences.

(76) *If he were taller, he wishes (for/ to have/ that he had) a different bed.

So what we have is that is that there are two lexicalizations in English that other languages can express as a verb + CF-morphology. However, in both cases internal to English, the lexicalized items cannot substitute for or be substituted by the relevant English verbs augmented by CF-morphology.

However, as before, in the "transparent wish" languages, the string *want* + CF is ambiguous between wanting in a counterfactual world as in (77) and wanting in the actual world as in (78):

(77) An itan psiloteros tha ithele makritero krevati
if was taller **FUT** want+**Past** longer bed
'If he was taller he would want a longer bed'

(78) Tha ithela na imun psiloteri
FUT want+**Past** NA was taller
'I wish I was taller'

English, on the other hand, lexicalizes into one item the case where the desire is in the actual world (*wish*[31]) while the periphrastic string is reserved for desire in a counterfactual world (*would want to*). The parallelism to the case of OUGHT should now be clear: English chooses specialized lexical items for the interpretation where the modal claim holds in the actual world (*ought*) and where the desire holds in the actual world (*wish*).

We can visualize the situation as in Fig. 1. In both cases, the case of transparent OUGHT and the case of transparent WISH, we see that while in the transparent languages the combination of the basic item and CF-morphology does double duty, in English a dedicated lexical item takes on the meaning where the modal claim holds in the actual world and in English the CF-marked structure carries only one of the meaning that it would have in the transparent languages. The systematicity of the picture suggests to us that English should be treated as the special case.

Why should in English the combination of CF-marking and strong necessity not be able to express weak necessity? One possibility is morphological blocking: it is precisely the presence of a dedicated lexical item that blocks the weak necessity meaning for the more complex structure. However, this idea would appear to be immediately falsified by the fact that some transparent languages also have dedicated weak necessity modals (Dutch, for example, has the dedicated deontic weak necessity item *horen* as we saw earlier).

Another possibility is that English is missing a crucial enabling factor without which CF-marking cannot do the job it does in the transparent OUGHT and transparent WISH constructions. It is quite likely that additional factors are, in fact, required. For example, CF-morphology with a necessity modal that is adjectival also fails to yield OUGHT. Sentence (79) is a counterfactual modal (i.e. it patterns with *would have to*); it does not mean OUGHT:

[31] This shows that the term "counterfactual wishing" is misleading. The desire is in the actual world.

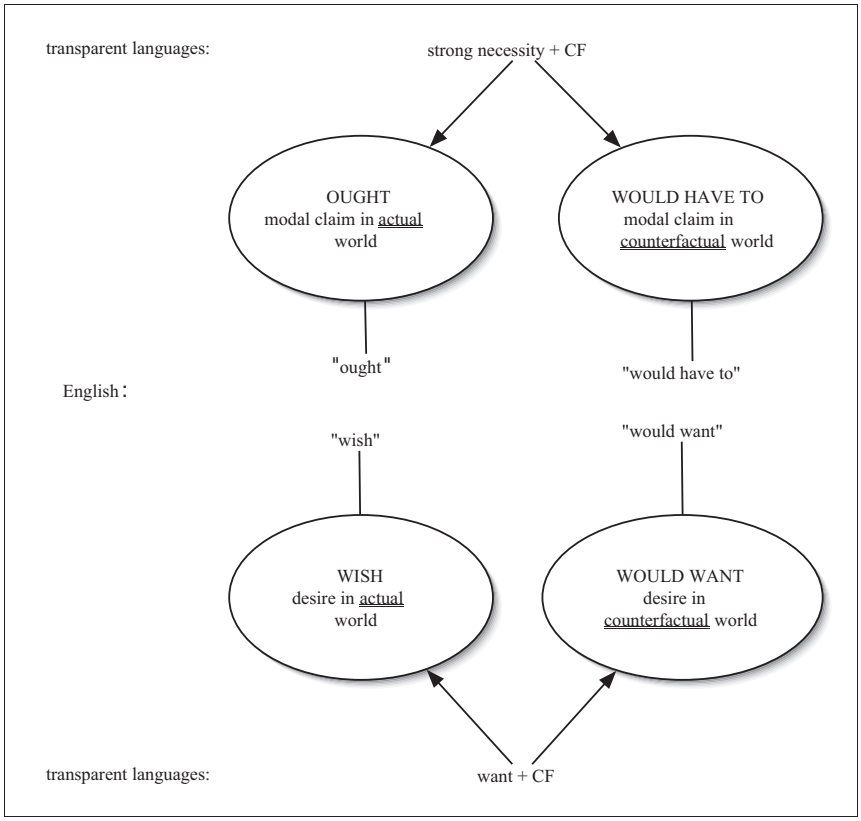

Fig. 1 Comparing English to "transparent" languages

(79) To get to the island it would be necessary to use this boat.

And lest the reader think that failure to compose OUGHT is a general property of English and that adjectival modals are just a special case of that, consider (80) from Greek. In this sentence, CF-marking with the adjectival necessity modal fails to yield OUGHT, the result is just that of a modal in a counterfactual world (i.e. WOULD HAVE TO):

(80) tha itan anageo na paris aftin tin varka
BE+CF necessary NA take this the boat
'It would be necessary to take this boat' (not 'it ought to be necessary to take this boat')

Actually, with the exception of the Russian participial modals (which may turn out to not be an exception after all), we have no case where a non-verbal modal could yield OUGHT when (the copula is) combined with CF-marking. From what we have seen, only verbal necessity modals turn into OUGHT. So it may not be sufficient

to have a necessity modal of any type and CF marking to make OUGHT. Some additional condition must be satisfied. We don't know what that would be.[32]

Here is where we are now. Our goal is to figure out how the combination of CF-morphology and a strong necessity modal can result in the meaning of a weak necessity modal. It was immediately clear that in the typical uses of OUGHT, we do not claim that a strong necessity holds in a counterfactual scenario. Instead, we claim that a weak necessity holds in the actual world. That throws doubt on the idea that CF-marking is doing its usual job in transparent OUGHT. Then, we saw that CF-marking on a strong necessity modal fails to create OUGHT in at least two cases: (i) English *would have to*, which may be due to blocking by the lexicalized form *ought* and is parallel to the failure of *would want* to mean 'wish' even though *want* with CF-morphology does mean 'wish' in many other languages; (ii) CF-marking on non-verbal necessity modals, for which we have no explanation. No matter how we eventually explain these exceptions, we still have no handle on what the CF-morphology is doing to the strong necessity meaning in the transparent OUGHT cases that do work. In the next section, we discuss a possible solution to the puzzle, which we argue cannot work.

7 Scope Confusion?

We saw that the combination of CF-morphology and strong necessity modals is ambiguous between a WOULD HAVE TO reading and an OUGHT reading. The former is what one would expect from a modal in a counterfactual scenario. It's the latter that is puzzling. What if in that case there is a permutation at LF whereby the counterfactuality doesn't actually take scope over the modal but takes scope under it? We owe this idea to Tim Stowell (pc).

We think that such an operation may in fact occur in certain cases. For example, consider the following puzzling use of counterfactual marking in English:

(81) I would have expected him to be here.

This sentence appears ambiguous. There is the entirely predictable reading of what the expectations of the speaker in a certain counterfactual scenario would have been, as in:

(82) If he had promised to attend this meeting, I would have expected him to be here.

But there is also a reading where (81) actually expresses an actual expectation, but one that turned out to be unsatisfied:

(83) I would have expected him to be here. Why isn't he?

[32] Noam Chomsky (pc) pointed out to us a possible generalization: the transparent reading only arises when tense is marked directly on the modal. Why would that be so, if it turns out to be true?

Perhaps, the right analysis of (81) is that the counterfactual marking on *expect* is out of place and at LF is interpreted on the complement sentence, marking that he is not in fact here.

Another case that one might consider such an analysis for is the case of transparent WISH that we introduced earlier. Here, counterfactual marking on *want* could be seen as expressing not a want in a counterfactual scenario but an actual want towards a counterfactual state of affairs.[33]

So, this is not a crazy idea. Can we carry it over to transparent OUGHT? No, the analysis fails spectacularly on two connected grounds. The first one is that in OUGHT, it is not a strong necessity modal that makes it to the actual world. That is, if scopal rearrangement brought the necessity modal out of the scope of CF-marking then a sentence with OUGHT should make a strong necessity claim in the actual world. But this is not so, as we have seen. The second reason is that in the transparent OUGHT cases, the complement is simply not marked as counterfactual. When a speaker uses transparent or non-transparent deontic or goal-oriented *ought*, there is no feeling whatsoever that the event under *ought* is contrary-to-fact or even unlikely.[34]

So, we are back to square one. We have no explanation for why counterfactual marking turns the meaning of a strong necessity modal into a weak necessity meaning.

8 Ordering Source Promotion

Let's regroup.

We started with a brief discussion of our previous view of the difference between strong and weak necessity modals. In essence, weak necessity modals bring in a secondary ordering of the favored worlds. Strong necessity modals say that the prejacent is true in all of the favored worlds, while weak necessity modals say that the prejacent is true in all of the very best (by some additional measure) among the favored worlds. While the standard Kratzer framework parametrizes the semantics of modals to two parameters (modal base and ordering source), we introduced a pair of ordering sources: (i) the primary one that is the only one that strong necessity

[33] We actually don't think that this is the right analysis. But we'll leave the treatment of transparent WISH to some other time. For now, there is some relevant discussion in Iatridou (2000).

[34] Of course, there are cases where the prejacent is interpreted as contrary-to-fact:

(i) He ought not to have revealed the secret.

But we assume that here the counterfactuality of the prejacent (*he didn't reveal the secret*) is signaled by additional morphological factors. Note by the way that it is not easy to use strong necessity modals to express the same post-fact denunciation of a mistake:

(ii) #He had to/has to not have revealed the secret.

(iii) #He would have to not have revealed the secret.

We do not know why this is so.

modals are sensitive to and (ii) a secondary one which is the one that weak necessity modals use to refine the ranking of the worlds favored by the primary ordering source. We built that differential sensitivity into the lexical entries of *must/have to* and *ought*.

The puzzle we are facing now is that in the transparent OUGHT construction something makes it so that a strong necessity modal suddenly shows sensitivity to the secondary ordering source. And that mysterious something is somehow brought into play by counter-factual marking. Our strategy now will be to first identify what operation needs to happen to make a strong necessity modal sensitive to a secondary ordering source, and then to think about why counterfactual marking brings about that operation.

What needs to happen to make a strong necessity modal sensitive to a secondary ordering source? By assumption, the lexical entry of a strong necessity modal only looks at the primary ordering source. So, what we need to do is to take the secondary ordering source and *promote* it to primary status, without, of course, forgetting the initial primary ordering source.

The idea is that saying that to go to Ashfield you *ought to* take Route 2, because it's the most scenic way, is the same as saying that to go to Ashfield in the most scenic way, you *have to* take Route 2. We have promoted the secondary goal of enjoying as much scenery as possible to primary status. It is crucial though that the primary goal of getting to Ashfield is still paramount—the fact that you get the most scenery possible if you go to Serengeti National Park is irrelevant. This makes formalizing the notion of ordering source promotion a bit tricky, as we will now see.

The simplest idea might be that we merge the secondary ordering source with the primary ordering source and interpret the strong necessity modal with respect to the newly merged primary ordering source, which now includes the promoted secondary ordering source. But what would "merger of ordering sources" be? In Kratzer's framework, ordering sources are (functions from evaluation worlds to) sets of propositions, and we assess the status of the worlds in the modal base as to how many of the propositions in the ordering source they make true. So, since the ordering sources are sets of propositions, a natural idea about promotion and merger would be to just take the set union of the two sets of propositions. But that will go wrong and will not produce the same as the weak necessity meaning.

Take our goal-oriented example. The primary ordering source is some goal such as "you get to Ashfield" and the secondary ordering source is a goal such as "you experience as much scenery as possible". Given the right circumstances, that might mean that you ought to (but don't have to) take Route 2. But when we merge the two ordering sources, we would quite possibly rank as equally optimal worlds where you get to Ashfield in a very scenic way and worlds where you go to Serengeti National Park in the most spectacularly scenic way imaginable. The problem is that the primary goal of getting to Ashfield should not be put on a par with maximizing scenery. Even though scenery maximization has been promoted, it should not be able to trump or even be considered at the same level as getting to Ashfield.

The trick then is to make strong necessity modals sensitive to the secondary ordering source by promoting it but without making it count at the same level as the

primary ordering source. There are at least two ways of doing this that we can think of. One would involve making modals in general sensitive to an ordered sequence of ordering sources, making strong necessity modals sensitive to ordering sources in a designated initial segment of that sequence, and treat promotion as moving an ordering source into that initial segment.[35]

A perhaps simpler way of formalizing promotion would involve something very much like set union of the two ordering sources but would only add propositions from the secondary ordering source into the new ordering source if they do not conflict with the primary ordering source. A complicating issue with such an approach would be that there might not be a unique way of getting a newly merged ordering source. (What if the secondary ordering source itself contained two contradictory propositions? Which one would be added to the primary ordering source?) So, at the moment, we don't know whether we should pursue this second option.[36]

The first half of our task is done (modulo the missing formal implementation): we understand what needs to happen to make a strong necessity modal sensitive to a secondary ordering source in such a way that it will express weak necessity. We need to promote the secondary ordering source to a status that makes it visible to the strong necessity modal. Now, we need to turn to the second half of our task: why is CF-morphology signaling ordering source promotion?[37]

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[35] It would probably be distracting to go through a formal development of that idea. Here are some rough sketches of the notions one might use:

(i) The context provides for each modal, a modal base f and a bipartitioned sequence of ordering sources $<< g_1,\ldots,g_i >, < g_{i+1},\ldots,g_k >>$

(ii) Strong necessity modals say that the prejacent is true in all worlds in $\max_{g_i(w)}(\ldots(\max_{g_1(w)}(f(w))))$.

Here $\max_g(w)$ is a function computed from an ordering source that identifies the best worlds in a set of worlds.

(iii) Weak necessity modals say that the prejacent is true in all worlds in $\max_{g_k(w)}(\ldots(\max_{g_{i+1}(w)}(\max_{g_i(w)}(\ldots(\max_{g_1(w)}(f(w)))))))$.

(iv) An ordering source sequence $<< g_1,\ldots,g_i >, < g_{i+1},\ldots,g_k >>$ is changed by ORDERING SOURCE PROMOTION by moving any number of ordering sources from the second tier into the first tier. For example, $<< g_1,\ldots,g_i,g_{i+1} >, < g_{i+2},\ldots,g_k >>$ is the result of submitting the initial sequence in 1 to a one-step promotion operation.

[36] Some of the technical work done by Frank (1996) on the notion of "compatibility restricted set union" would probably be useful to us.

[37] Ordering source promotion may happen outside the transparent OUGHT construction as well. Consider an example attributed to Wolfgang Klein by von Stechow et al. (2006). Imagine that to cross Siberia to go to Vladivostok you can take one of two trains: the Russian train or the Chinese train. The Chinese train is significantly more comfortable. Now consider the following two variants:

(i) To go to Vladivostok, you have to take the Chinese train.

(ii) To go to Vladivostok, you ought to take the Chinese train.

9 Why Counterfactual Marking?

Why is it CF-morphology that gets put to the use of turning a strong necessity modal into a weak necessity modal in the transparent languages? What does CF-morphology on its more understood uses have in common with this notion of promotion of the secondary ordering source?

In the transparent OUGHT cases, we are not moving to counterfactual worlds that differ from the actual world at the ground level of empirical facts: there are no different circumstances there, no different goals, primary or secondary, no different evidence, reliable or shaky. Instead, a parameter of evaluation is changed. We move from one context where a secondary ordering source is invisible to a strong necessity modal to a new context where that secondary ordering source is promoted in such a way as to become visible to the strong necessity modal.

Perhaps, then, the counterfactual marking is co-opted here in a somewhat metalinguistic kind of way: "if we were in a context in which the secondary ordering source was promoted, then it would be a strong necessity that…". This would explain why even though there is CF-morphology, the modal claim is made firmly about the actual world; all that the morphology marks is a change in evaluation parameters.

It is probably not an accident that counterfactual marking brings with it an element of tentativeness: the speaker is not saying that the secondary ordering source is something that has to be obeyed. The choice of whether to really promote the secondary ordering source is left open.

10 Conclusion

In this paper, we have raised the question of how the semantics of weak necessity modals fits into the general picture of the semantics of modal expression. We have reiterated a tentative suggestion inspired by the old proposal by Sloman. We then brought in the cross-linguistic picture. It turned out that it is a very stable fact across languages that weak necessity can be expressed by taking a strong necessity modal and marking it with counterfactual morphology. We explored this pattern in a number of languages. We then raised the question of whether our ideas about the semantics of weak necessity can help us understand the fact that a strong necessity modal becomes a weak necessity modal when marked with counterfactual mor-

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They report that Wolfgang Klein accepts the *have to*-variant, while Orin Percus only accepts the *ought to*-variant. What Klein-type speakers can do, in our analysis, is to silently promote the secondary goal of being comfortable. Percus-type speakers cannot do silent ordering source promotion but either have to mark it by choosing a weak necessity modal or explicitly add comfort to the primary ordering source:

(iii) To go to Vladivostok comfortably you have to take the Chinese train.

phology. We proposed that what is going on here is the promotion of a secondary ordering source. The counterfactual morphology marks this quasi-meta-linguistic operation but in a hypothetical way ("if we were to take your secondary goals and make them non-negotiable", "if this were a normal day (i.e. if we were to take as given assumptions that only hold firmly for normal days)", etc.).

References

Bybee, J. L., Perkins, R. D., and Pagliuca, W. (1994). *The Evolution of Grammar: Tense, Aspect, and Modality in the Languages of the World*. Chicago University Press.

Copley, B. (2006). What should *Should* mean? Ms of a paper given at the Workshop "Language under Uncertainty: Modals, Evidentials, and Conditionals", Kyoto University, January 2005.

Finlay, S. (2006). (In Order That. . .) Ought. ms, USC.

von Fintel, K. (1999). The presupposition of subjunctive conditionals. In Sauerland, U. and Percus, O., editors, *The Interpretive Tract*, number 25 in MIT Working Papers in Linguistics, pages 29–44. MITWPL, Cambridge, MA.

von Fintel, K. and Gillies, A. S. (2007). An opinionated guide to epistemic modality. ms, MIT and University of Michigan, to appear in Tamar Gendler Szabó and John Hawthorne (eds.) *Oxford Studies in Epistemology, Vol.2*, Oxford University Press.

von Fintel, K. and Iatridou, S. (2005). What to do if you want to go to Harlem: Anankastic conditionals and related matters. ms, MIT.

Frank, A. (1996). *Context Dependence in Modal Constructions*. Ph.D. thesis, Universität Stuttgart.

Horn, L. R. (1972). *On the Semantic Properties of the Logical Operators in English*. Ph.D. thesis, UCLA, CA.

Iatridou, S. (2000). The grammatical ingredients of counterfactuality. *Linguistic Inquiry*, 31(2):231–270.

Jones, A. J. and Pörn, I. (1986). Ought and Must. *Synthese*, 66(1):89–93.

Kratzer, A. (1981). The notional category of modality. In Eikmeyer, H. J. and Rieser, H., editors, *Words, Worlds, and Contexts. New Approaches in Word Semantics*, pages 38–74, Berlin. de Gruyter.

Kratzer, A. (1991). Modality. In von Stechow, A. and Wunderlich, D., editors, *Semantics: An International Handbook of Contemporary Research*, pages 639–650, Berlin. de Gruyter.

McNamara, P. (1996). Must i do what i ought? (or will the least i can do do?). In Brown, M. A. and Carmo, J., editors, *Deontic Logic, Agency and Normative Systems – DEON'96: Third International Workshop on Deontic Logic in Computer Science, Sesimbra, Portugal, 11–13 January 1996*, Workshops in Computing, pages 154–173. Springer, Berlin.

McNamara, P. (2006). Deontic logic. In Zalta, E. N., editor, *The Stanford Encyclopedia of Philosophy*.

Sloman, A. (1970). *Ought* and *Better. Mind*, 79(315):385–394.

von Stechow, A., Krasikova, S., and Penka, D. (2006). Anankastic conditionals again. In Solstad, T., Grønn, A., and Haug, D., editors, *A Festschrift for Kjell Johan Sæbø – In Partial Fulfilment of the Requirements for the Celebration of his 50th Birthday*, pages 151–171. Oslo.

Wertheimer, R. (1972). *The Significance of Sense: Meaning, Modality, and Morality*. Cornell University Press, Ithaca, NY.

LSA 220
Class 5: Modality and Tense

Kai von Fintel Sabine Iatridou

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1 Two times

Two ways to locate a modal claim in time

- Time of Modality vs. Time of Prejacent
- Condoravdi's (2002) terminology:
  - temporal orientation
  - temporal perspective

  but which is which?

2 Time of modality

Notional semantics vs. natural language semantics

"People do many things with language, one of which is to express propositions for one reason or another, propositions being abstract objects representing truth conditions. Semantics has studied that aspect of language use in isolation from others. Hence I shall consider semantics to be the study of propositions. [...] According to this characterization of semantics, then, the subject has no essential connection with languages at all, either natural or artificial." (Stalnaker, 1970)

Time of modality

epistemic the evidence available at time *t*

deontic the laws in effect at time *t*

Clearly, these modal bases should in principle be sensitive to a time parameter. Can we in fact express what we should in principle be able to express?

Paraphases

(1) a. At that point, it was evident that the butler had done it.
b. By then, it will be evident that one of two suspects committed the murder.

(2) a. In those days, it was required that you kneel in front of the king.
b. Soon enough, it will be required that one justify each purchase of fossil fuels.

Shifting modals to the future

Only semi-modals can take the future:

(3) a. ?At that point, the treasure will have to be in one of two places.
b. We will soon have to justify each purchase of fossil fuels.
c. We will at some point be able to travel at close to light speed.

Shifting modals to the past

Again, semi-modals:

(4) a. ?At that point, the butler had to be the murderer.
b. In those days, you had to kneel in front of the king.
c. In his prime, Roger was able to run a mile in under 4 minutes.

3 Are epistemic modals special?

A problem with epistemic modals?

Stowell (2004): distinction between epistemic modals and root modals:

(5) a. Carl couldn't move his arm. (ability at a past time)
b. Max couldn't go out after dark. (permission at a past time)
c. 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.’

(6) a. John had to stay home last night because he was sick.
b. There had to be at least a hundred people there.
‘There must have been at least a hundred people there.’

Stowell: “past tense may scope above a root modal occurring in the same clause but not above an epistemic modal in the same clause.”

A principled exception

(7) 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)

Boogaart

(8) Het moest wel een licht en lief geheim zijn, want het nam geruisloos zijn plaats in tussen kamelenvoeten en een glaasje jenever. (internet)

‘The secret had to be a light and sweet one, since it silently took its place in between camel feet and a glass of jenever.’ (Boogaart, 2005)

NB: *moest* = must + PAST

Iatridou 1990

(9) a. It was/will be evident/obvious that John stole the tapes.
b. #It was/will be possible/probable that John stole the tapes.

Distinction between modality that is sensitive to a particular “knower” and modality that isn’t.

Another exception?

(10) He might have won the game.

(11) a. He might have (already) won the game (#but he didn’t).

b. At that point, he might (still) have won the game but he didn't in the end.

- epistemic *might* from a present perspective about what the past was like
- counterfactual future possibility in the past

Condoravdi: "Certainly, (11b) is not just about epistemic uncertainty at that past point (though of course since the outcome had not materialized one couldn't know it either)."

Abusch

(12) The Ranch
John is an expert petroleum geologist and investor. In 2003, he finds a ranch property in Ecuador and analyzes its geology very carefully. He applies best-practice methodology for petroleum prospecting. He decides the ranch has a good probability of containing a large oil reserve, and on December 1, 2003 buys the property together with a partner. Unfortunately, expensive drilling establishes that there is only worthless salty water under the ranch. The partner's opinion on June 1, 2006:

"We bought a ranch which might well have contained a significant oil reserve. But unfortunately there is no oil on this ranch. Let's sell it and move on to the next project." (Abusch, 2008)

von Fintel & Gillies

(13) Sophie is looking for some ice cream, and checks the freezer. There is none in there. Asked why she opened the freezer, she replies:

There might have been ice cream in the freezer. (von Fintel & Gillies, 2008)

Abusch against epistemic analysis

"The two trees are in a part of our forest reserve which we never visited before. The tree fell away from a plantation of endangered orchids. We find it several months after it fell. The point about our never having visited that

part of the reserve before is that at the time of the storm, there is no agent around who has information about the trees. Nobody had ever seen those trees. So it is difficult to argue that the modality in (14) is epistemic in the sense of referring to the information of an agent.

(14) The tree could have fallen on the orchids. Let's cut down the other tree. It might fall on the orchids in another storm." (Abusch, 2008)

4 Modal-perfect scope reversal

A closer look

(15) At that point, he could/might still have won the game.
'At that point, it was still possible that he would win the game'

Somehow, the perfect morphology underneath the modal correlates with the possibility of shifting the time of the modality into the past.

Other reversals?

(16) 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 (16) 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)." (Stowell, 2004)

When can reverse happen?

"Finally, past perspective with a future orientation, associated with the counterfactual reading of modals for the past, comes about when the perfect takes scope over the modal. This is possible only for modals that are in the so-called subjunctive form in English, such as *might*, *would*, *should*, *ought to*." (Condoravdi, 2002)

Counterfactuality?

(17) a. At that point, he might (still) have won the game.
b. You should have bought that book.

Implicature?

(18) a. ?At that point, he might have won the game, and in fact he did. (Portner)
b. You should have bought that book, so it's a good thing you did.

5 Time of the prejacent

Notional Semantics, again

- At any time t, we can have evidence about what was/is/will be the case at some other time t'
- At any time t, principles can be in effect about what should be the case at some other time t' ...well maybe not

Deontics about the past

- If a deontic modal claim is meant to make someting happen, to bring about a change so as to make the prejacent true, then a prejacent in the past of the time of modality might not be possible.
- On the other hand, principles at time t can very well judge that the way things were at some previous time t' were not good, even though there is at t no way to change how things were at time t'.

Temporal relations in non-finite complementation

- In constructions with modals that take non-finite complements, the prejacent will not be able to use the full toolset of tense/aspect morphology to locate itself in time.
- So, we need to see how temporal relations work in non-finite complementation.

Some non-finite embeddings

(19) a. John believes Bill to be in New York by now/?tomorrow.
b. John believes Bill to have left this morning.

(20) a. John expects Bill to be in New York by now/tomorrow.
b. John expects Bill to leave #earlier today/tomorrow.

c. John expects Bill to have left this morning.

Epistemic modals and their prejacent

(21) John must/might/may/should/ought to be in New York by now.

(22) John must/might/may/should/ought to have left this morning.

(23) The Red Sox #must/might/may/should/ought to win the world series later this year.

Three ways to go from the time of modality

i. simultaneity: time of prejacent = time of modality

ii. with perfect morphology: time of prejacent before time of modality

iii. future orientation: time of prejacent after time of modality

Future Orientation and Aspectual Class

- stative complement: optional future orientation
- eventive complement: obligatory future orientation

Options

- covert future
- future-orientation part of meaning of modal

The special status of *must*

Why can't *must* take a future-shifted reading of the prejacent?

(24) a. The Red Sox must win next year.
b. His plane must leave at 6.

Past shifting with perfect morphology

- Condoravdi: really a perfect

- Jespersen (1931, 88): "The perfect infinitive . . . corresponds . . . notionally to the preterite and pluperfect as well as the perfect. Thus *He may have seen her* is equal to *Perhaps he saw her* or *Perhaps he has seen her* . . . ".

Past tense in disguise?

(25) a. John may have solved the problem on Tuesday.
b. *John has solved the problem on Tuesday.
c. John solved the problem on Tuesday.

Conclusion

As Portner (2009) says:

> "There has been some very interesting research into various aspects of the problem of temporal interpretation of modals, but — even limiting our attention to English — no one has presented a theory which aims to cover all of the cases."

References

Abusch, Dorit. 2008. Circumstantial and temporal dependence in counterfactual modals. URL http://semanticsarchive.net/Archive/2NhNGNlZ/Abusch-circumstantial-modals.pdf. Ms, Cornell University.

Boogaart, Ronny. 2005. The past and perfect of epistemic modals. URL http://www3.let.vu.nl/staf/rju.boogaart/past_and_perfect_of_modals.pdf. Ms, Vrije Universiteit, Amsterdam, submitted to *Cahiers Chronos*.

Condoravdi, Cleo. 2002. Temporal interpretation of modals: Modals for the present and for the past. In David I. Beaver, Luis D. Casillas Martínez, Bardy Z. Clark & Stefan Kaufmann (eds.), *The construction of meaning*. Stanford: CSLI. URL http://semanticsarchive.net/Archive/2JmZTIwO/.

von Fintel, Kai & Anthony S. Gillies. 2008. CIA leaks. *The Philosophical Review* 117(1). 77–98. doi:10.1215/00318108-2007-025.

Jespersen, Otto. 1931. *A modern English grammar on historical principles*, vol. 4. London: G. Allen and Unwin, Ltd.

Portner, Paul. 2009. *Modality*. Oxford University Press.

Stalnaker, Robert. 1970. Pragmatics. *Synthese* 22(1-2). 272–289. doi:10.1007/BF00413603.

Stowell, Tim. 2004. Tense and modals. In Jacqueline Guéron & Jacqueline Lecarme (eds.), *The syntax of time*, 621–636. MIT Press. URL http://www.linguistics.ucla.edu/people/stowell/Stowell-Tense&Modals.pdf.

Werner, Tom. 2006. Future and non-future modal sentences. *Natural Language Semantics* 14(3). 235–255. doi:10.1007/s11050-006-9001-8.

LSA220 Modals
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Covert Modals? One particular case.

Section 1: Introduction

As we already saw in Session II, modals have also been argued to exist "covertly". That is, there are constructions that clearly contain a modal meaning, but there is no obvious lexical source for this meaning. A common response to this situation has been to postulate the presence of a covert modal. However, while it is not impossible that semantically contentful covert elements exist, for each particular case, the standard of proof is quite high.

In this last session we will look at one particular case where a covert modal has been postulated and investigate in some detail the arguments for and against the postulation of such an element. In the course of doing so, we will explore a construction that is fascinating in its own right.

From your reading of 'De Modo Imperativo', you should have seen three proposals for an answer to the following question:

Q: What is there in the morphosyntax of a formally imperative verb (FIV) that is responsible for its semantics?

Here is a summary of what you should have read:

Table 1

	Semantics	Syntax
Han	Imperatives contain an illocutionary operator with Directive force	Imperative contains [dir] and [irr] features, situated in C.
Schwager	Imperatives contain a performative modal of universal force.	The imperative modal is in SPEC,CP. There is an +imp feature on C that ensures V-movement
Portner	Imperatives denote addressee-restricted properties. There is a pragmatic operation that interprets such properties as instructions to add items to the addressee's TO DO list.	The only imperative-specific syntax *might* be an operator that forces the imperative subject to be the addressee.

In a way, both Han and Schwager could be placed in the "modal" accounts of an imperative (and Portner certainly does group them together). However, of the two, the one that explicitly and in some detail calls her account 'modal' is Schwager. For Schwager, FIVs contain what is called a covert "performative modal of universal force".

We know what it means for a modal to be of universal force.
But what is a "performative modal"?

Overt modals have descriptive and non-descriptive, or "performative", uses.
When uttering a sentence with a descriptive modal, the speaker is making an assertion that the subject has, for example, a certain obligation.

(1) John has to take out the garbage.
(Because his mother has imposed this rule.)

When uttering a sentence with a performative modal, the speaker is *making* the subject have an obligation:

(2) Now, John has to take out the garbage.
(I am hereby imposing this obligation on him)

The same holds for modals of existential force:

(3) John may go to the movies.
(His mother allows him to do so.)

(4) Now, John may go to the movies.
(I am hereby permitting him as he has finished his homework)

What, for Schager, determines whether a modal is used descriptively or as a performative? Certain presuppositions on the context of use, specifically the following three:

– The Authority Condition: "…either the social status of the speaker with respect to the hearer allows him to issue an imperative that is meant to guide the actions of the latter, or, the speaker possesses some rational authority with respect to an issue that he is authorized to give advice on the matter" (p. 157; inspired by Hamblin 1967).

– Epistemic Uncertainty Condition: The speaker should consider both **p** and **~p** to be possible.
Performative modals differ from descriptive modals, which can be uttered when the speaker knows that **p** is going to happen, or when the speaker knows that **p** is

not going to happen (6 and 7 are Schwager's, though she gives the German equivalents; these are her translations):

(5) You have to do it but I know you will not
(6) #Do it! But I know you will not.

(7) I know that you are going to do it, and moreover you have to.
(8) #I know that you are going to do it (anyway), so do it! [1]

.
– Ordering Source Affirmation: "the speaker affirms the ordering source. (Therefore, he considers it to be better (sometimes with respect to a contextually salient goal) that the proposition modalized by the imperative operator come out true" (p. 169)

The imperative modal differs from overt modals in this:

(9) You have to leave, but I don't want you to leave
(10) #Leave! But I don't want you to leave.

According to Schwager, this condition is why "uttering imperatives induces a strong pressure on the addressee to act upon them, or, why imperatives are felt to be …'uncomfortable' as Wratil (2004) chooses to put it."

In short, for Schwager, when the context of a sentence with an overt modal satisfies the above conditions, the overt modal can be used performatively. On the other hand, the covert modal in an imperative is only performative. That is, it can felicitously be used only when its context meets those three conditions.

In other words, if these conditions on the context are not met, an overt modal is used descriptively, but an imperative is undefined (suffers from presupposition failure).

[1] Example (8) is actually fine when it is reinterpreted as "… so do it *now*". The obligatoriness of this reinterpretation supports the Epistemic Uncertainty Condition. Instead of (8) Schwager had the following (verbatim):

i. #I know that you are at any way going to do it, so do it also

However, (i) is ill-formed as a sentence of English for independent reasons.

Portner criticizes a modal account of FIV as follows:

"A modal which only had a performative use might as well not be called a modal at all. The performative aspect of its meaning, modeled as the addition of its prejacent to the To-Do List or in some other way, would explain everything that needs to be explained about its meaning. In addition, there are no overt modals whose sole function is to update the To-Do List (even *must* has modal truth conditions as well… For these reasons, we're better off simply saying that an imperative's only role is to add to the To-Do List" (p. 11)

In short, the properties that one would need to ascribe to the imperative modal are so unique, and they would make the modal in the imperative so unlike any other modal, that you are just as well off saying that these are just the properties of the imperative.

Beyond Portner's criticism, how does a modal account fare in the face of several challenges?

In DMI, this issue is discussed with respect to

- negative imperatives (some languages have such, some not)
- the semantic variability of FIVs, in particular the fact that a FIV can sometimes be a command, sometimes a permission[2]:

(11) a. Make your bed!
b. Do your homework!

(12) A: May I open the window
B: Yeah, open it.

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[2] Other non-command uses of the FIV that have been reported include:

Instructions:
i. A: How can I get to Ashfield?
B: Take Route 2

ii. Peel the eggplants. Cut them into small pieces. Throw them in the soup.

Dares/ Threats (Han 2000) / Concessives (Schwager)
iii. Go on. Throw the rock. I dare you. (Han 2000)
iv. Alright. Don't come then
(Schwager 2006)

Wishes:
v. Have a good time!

(13) It starts at 8pm but come earlier, if you like (Schwager 2006)

If a FIV contains a performative modal of universal force, how can the permission readings come about? After all, the performative *You must leave now!* Can never mean that the hearer has permission to leave.
The question of how to analyze the permission use of the FIV given its more common command reading, has received a fair amount of attention (Han, Schwager). See the original sources or the summary in DMI.

Today, we will focus on yet another challenge for any account of FIVs and we will ask the question of whether a covert modal account is beneficial. We chose this particular phenomenon partly because it is fairly unknown and complicated (and therefore fun), partly because we are working on it and don't know the solution to it (though we do have several findings and thoughts to report).

Section 2: IaDs

FIVs can appear as a first conjunct, with the second conjunct being a declarative. We will adopt Schwager's term "IaD" (for "Imperative *and* Declarative") for this construction:

(14) Study hard and you will pass the class.
(15) Ignore your homework and you will fail the class.

Although we will see that this position has been called into doubt, we will assume for the time being that both (14) and (15) contain an FIV in Conjunct1.
Why are these so interesting? Because (15), unlike (14), is used to get the addressee to *not* do what the first conjunct says. That is, (15) intends to instigate the addressee to *not* ignore the homework by pointing out its undesirable consequence in the second conjunct. But if this is so, how can (15) contain the FIVP "ignore your homework"?

We will call the IaDs that contain the meaning of directive and that are amenable to the paraphrase containing a command, as in (14), **Type I IaDs**. We will call the IaDs with the undesirable consequent, which cannot be paraphrased as containing an imperative, as in (15), **Type II IaDs.**

That is: IaDs with undesirable second conjuncts are always Type II IaDs

Both types occur in languages other than English. Consider the following examples form Greek, which have the added benefit that the FIV is unambiguously imperative:

Type I IaD:

(16)a. Kane ta mathimata su ke ola tha pane kale
do the lessons your and all will go well

Type II IaD:

b. Fae ena apo afta ke tha
Eat.IMP one from these and FUT

pethanis mesa se 24 ores
die within 24 hours
'Eat one of these and you will die within 24 hours'

Section 3: Type I IaDs

Let us start with Type I IaDs, which have been taken to be the "easier" ones, as the FIV still retains the meaning of a directive in them.

Schwager 2006 and Russell 2007 have similar accounts for Type I IaDs:

- Type I IaDs are conjunctions of speech acts.
- Type I IaDs contain modal subordination[3] (Roberts 1989)

Krifka (2001) is credited with the idea that speech acts can be conjoined. Speech act *and* conjoins two sentences that already have force and returns another speech act. The result is as if the two speech acts applied in succession.
Because it is a speech act conjunction, the meaning of the imperative is not "buried" in the conjunction, i.e. the meaning of the FIV is retained in its full glory, more specifically the command reading.
Subsequently, Modal Subordination takes us to the worlds in which the command is satisfied. In effect, after the imperative speech act has been uttered, a conditional is created in which the modal *will* is restricted by an antecedent like *if you study hard* and the consequent of this conditional is the second conjunct.

All this gives us the composite meaning of Type I IaD:

[3] In particular, modal subordination of the following type (Roberts 1989, p. 699): "The approach I suggest, which I will call **the accommodation of the missing antecedent** approach to modal subordination, is the pragmatic **accommodation** of a contextually given hypothetical common ground to be the antecedent of the modally subordinated clause".

(17) Study hard and you will pass the class. =
(18) Study hard! In the worlds in which you study hard you pass the class.

As we said earlier, speech act conjunction is taken to be the same as speech act sequencing (henceforth "I.D"s, with "." representing the period (exclamation mark, actually) between two sentences in the discourse). That is, (17) and (19) are claimed to be identical, both resulting in (19).

(19) Study hard! You will pass the exam.

Certainly such an account seems to intuitively capture what we feel Type I IaDs to be saying. This is probably the reason why this idea is common to many accounts.

And indeed, IaDs provide the anaphora which is a well-known trademark of modal subordination:
(20) Plant a fig tree and it will give you plenty of good shade.

Unfortunately, on closer inspection, there are some problems that have to be dealt with (for any account but we will focus on a covert modal account of FIVs)

P1: It is predicted that sentences with universal deontic modals should be amenable to a similar derivation. But this is not true. Compare Type I IaDs with MaDs (Modal *and* Declarative).

Type I IaDs don't behave like MaDs:

(21) a. Invest in this company and you will become rich. ≠
b. */??[4] You have to/must[5]/should invest in this company and you will become rich.

(22) a. Speak to them in French and they will hire you immediately. ≠
b. */??You have to/must/should speak to them in French and they will hire you immediately.

On the other hand, in speech act sequencing (as opposed to speech act conjunction), *I.Ds and M.Ds do behave the same:*

(23) a. Invest in this company! You will become rich. =
b. You must /have to/ should invest in this company. You will become rich.

[4] The judgment is for the reading of a sentence where the second conjunct is modally subordinated to the first. The sentences are fine as plain conjunctions, of course.
[5] The judgment holds even for *must*, which is taken to have performative uses (Ninan 2005)

(24) a. Speak to them in French. They will hire you. =
b. You must speak to them in French. They will hire you.

In other words:
Modal Subordination (*the* crucial ingredient in this account) is possible in sequencing with modalized sentences and imperatives alike. However, Modal Subordination in conjunction is possible only with imperatives, not with modalized sentences.
Why should this be? There is nothing (yet) in our knowledge of modal subordination that could explain this. Moreover, why would a covert modal (as in the covert modal account of FIVs) behave differently from an overt one?

Within a modal account of FIVs,…

- If we say that modal subordination happens only in sequencing and not in conjunction we can explain why MaDs do not have it but we are left with no account for Type I IaDs.

- If we say that modal subordination happens in conjunction as well as sequencing, we have no account for why MaDs are not OK.

Hwever, if there is no covert modal in an FIV, then the fact that Type I IaDs differ from M.Ds is in itself not a problem. We can say then that there is no modal subordination in conjunction (though we would have to investigate why), The ability of FIVs to form Type I IaDs would still have to be investigated.

At any rate, it doesn't seem that a modal account is advantageous with respect to this first problem.

P2: A second problem that arises if we take Type I IaDs to contain an imperative followed by modal subordination regards the phenomenon of polarity switch. Polarity switch is a known possibility for modal subordination. Partee 1972 has this example[6]:

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[6] At first glance, it might seem that polarity switch is somewhat easier from negative to positive than from positive to negative:

(i) Don't park on the even side of the street today! You will get towed. =
Don't park on the even side of the street today! If you park on the even side, you will get towed.

(ii) Park on the odd side of the street today! You will get towed. ≠
Park on the odd side of the street today! If you park on the even side (i.e. if you don't park on the odd side) you will get towed.

That is, it seems easier to subtract a negation rather than add one. However, example (22b) from the text and (iii) below show that this is not necessarily so.

(25) John won't buy a car because he wouldn't have space for it in his garage
=John won't buy a car because in the worlds in which he does buy a car he does not have space for it in his garage.

An FIV in sequencing (I.Ds) can involve modal subordination with a polarity switch:

(26) a. Don't park there. You will be towed. =
Don't park there. If you **do**, you will be towed.

b. Conserve your energy. You will run out of breath. =
Conserve your energy. If you **don't**, you will run out of breath.

What the above shows us is that modal subordination in I.Ds can take us to the worlds in which the first clause is *not* satisfied (polarity switch). However, such a polarity switch is not possible in IaDs[7]:

(27) a. Don't park there and you will be towed. ≠
Don't park there. If you do, you will be towed.

b. Conserve your energy and you will run out of breath. ≠
Conserve your energy. If you don't, you will run out of breath

The only meaning that (27) can have is the one where the polarity is maintained, i.e., where you will be towed if you *don't* park there and where you will run out of breath if you conserve your energy.

In addition, polarity switch is possible in sequencing not just with I.Ds but also with M.Ds[8]:

(28) You must not park on the even side on the street. You will get towed. =
You must not park on the even side of the street. If you do, you will get towed.

(iii) Be careful! You will fall. =
Be careful! If you aren't, you will fall.

It is unclear what the difference between (ii) and (26b)/(iii) is due to.

[7] The fact that the first conjunct retains its imperative meaning (that is, the speaker does want the addressee to not park there in (13a), and does want her or him to conserve energy in (13b)) makes these sentences Type I IaDs.

[8] MaDs, with modal subordination are not grammatical and thus we cannot test their behavior with respect to polarity switch and thereby compare IaDs to MaDs.

(29) You should conserve your energy. You will run out of breath. =
You should conserve your energy. If you don't, you will run out of breath.

It suffices to say that if IaDs are reduced to speech act conjunction and modal subordination, there is no reason whatsoever why they should not be able to have a polarity switch. And yet, polarity switch is out for IaDs, while it is fine for sequencing in both I.Ds and M.Ds.

P3: A third property of IaDs that seems to set them apart from other known cases of modal subordination is that typically, modal subordination permits a choice between *will* and *would*, even when the first clause is an imperative:

(30) Read that book by Max. You will like it.
(31) Read that book by Max. You would like it.

(32) You have to/must/should read that book by Max. You will like it.
(33) You have to/must/should read that book by Max. You would like it.

Possibly this choice reflects the choice in the accommodated antecedent: *if you do* .. versus *If you did,*….. However, in IaDs, the choice can be only *will*:

(34) Study hard and you will pass the class.
(35) *Study hard and you would pass the class.

So this is another place where IaDs behave differently from the known cases of modal subordination.

In summary, while the speech act conjunction plus modal subordination account of Type I IaDs seems intuitively appealing, it does face a few difficulties.

Moreover, a modal account of imperatives does not help things. If anything, it adds extra things to be explained in the cases where IaDs and MaDs behave differently.

More specifically, the fact that IaDs differ form MaDs is a problem for Schwager. In addition, the fact that IaDs differ from I.Ds is a problem for anyone who believes that speech act conjunction behaves identically to speech act sequencing.

Section 3: Summary and preview of accounts of Type I and Type II IaDs.

Before we proceed, it is useful to give a preview of certain ingredients that are common to the solutions proposed by Han, Schwager and Russell for Type II IaDs.

Basically, Han[9], Russell and Schwager, while they differ on quite a few things, they argue that in Type II, the first conjunct becomes the antecedent of a conditional:

(36) Ignore your homework and you will fail =
If you ignore your homework you will fail

While they agree that the Conjunct1 of Type II IaDs does not receive the command reading typically associated with "imperative semantics", they differ on its exact nature. For Han, it is a "stripped" imperative, that is, an imperative that has lost its [+dir] feature. For Russell, the first conjunct of a Type II IaD is not an FIV but some sort of truncated, infinitival form. For Shwager it is still an FIV, but it gets reinterpreted in context in a way that we will come to later.

Here is a quick summary as preview:

Table 2:

	Type I IaD	Type II IaD
Han	Conjunct 1 is not an imperative but infinitive-like. It refers to hypothetically possible worlds/becomes a conditional antecedent. Conjunct2 is the consequent.	
Russell	Conjunct 1 is an imperative. Conjunct2 is modally subordinated	Conjunct 1 is infinitive-like. It becomes a conditional antecedent. Conjunct2 is the consequent.
Schwager	Conjunct 1 is an imperative. Conjunct2 is modally subordinated	Conjunct1 is an imperative. It becomes a conditional antecedent. Conjunct 2 is the consequent

[9] Though, actually, Han proposes different analyses for different languages but the one in Table 1 is among those and it is the one relevant for English.

As you can see in Table 2, Han 2000 proposes that both types of IaD should be analyzed as transforming into a conditional, with the first conjunct being the antecedent.
As a working hypothesis, we will side with Han, who argues that a unified derivation underlies both types. In addition we will agree with the position that in some sense, IaDs transform into conditional sentences of sorts, with the Conjunct1 being akin to an antecedent. We will also follow Han in saying that the intuition that Type I contains an imperative is due to the fact that the consequent/Conjunct1 of a Type I IaD is positive and so there is the implicature that the speaker wants the hearer to do the action in Conjunct1.

As a first step towards this conclusion, let us see how we would account for problems 1-4 that we saw above.

Wrt P1: We noticed that IaDs behave differently from MaD, which are basically ungrammatical on the relevant reading. On the other hand, I.Ds and M.Ds are both fine. If we say that modal subordination is not possible in conjunction but only in sequencing[10], we correctly predict the acceptability of I.Ds and M.Ds, as well as the unacceptability of MaDs. What remains to be explained is what is behind the acceptability of Type I IaDs. As we said above, the solution to this will be found in the domain of a type of conditional semantics.

Wrt P2: We noticed that Type I IaDs do not permit the polarity switch that is possible in modal subordination, as with I.Ds and M.Ds. If Type I IaDs do not involve modal subordination, the lack of polarity switch is not noteworthy. Moreover, if we assign (Type I) IaDs a conditional semantics, we would expect the absence of a polarity switch, as these never happen with conditionals:

(37) *If you conserve your energy you will run out of breath
(≠ If you don't conserve your energy you will run out of breath)

Wrt P3: We noticed that unlike known cases of modal subordination, namely, I.Ds and M.Ds, which permit a choice between *will* and *would* in the second clause, IaDs do not. We consider the choice between *will* and *would* a characteristic of modal subordination and due to the fact that the covert antecedent which is responsible for modal subordination can be as in (38) or as in (39) and similarly for the M.Ds in (40-41)

(38) Read that book by Max. ~~If you do,~~ you will like it.
(39) Read that book by Max. ~~If you did~~ you would like it.

(40) You must/should/ought to/have to read that book by Max. ~~If you do~~ you will like it.
(41) You must/should/ought to/have to read that book by Max. ~~If you did~~ you would like it.

[10] Though we do not know why this should be the case.

On the other hand, with IaDs, there is no such covert antecedent, as there is no modal subordination. If IaDs receive conditional semantics, the CF morphology in the consequent is possible only with matching CF morphology in the first conjunct/ antecedent (specifically past morphology), and that is clearly lacking in IaDs.

Finally, recall that we had given as argument in favor of the modal subordination account of Type I IaDs the fact that we observe the anaphoric relationship associated with modal subordination:

(42) Plant a fig tree and it will give you plenty of good shade.

However, the acceptability of the anaphoric relationship between *it* and *a fig tree* would be just as expected under a conditional semantics for this sentence. That is, under modal subordination, the derivation would be schematically as in (39), while with a conditional semantics, it would be as in (40):

(43) Plant a fig tree and ~~if you plant a fig tree,~~ it will give you plenty of good shade.

(44) If you plant a fig tree, it will give you plenty of shade

In other words, while the acceptable anaphora in (42) is certainly consistent with a derivation that involves modal subordination, it does not argue in favor of it over an account that assigns conditional semantics to the sentence.

In short, we keep alive the hope that a common derivation for bth Types will be possible.

Section 4: Type II IaDs

Remember that these are the IaDs that cannot readily be paraphrased as containing an imperative.

These include cases where the speaker is trying to get the addressee to NOT do what the imperative verb says:

(45) Ignore your homework and you will fail the class
(46) Insult him and he will get you fired.
(47) Don't study hard and you will fail the exam.
(48) Continue this way and you will be dead before you are 20.
(49) Eat that and your cholesterol will go through the roof.

Type II also contains cases where the speaker is neither trying to get the hearer to do what the first conjunct conveys, nor trying to dissuade the hearer from the action in

Conjunct1 (attributed by Russell to Bolinger 1967 and Franke 2005). The reason these are considered Type II is that they do not contain "imperative semantics", that is, they do not contain a command.

(50) Tell him anything and he just looks at you blankly.
(51) Open the Guardian and you'll find three misprints on every page.

In this section, we will go in more detail over the accounts of Type II IaDs provided by Han, Russell, and Schwager, respectively.

Subsection 4.1: Han 2000

Recall that Han 2000 argues that no type of IaDs contains a true imperative. That is, Han does not make the Type I versus Type II distinction. She argues that the first conjunct of neither type is an imperative. Instead, she transforms all IaDs into conditional statements[11]. That is, (53) somehow becomes (54):

(53) Study hard and you will succeed.
(54) If you study hard, you will succeed.

According to Han, imperatives have the features [directive] and [irrealis] The reason Conjunct1 can become a conditional antecedent, Han says, is because it has the feature [irrealis] only, not [directive], which would have made it an imperative.

However, it remains unclear how the morphosyntax of Conjunct1 generates the desired semantics, as no compositional account is given.

In addition, if such a "defective"/"stripped" imperative is possible in an IaD, why couldn't the same happen to an embedded imperative? According to Han, true imperatives cannot be embedded because of their [directive] feature.

[11] Actually, Han describes her account as making an IaD similar to a conditional statement (p.199-200) and indeed, Russell p. 25 describes Han's account in those terms as well. However, in the section where she formalizes the description within a dynamic semantics model (p.197-200) she argues that Conjunct1 is interpreted like a *might*-statement, introducing a hypothetical possibility, about which Conjunct2 then makes a modally subordinated claim:

(i) Study hard and you will succeed.
(ii) You might study hard and then you will succeed.

In addition, Han has a different account for dfferent languages. What we say in the main text is her account for English IaDs. For Greek and German she says that IaDs do contain imperatives. We will return to this point shortly.

Han says we *think* that some IaDs contain a directive for action (the ones we call Type I) but that is not the result of them containing an imperative. It is the result of Conjunct2 being desirable, from which we draw the conclusion that we have an incentive to do what Conjunct1 describes.

So for Han, (55) does not contain an imperative any more than (56) does:

(55) Come closer and I will give you five dollars.
(56) Come closer and I'll shoot.

Han argues to have a variety of behavioral points on which Conjunct1 of any (i.e. of either type) IaD differs from an FIV. We will summarize these points shortly, in combination with a summary of the next author.

SubSection 4.2: Russell 2006 [12]

Russell claims that Conjunct1 in a Type II IaD is not an FIV. If this were tru, we would not need to worry about where the directive meaning has disappeared to, a problem which one faces if one thinks that Conjunct1 is an FIV. Though Russell gives some properties of Type II IaDs, he does not try to give a full account of Type II. That is, his main point is to show that Type II IaDs do not contain imperatives but Type I IaDs do. What is the nature of Conjunct1 in Type II for Russell then? He says that it is a bare infinitive, the nature of which he does not investigate much[13] and he acknowledges that he really has no account for it. However, he does say that Type II properties are reminiscent of Jackendoff and Cullicover's 1997 "Left Subordinating *and*" or "$_{LS}$and". We will return to what this is shortly.

According to Russell, there is a series of differences that distintinguish Type I from Type II IaDs. Moreover, he claims that these differences cluster together. He concludes that this provides support for his position that Type I and Type II undergo different

[12] Although Russell admits that his account has elements of Han's, see his p. 25 for some criticism of her proposal.

[13] Though Russell is very explicit about not committing himself to the nature of this bare VP, he speculates that they may be simple present declaratives with deletion of subject *you*. The existence of such deletion is motivated by sentences like the following:

(i) Want a cracker?
(ii) Know what I did today?

These have in common with the base VP of a Type II IaD that the missing subject can only be *you* and no other person is possible (though in Type II IaDs, missing impersonal *you* is also possible).

derivations. Interestingly, some of these differences are inspired by Han, who, though, took them to be differences between *any* type of IaD and imperatives.
That is, some of these facts discussed below were taken by Han as differences between IaDs and imperatives, and by Russell as differences between Type II and Type I IaDs.

In other words, there is considerable disagreement about the data, and we found this too: several of the tests below we were not able to duplicate[14]. We will point out our own findings for each difference. We turn to these differences in the next section.

Subsection 4.3: Is Conjunct1 in English IaDs imperative or not?
[This subsection contains a discussion of whether English Type II IaDs contain an FIV or not. As you will see, the data are inconclusive. However, whatever happens to be the case for English, there are languages where Conjunt1 of a Type II IaD is clearly morphologically an FIV, as we saw. In other words, the type of language that Russell wants to avoid admitting to, does clearly exist. So if you want, you can skip to section 4.4 on page 22]

What are these alleged differences then? Below is a list of what Han and Russell claim to have found and their comparisons. We also mention our findings for each point, but details of our findings are shown at the end of the section.

A) Both Han and Russell discuss subjects in imperatives, though they disagree about the facts. According to Russell, some IaDs can contain a subject, others cannot. Russell claims that the ones with undesirable consequents (Type II) can never contain a subject. As it is a known characteristic of the (English) imperative to take a subject, Russell concludes that Type II IaDs do not contain an imperative but Type I does.
These are Russell's examples:

Type I:

(57) Nobody steal and you'll all go to heaven.
(58) Everyone tithe[15] and you'll all go to heaven.
(59) Don't you steal and you'll go to heaven.

Type II:

(60) #Nobody tithe and you'll all go to hell.
(61) #Everyone steal and you'll all go to hell.
(62) #Don't you tithe and you'll go to hell.

According to Han, however, no IaD can contain a subject, not even those with desirable consequents:

[14] Schwager makes the same point about several of these alleged differences.
[15] To tithe: to pay one tenth of your income, especially to a church.

(63) *Everybody come to the party and she will be happy.
(64) *Someone open the window and we'll get some fresh air.

So from these facts she concludes that IaDs do not contain imperatives, since imperatives can take subjects.

We were unable to duplicate this difference systematically.

B) According to Han, no IaD can be negated with *don't*:

(65) ?Don't show up on time and you'll miss the beginning of the movie
(66) *Don't you worry so much and you'll be happier

From this she concludes that IaDs do not contain an imperative, since imperatives can be negated with *don't*:

(67) Don't move!

Russell, on the other hand, describes the facts differently. According to him, both types of IaDs can contain *don't*[16]:

(68) Don't steal and you'll go to heaven (Type I)
(69) Don't tithe and you'll go to hell (Type II)

However, according to Russell, a difference between the two types shows up in their possibility to take *don't – subject – verb* word order.
Type I IaDs can contain the order *don't – subject – verb*; Type II cannot:

(70) Don't you steal and you'll go to heaven
(71) #Don't you tithe and you'll go to hell.

From this, Russell concludes that Type II does not contain an imperative but Type I does.

We found (68, 69) equally acceptable, but found no difference between (70) and (71). In other words, in our findings, Type I and II both accept negation with *don't.* However, for our informants, neither Type I nor Type II accepts *don't you V* as first conjunct.

C) Russell says that Type I IaDs can be negated with *Do not*, and Type II cannot:

(72) Do not steal and you'll go to heaven

[16] Though how the infinitive that is Conjunct 1 of Type II IaDs according to Russell can support *don't* according to him is unclear.

(73) #?Do not tithe and you'll go to hell

From this he concludes that Type II does not contain an imperative but Type I does.

Han does not discuss similar facts; she asserts that IaDs cannot be negated but gives examples only with *don't* , as above, not with *do not*.

We found that both Type I and Type II equally accept *do not*.

D) According to Han, IaDs can never contain emphatic *do*. This sets them apart from imperatives, which can contain emphatic *do* (judgment Han's):

(74) Do put the light on!
(75) *Do put the light on and you'll see better.
(76) *Do come one step closer and I'll shoot.

For Russell, Type I IaDs can contain emphatic *do*; Type II cannot (judgments are Russell's):

(77) Do tithe and you'll go to heaven.
(78) #Do steal from the church and you'll go to hell.

From this he concludes that Type II does not contain an imperative but Type I does.

We were unable to duplicate this difference between Type I and Type II. Our speakers found no significant difference between (77) and (78).

E) Han discusses facts from Davies 1986, actually first discussed by Bolinger 1967, and says that IaDs can contain NPIs. This sets them apart from imperatives which can never do that:

(79) *Come any closer.
(80) Come any closer and I'll shoot.
(81) Lift a finger to help her and you'll be sorry.
(82) Say one word to anyone about this and I'll never forgive you.
(83) Drink any more beer and you'll puke.

Russell, though, points out that only *some* IaDs can contain NPIs, namely Type II ones (and if you look at Han's examples with NPIs in IaDs, you will see that indeed all of them have undesirable consequents). Russell concludes this by putting an NPI in IaDs that have Type I properties for him, like emphatic *do* and overt subjects:

(84) *Do eat any raw pork and you'll contract trichinosis.

(85) *Anyone turn out the light and I'll show you my slides.
(86) *Someone lift a finger to help and we'll finish building the model today.

From this Russell concludes that Type II does not contain an imperative, though it is still possible to conclude that Type I does.

Since our speakers did not systematically distinguish between Type I and Type II on the basis of emphatic *do* or overt subjects, we cannot set up the control environments in (80-82). However, we did find that our speakers made a difference wrt NPI-licensing, and we will return to this.

F) Han, discussing facts from Clark 1993, says that IaDs do not contain an imperative because the subject of Conjunct1 in an IaD can be impersonal 2nd person, an option which allegedly does not exist for imperatives:

(87) Wash yourself every day and your skin gets dry.

Russell points out that the impersonal subject is an option only for Type II. According to him, (88) is fine and it is a Type II IaD. However, (89) is meant to be a Type I, as evidenced by the *don't – subject – verb* sequence, which is possible only for Type I, according to him:

(88) Marry your sister and your kids will probably be messed up.
(89) #Don't you marry your sister and your kids will probably be OK.

However, Schwager 2006 (p. 247) disputes this difference because she found that plain imperatives can have impersonal subjects, as in proverbs:

(90) What you can manage to do today don't postpone for tomorrow

So this difference may not be real.

G) Han argues that IaDs do not contain imperatives as they can contain Conjunct1 with predicates that can never be imperatives:

(91) ?Doubt that you will succeed
(92) Doubt that you will succeed and you won't

(93) ?Know the answer
(94) Know the answer and you'll get an A

Russell does not discuss such facts. We found that our speakers agree with this. This is indeed a difference between unembedded imperatives and IaDs. However, this is not something that distinguishes Type I from Type II.

H) Russell, inspired by Jackendoff and Cullicover 1997[17], points to an additional difference between the two types. Type I IaDs cannot contain a pronoun in the first conjunct which is bound by a quantifier in the second; Type II can:

(95) *Someone come up with a few nice stories about him_k and every $senator_k$ will change his vote in our favor.
(96) *Everyone give him_k enough money/ten dollars and every $senator_k$ will give us access to his files.
(97) *Don't you slander him_k and every $senator_k$ will give you access to his files.

(98) Come up with a few nice stories about him_k and every $senator_k$ will change his vote in your favor.
(99) Give him_k enough money and every $senator_k$ will give you access to his files.

Han does not discuss such facts. We could not duplicate Russell's judgments. We found people who like Binding in IaDs with subjects contra Russell. We found people who accept subjects in IaDs with undesirable consequences
But the people that like IaDs with subjects also accepted Binding in those cases, contra Russell.

I) On the assumption that comma separation of conjuncts is possible only with *and*s of the same category, Russell concludes that Type I IaD has "normal" *and*, while Type II does not. That is, Type I but not Type II can have the form *p, q and s* interpreted as *If p and q, then s*. (Again, the presence of an overt subject is meant to ensure a Type I derivation, as in Russell's system, while a desirable second conjunct is not by itself sufficient to do that, since desirable conjuncts can also undergo a Type II derivation).

(100) Everyone sit down, someone turn out the lights, and I'll show you my slides.
(101) Everyone sit down and someone turn out the lights and I'll show you my slides.
(102) If everyone sits down and someone turns out the lights, I'll show you my slides.

(103) *Make a lot of noise, goof off, and you won't get a lollipop.
(104) Make a lot of noise and goof off and you won't get a lollipop.
(105) If you make a lot of noise and goof off, you won't get a lollipop.

[17] Schwager 2006 also discusses such facts but does not present them as a difference between the two types of IaDs.

Han does not discuss such facts. We were not able to duplicate these judgments. Our speakers had no obvious problem with (103)

J) Han, discussing facts from Davies 1986 and Clark 1993, says that IaDs can contain a Conjunct1 with past reference, an option not available for imperatives. This is another argument for her that IaDs do not contain imperatives:

(104) Life was hard in those days.
   a. Say one word out of turn and they'd dock you a week's wages.
   b. Take a holiday in those days and you were regarded as a spendthrift.

Russell does not discuss such facts. However, Schwager 2006 p.251 says that examples like (104) may be the result of interior monologue and that therefore "it does not have to be interpreted as prior to the utterance time, but rather as simultaneous with fictive *now*". We did not check this, as the parameters of this test are unclear to us and as it does not involve a difference between Type I and Type II anyway.

In summary, the only difference between Type I and Type II that we were able to duplicate involves NPIs.

Recall that our ultimate goal is to achieve a unified account of Type I and II in terms of some type of conditional semantics. Conditionals support NPIs in their antecedent, but not always. If we manage to show that the IaDs that do not support NPIs in the first conjunct correspond to conditionals that do not support NPIs in their antecedent, then the conditional account of both types will not be endangered by the variable acceptability of NPIs in IaDs.

We find that this is indeed the case.

(105) Lift a finger to help him and I will never speak to you again
If you lift a finger to help him I will never speak to you again

(106) *Lift a finger to help him and he will finish the building in time
(107) *If you lift a finger to help him he will finish the building in time

(108) *Anyone turn out the light and I'll show you my slides.
*If anyone turns out the light, I'll show you my slides.

(109) *Someone lift a finger to help and we'll finish building the model today.
*If someone lift a finger to help, we'll finish building the model today.

(110) Drink even a single glass of wine and your boss will fire you
If you drink even a single glass of wine, your boss will fire you

(111) Take even a single one of these pills and you will feel better
If you take even a single one of these pills you will feel better

As we see form the above, NPI licensing in IaDs does seem to track the acceptability of an NPI in the corresponding conditional. We will not go into details into the licensing of NPIs in conditionals here but will be content with the conclusion that they do not endanger a unified account[18]. However, there are types of conditionals that do not correspond to IaDs and some of these can license NPIs as well, which correctly give the impression that there are more NPIs in conditionals than in IaDs.

So far then, it seems that the data provided do not amount to an insurmountable obstacle to a unified account.

Section 4.4: Schwager[19].

Schwager's account for Type I IaDs is the one we already discussed, involving Modal subordination.
With respect to Type II IaDs: unlike Han, who thinks that Conjunct1 is a stripped imperative, and unlike Russell, who thinks that Conjunct1 is no imperative at all, Schwager thinks that Conjunct1 is an honest-to-goodness imperative.

Like Russell (and earlier than him), Schwager sees Type II IaDs as another case of Cullicover and Jackendoff's *LSand* and she wants an account that will unify all *LSand* cases.

So let's see what this *LSand* is. For a summary, please go to section 6 on page 29.

So how does *LSand* turn something that looks likes conjunction into a conditional?

In conditionals, the antecedent restricts a modal, and the consequent is the scope of that modal. In *LSand* environments, Conjunct1 becomes the restrictor of a modal and

[18] Note that (111) is a counterxample to the position that only IaDs with negative consequences license NPIs. Moreover, even if it were to turned out that it is only IaDs with negative consequents that licensed NPIs in Conjunct1, this could have been expressible in terms of R. Lakoff's and Linebarger's Negative Implicatum.

[19] Schwager discusses Han's work but not Russell's, which it precedes.

Conjunct2 becomes the scope. The modal whose restrictor and scope we are talking about is contained in Conjunct1.

Schematically:

(112) $[\text{Modal } (\alpha)]_{\text{Conjunct1}}$ $_{LS}$*and* $[(\beta)]_{\text{Conjunct2}}$

→

Modal $[(\alpha)]_{\text{restrictor}}$ $[(\beta)]_{\text{scope}}$

This means that the first conjunct of $_{LS}$*and* should always contain a modal. This is the modal that gets restricted by (the prejacent of the modal in) Conjunct1.

What is the source of the modal?

For the basic CJ cases, she says that present tense marks the presence of a generic operator, which plays the role of the modal in (112):

(113) Big Louie looks at him and he shies away in fear

Imperatives can be the first conjuncts of $_{LS}$*and* because they too are modalized in her account. So this is how she gets Conjunct1 to be a conditional antecedent:
In Type II IaDs, $_{LS}$*and* is semantically empty; it does not contribute conjunction.
There is a modal, however, specifically, the modal whose presence is marked with the imperative form in Conjunct1. This modal does not get applied to the prejacent material in Conjunct1 in the way it does in a regular imperative. Instead, the prejacent material in Conjunct1 gets mapped into the restrictor of that modal and Conjunct2 becomes the modal scope.

Scwager argues that "$_{LS}$*and* comes with a special intonation contour that triggers mapping of the entire proposition embedded under a modal operator in the first conjunct into the restrictor of the modal operator" (p.258)

Where does the "special intonation" of the initial quote come into play? Schwager, following Halliday 1967, talks about how sentences like those (114) is in principle ambiguous:

(114)a. (sign on an escalator:)
Dogs must be carried.

(114)b. (sign outside a seaside restaurant:)
Shirts must be worn

Sentence (114a) has the following two readings:

(115) In all the worlds compatible with the law in which there is an event involving this escalator and a dog, the dog is carried.

$(\forall w' \in f(w))\ [\exists x\ \exists e\ (dog'_{w'}(x)\ \ \text{on-this-escalator'}(x)(e))][\text{carried'}_{w'}(x)(e)]$

and

(116) In all the worlds compatible with the law in which there is an event involving this escalator, there is a dog that is carried.

$(\forall w' \in f(w))\ [\exists e\ (\ \text{on-this-escalator'}(e))]\ [\exists x\ [dog'(x)\ \&\ \text{carried'}_{w'}(x)(e)]$

In the first reading, *dogs* is in the restrictor of the universal modal. In the second reading it is not.

In the first reading, *dogs* is deaccented. In the second reading it is accented.

Deaccenting of *dogs* is more natural for (114a), but stressing *shirts* is more natural in (114b).

In other words, deaccenting is a mark of being mapped in the restrictor of the modal.

With $_{LS}$*and* , we see that Conjunct1 *must* be deaccented. That is, Conjunct1 must get mapped into the restrictor Otherwise, the properties characteristic of IaDs are not possible.

What are the challenges for Schwager's account? Here are some:

Q1: According to Schwager, the modal in the imperative is necessarily performative (which is why FIV are alwaysp erformatives and never descriptive statements)
What happens to the performativity of the modal in Type II IaDs?

Q2: The syntax-semantics mapping seems suboptimal: Schwager has left downward movement of the complement of the imperative into the restriction of the modal and then allows insertion of an abstractor capturing the trace left behind by the complement, and application of that abstract to the second conjunct. The operations "get" the right result but they are custom-made for this construction. As an attempt to fit the transformation of IaDs into a conditional by means of independently known operations, it fails.

Q3: Schwager points out that IaDs can never be epistemic:

(117) Feel warm and you will have caught something. ≠
(118) If you feel warm you will have caught something.

She attributes this to the fact that the covert modal of the FIV is not an epistemic modal. However, as she herself notes, she wrongly predicts that other necessity operators in Conjunct1 of *LSand* should also work but this is not true (point attributed to Manfred Krifka). The following fails as a conditional:

(119) You must come in time and you'll get a seat.
(120) It must rain and you take an umbrella

Q4: As also noted by Schwager, It is unclear how/why sufficiency modals would work in the *LSand* construction (von Fintel and Iatridou 2007):

(121) You only have to look at him and he shies away in fear.

Q5: Another challenge that Schwager herself notices has to do with an observation in Bolinger 1967 that she cannot account for. Bolinger 1967 points out that constructions like the ones we have been referring to as IaDs have the property that the second conjunct must be an intrinsic consequence of the first conjunct[20].

Here are some examples from Bolinger, involving statives, that show the intrinsic consequent reading in action

(122) Like her and her friends will love you.
*Like her and I'll introduce her to you.

(123) Own a piece of property and you get taxed mercilessly.
*Own this property and I'll buy it from you

(124) Understand Chinese and you can get any of these jobs.
*Understand Chinese and I need you for a teacher.

Finally, Schwager herself thinks her account wrongly predicts that IaDs could express restrictions on the modal background of imperatives and this is not true:

(125) If you leave your house, take an umbrella with you. ≠
Leave your house and you take an umbrella with you.

[20] See also von Fintel and Iatridou's 2007 "automatic result".

However, it is possible that this is not a different challenge from the one related to Bolinger's observation.

In the end, the postulation of a null modal does not help at all with the challenge of Type II IaDs either.

Section 5: What do we need?

So we have seen that while there are three proposals for IaDs, they all have their challenges. Can we do better? Let's see what some of the ingredients of an account would have to be.

A. Since we have found problems with the modal subordination account of Type I, we will not adopt it. This means that we will seek a common account for both types but without modal subordination. The intuitive appeal of $_{LS}$*and* seems obvious, so the initial working hypothesis will be do attempt to develop an account along those lines, which means that we need to figure out the nature of $_{LS}$*and* and its relation to conditional semantics. The fact that some IaDs are felt to have a paraphrase containing an imperative will be accounted for along the lines proposed by Han's: if the consequent (Conjunct2) is desirable, it is implicated that the speaker wants the hearer to initiate the action in Conjunct1.

B. The semantics of $_{LS}$*and* will be such that it includes the intrinsic consequent condition (Bolinger) or the automatic result (von Fintel and Iatridou)

C. From the above it follows that Conjunct 1 in all IaDs is of the same type. We will side with Schwager and against Russell that Conjunct1 is an imperative. Here are some reasons why:

- in languages with richer morphology than English, Conjunct1 even of Type II is marked as imperative[21]:

[21] Han notices that in Greek and German Conjunct1 is clearly an FIV and therefore gives a different account of IaDs for those languages from the one she does for English. The reason she does this is simply that it does not seem possible to duplicate the differences between the Conjunct1 of (Type II) IaDs and the Imperative that she thought she had found in English..

Recall that for Han, Conjunct1 in English is a "defective imperative" (p.195). That is, it is an imperative that has been stripped of its [directive] feature. Given that she considers Conjunct1 a stripped imperative, the question arises why Greek and German cannot have a "stripped imperative" either. This way she would be able to collapse the accounts for all three languages. Han's answer to this question is the following (p.195):

(126) Fae ena apo afta ke tha
Eat.IMP one from these and FUT

pethanis mesa se 24 ores
die within 24 hours
'Eat one of these and you will die within 24 hours'

- IaDs cannot be embedded, except under the verb *say* and without a complementizer. This is the embedding pattern of an imperative and not the embedding pattern of conditionals:

(127) *He thinks (that) eat one of these and you will die within 24 hours
He thinks (that) if you eat one of those you will die within 24 hours

(128) *He thinks/believes/etc that call him
He said (*that) call him[22]

(129) He said eat this and you will die within 24 hours

Note that the inability of the IaD to be embedded is not a function of $_{LS}$*and* but of the imperative in Conjunct1, as there appears to be nothing wrong with the following:

(130) John thinks that Mary frowns and Fred shies away in fear.

So like Schwager, we will take Conjunct1 to be an FIV in all IaDs.[23]

"… English uses bare verb forms for imperatives, whereas German, Korean, and Modern Greek have distinctive morphology for imperative verbs. In English, the absence of some of the morphosyntactic features associated with the imperative operator would have no effect on the bare verbal form. But in languages with distinctive morphology on the verb for imperatives, the absence of some of the morphosyntactic features of imperative operator would likely to have an effect on the verbal form. Thus, in these languages, there are no defective imperatives that look just like imperatives"
However, this rationale does not seem very clear. For example, from "in languages with distinctive morphology on the verb for imperatives, the absence of some of the morphosyntactic features of imperative operator would likely to have an effect on the verbal form", one could have just as well concluded that since the form is still imperative, the theory that permits stripping of an imperative is not correct.

[22] Crnic and Trinh

[23] Han's position is also that Conjunct1 contains an imperative but a "stripped" one. This raises the question of what the nature of this stripping mechanism is. For Han it is the removal of the [directive] feature, which will permit it to be embedded in a conjunction.

D. We have seen that IaDs cannot be epistemic. In fact, other cases if $_{LS}$and cannot be epistemic, or anankastic:

(131)a. If he left yesterday he must have arrived already
b.=/= He left yesterday and he must have arrived already

(132) If you want good cheese, you have to go to the North End
=/+ you want could cheese and you have to go to the North End

Which conditionals can appear in conjunctive form? According to Lakoff, it's threats and rewards, but clearly this does not cover all the cases, as already CJ's $_{LS}$and cases are neither threats nor rewards. We propose that a necessary condition for the conditional conjunction is that the relationship be causal. That is *if p, q* and *p and q* appear correlates only if p, when it happens, causes q. If the conditional does not express/contain a causal relationship, it does not have a correlated $_{LS}$and conjunction. Moreover, *p* is not a necessary but a sufficient condition for *q*. In other words, if *p* comes about, *q* will come about for sure. In other words, *p* inevitably causes *q*.

As evidence that the causal relation holds, look at all the cases cited from CJ above. Here are some examples in addition to (131-132) that show that when causality is absent, the conditional and conjunction are not paraphrases:

(133)a. If a dog has blue eyes it is intelligent
b.=/= A dog has blue eyes and it is intelligent

(134)a. If a man buys a horse he pays cash for it
b. =/= A man buys a horse and he pays cash for it

One might object that these do not work because unselective binding does not work in conjunctions. But this is not true:

(135) She looks at a man and he falls in love with her

What separates (135) from (133-134) is that in (135) the relationship is causal (in fact, sufficiency causal).

Of course, it *is* possible to look at (133-134) as paraphrases after all, but one can do that only if one imposes a causal relationship between the two conjuncts. For example, only if a dog's getting blue eyes causes it to become intelligent. And of course we see that

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However, we have not yet committed ourselves to the existence of such a feature. Moreover, we saw that while the "stripped" imperative can be embedded in an IaD, the IaD as a whole retains the embedding properties of an imperative.

threats and rewards are natural candidates for conditional conjunction, as in those cases the first conjunct causes the second.

This sufficiency/causal relationship is what Bolinger described as 'intrinsic consequent' (and von Fintel and Iatridou as 'automatic result').

What the SMC seems to contribute to $_{LS}$and is that Conjunct1 is easy, or low on some scale. Here are some more examples:

(136)The skies only have to darken and my dog runs under the table
You only have to go to the NE and you'll have a great dinner
You only have to give him $5000 and you will have his soul/he will be yours.

But the SMC is not what brings in the instrinsic consquence condition. That comes from $_{LS}$and itself. There are two reasons for this. On the one hand, we have seen plenty of cases of $_{LS}$and without an SMC that have the intrinsic consequence property. Here is one more example:

(137) You (onlyh ave to) go to the Stata Center and you learn what Morris is working on

On the other hand, there are environments where the SMC appears but that lack the intrinsic consequence:

(138) To learn what Morris is working on, you only have to go to the Stata Center
(139) If you want to learn what Morris is working on, you only have to go to the Stata Center

In (138) the SMC is used with a purpose clause, and in (139) in an anankastic conditional. However, both sentences permit the possibility that you go to the North End and do something other than get good cheese. On the other hand, in (175), even without the SMC, going to the North End will unavoidably land you with good cheese.

In short, the automatic result is a property of $_{LS}$and., not of the SMC[24]. When the SMC is present it says something explicit about the effort involved in Conjnct1.

[24] In addition, in (138-139) there is goal-oriented modality. This is the result of the purpose clause and the anankastic if-clause., not the result of the SMC. The $_{LS}$and with or without the SMC does not contain goal-oriented modality.

i. You (only need to) look at Fred and he shies away in fear
ii. The skies (only have to) darken a little bit and my dog runs under the table

The above sentences do not convey that the speaker wants Fred to shy away in fear or my dog to run under the table.

So here are the basic elements an account of IaDs should have:

No distinction between Type I and Type II All IaDs contain an imperative IaDs contain $_{LS}$*and* $_{LS}$*and* expresses a causal modal No modal contained in Conjunct1 other than sufficiency

Section 6: The most basic ingredient: Cullicover and Jackendoff (1999)' s $_{LS}$and

Cullicover and Jackendoff (1999) (CJ) discuss a variety of points at which simple "coordinating" conjunction (and$_C$) differs from what they call "Left Subordinating Conjunction" ($_{LS}$and), which permits a conditional paraphrase[25].

A. $_{LS}$and permits an anaphor in the first conjunct where and$_C$ does not.

(140) a. Another picture of himself (appears) in the paper $_{LS}$and Susan thinks that John will definitely go out and get a lawyer

b. *Another picture of himself has appeared in the paper and$_C$ Susan thinks that John will definitely go out and get a lawyer

B. $_{LS}$and permits a pronoun in the first conjunct to covary with a quantifier in the second conjunct but and$_C$ does not.

(141)a. You give him enough opportunity $_{LS}$and every senator, no matter how honest, will succumb to corruption.

b. *We gave him enough opportunity and$_C$ every senator, no matter how honest, succumbed to corruption.

C. Both $_{LS}$and and and$_C$ can be embedded but $_{LS}$and permits only IP-conjunction, not CP-conjunction.

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[25] As a safe-guard that we are dealing wth $_{LS}$and, CJ use the conditional paraphrase, as well as keeping the Tense/Aspect contents of the two conjuncts what they would be in a conditional (see CJ for more details on the latter).

(142)a. You know, of course, that you drink one more beer and you get kicked out. (=…that if you drink one more beer you get kicked out).

b.You know, of course, that you drink one more beer and that you get kicked out. (=/=…that if you drink one more beer you get kicked out).

D. $_{LS}$and does not permit VP-conjunction, unlike and$_{C.}$

(143)a. *Big Louie sees you with the loot and puts out a contract on you. (=/= If Big
b. Louie sees you with the loot, he puts out a contract on you)

E. According to CJ, $_{LS}$and and and$_{C}$ differ in ways which follow from the fact that with and$_{C}$ conjunction is symmetrical, while with $_{LS}$and the two conjuncts are not on equal standing, so to speak. However, CJ warn against treating all asymmetrical coordinations as LS-coordinating. They mention some cases where the coordination is asymmetric (e.g. where the first conjunct temporally precedes the second and so inversion of the two conjuncts is not possible) yet not left subordinating. The most telling tests for $_{LS}$and they argue are those involving binding, for this reason, we will not say much more about these differences other than mentioning them

With and$_{C}$ we get the well-known effect of inability to extract from only one of the conjuncts. Instead, we have to do ATB. With $_{LS}$and, on the other hand, ATB is out but we can have asymmetrical extraction from either conjunct. (judgments as indicated in CJ)

and$_{C}$:

(144)a. *This is the senator that I voted for and$_{C}$ Terry met Bill Clinton in Wahington
b.*This is the senator that I voted for Bill Clinton for and$_{C}$ Terry met in Washington
c. This is the senator that I voted for and$_{C}$ Terry met in Washington

$_{LS}$and:
(145)a. ?This is the loot that you just identify and we arrest the thief on the spot
b.?This is the thief that you just identify the loot and we arrest on the spot
c. ??This is the thief that you just point out and we identify on the spot.

F. Another point of difference between symmetrical and$_{C}$ and asymmetrical $_{LS}$and according to CJ is that the former permits inversion only if it occurs in both conjuncts, while asymmetrical $_{LS}$and permits inversion in either conjunct. (1146a,b)) are possibly a function of what the cause of the requirement for ATB is, namely, the parallelism of symmetric conjunction. (c,d) satisfy parallelism:

(146)a. *What has Bill seen and he has heard the bad news?
b. *Bill has seen the broken window and what has he heard?
c. What has Bill seen and what has he heard?
d. Who was at the party and what were they wearing?

On the other hand, asymmetrical $_{LS}$and permits inversion in either conjunct[26]:

e. Who does Big Louie visit and the whole gang goes nuts?
f. What does he mention and she kicks him out of her office?

g. Big Louie sees this mess and who's going to be in trouble?
h. You so much as mention the Minimalist program and how loud does he scream?

As we said earlier and for the reasons mentioned by CJ themselves, we will mostly concentrate on A-D, leaving E for a different occasion.

CJ argue that $_{LS}$and is syntactically a coordination yet that there is a level where the first conjunct is (semantically) subordinated to the second and the whole sentence is interpreted as a conditional. For CJ, an important part of their paper (possibly the most important part) is to argue that the level at which $_{LS}$and is interpreted as a conditional is not LF. The reason they give is that there are no syntactic transformations that will change a coordination into a subordination and the derivation from S-structure to LF can only be done with syntactic transformations. They conclude that $_{LS}$and is a case of syntax-semantics mismatch for the "Chomskyan Paradigm" and there is a need for what they call "Conceptual Structure" (refs), that is not derived syntactically from S-structure.

While we think that the discovery and investigation by CJ of $_{LS}$and is extremely valuable, we disagree with their larger conclusion. The reasoning is the following. When CJ claim that we are dealing with a case of a coordination that turns into a semantic subordination, what they in effect do is to say that a coordination turns into the **syntax** of an *if*-clause. That is, they compare the syntax of coordination of $_{LS}$and to the **syntax** of an adjunct *if*-clause. And indeed, this is an impossible syntactic derivation. But the syntax of an *if*-clause is not the same as "semantic subordination" or even "conditional semantics". It is just one of the syntactic structures that can end up with conditional semantics. In order to prove a syntax-semantics mismatch, they would need to give a semantics for conditionals for the semantic side of the "mismatch. Instead, they give syntactic structures for both sides of the mismatch (that of $_{LS}$and and that of an *if*-clause).

To prove a mismatch, one would need to first assume a certain *semantics* of conditionals, which they don't do. Let's assume Kratzer's semantics, where in one clause restricts a modal/quantifier over worlds (the restrictor) and another clause is a predicate of those worlds (the scope). What we need from the syntax is an indication as to which clause is the restrictor and which clause is the scope. One such indication can be seen in the syntax of *if-then*. But why should that be the only possible flag? We have another indication

[26] (CJ argue that in (e,f) the wh-phrase is inside the first conjunct, yet it has scope over the entire sentence, one of their mismatches)

with $_{LS}$and, at least in that the first conjunct is not postposable[27]. Note that *if*-clauses are postposable (since we already have a sufficient flag for which clause is the restrictor). The inability to postpose the first conjunct in $_{LS}$and may be exactly because we would then loose the clue as to which clause is the restrictor.
In short, $_{LS}$and and *if-then* structures contain the same amount of information that a conditional semantics needs, at least as for the identification of the restrictor and scope of the modal.

Is there something else we need from our syntax? Possibly a tripartite structure along the lines of Heim/Diesing, with the quantifier highest, followed more locally by the restrictor and then by the scope.
However, it is notoriously hard to derive this syntax for *if-then* structures anyway (refs). Moreover, in $_{LS}$and we have at least part of the desired structure already, in that the restrictor is higher in the tree than the scope. How the modal can end up in the highest position, is as much a mystery for $_{LS}$and as it is for *if-then*, though we ill return to this later.

In short, we do not think that CJ's larger conclusion follows from their premises. However, we do think that their empirical discoveries are very important.

CJ make a good case that there is are (at least) two types of *and* and that the one they call '$_{LS}$and' has somehow a modal, possibly conditional paraphrase.

CJ say that the first conjunct becomes and *if*-clause and that therefore the tense/aspect combinations of the two conjuncts must be identical to what would appear in conditionals. Putting aside the issue of Conjunct1 becoming a restrictor of a modal and not obtaining the syntactic status of an *if*-clause, as discussed earlier, the fact is that there are reasons to believe that it is not the case that at least Conjunct1 gets mapped into the restrictor as is. There are at least two reasons for this.
One is the cases of IaDs, where, if Russel and Schwager are right that these are also cases of $_{LS}$and, conjunct1 contains an imperative (like) form, which cannot make it as such in an *if*-clause:

(147) a. Ignore your homework and you will fail
b. *if ignore your homework, you will fail

The second case, reported from von Fintel and Iatridou, is the appearance of the sufficiency modal in conjunct1, which cannot appear in an *if*-clause:

(148) You only have/need to look at him and he shies away with fear
=/= *If you only have/need to look at him, he shies away with fear.

[27] And maybe the TMA specifications that CJ talk about is also such a flag, though we will see that IaDs defeat this point.

So we don't just have the mystery of obtaining a conditional paraphrase, we also need to find what happens to the missing elements and what their contribution is in the $_{LS}$and conjunction.

LSA 220
Morphology, syntax, and semantics of modals
Bibliography

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General Modal Semantics

von Fintel, Kai. 2006. Modality and language. In Donald M. Borchert (ed.), *Encyclopedia of philosophy – second edition*. Detroit: MacMillan Reference USA. URL http://mit.edu/fintel/fintel-2006-modality.pdf.

Kratzer, Angelika. 1977. What *must* and *can* must and can mean. *Linguistics and Philosophy* 1(3). 337–355. doi:10.1007/BF00353453.

Kratzer, Angelika. 1978. *Semantik der Rede: Kontexttheorie – Modalwörter – Konditionalsätze*. Königstein/Taunus: Scriptor.

Kratzer, Angelika. 1981. The notional category of modality. In H. J. Eikmeyer & H. Rieser (eds.), *Words, worlds, and contexts: New approaches in word semantics*, 38–74. Berlin: de Gruyter.

Kratzer, Angelika. 1991. Modality. In Arnim von Stechow & Dieter Wunderlich (eds.), *Semantics: An international handbook of contemporary research*, 639–650. Berlin: de Gruyter.

Kratzer, Angelika. 2008. What *Must* and *Can* must and can mean. URL http://semanticsarchive.net/Archive/Tc2NjA1M/. Manuscript of a chapter from a book to be published by Oxford University Press.

Kratzer, Angelika. 2009. The notional category of modality. URL http://semanticsarchive.net/Archive/Tc2NjA1M/notional-category-modality.pdf. Manuscript of a chapter from a book to be published by Oxford University Press.

Palmer, Frank Robert. 1986. *Mood and modality*. Cambridge University Press.

Portner, Paul. 2009. *Modality*. Oxford University Press.

Nauze, Fabrice. 2008. *Modality in typological perspective*. Ph.D. thesis, Universiteit van Amsterdam. URL http://www.illc.uva.nl/Publications/Dissertations/DS-2008-08.text.pdf.

Epistemic Modality, Evidentiality

Drubig, Hans Bernhard. 2001. On the syntactic form of epistemic modality. URL http://www.sfb441.uni-tuebingen.de/b2/papers/DrubigModality.pdf. Ms, Universität Tübingen.

von Fintel, Kai & Anthony S. Gillies. 2007. An opinionated guide to epistemic modality. In Tamar Szabó Gendler & John Hawthorne (eds.), *Oxford studies in epistemology: Volume 2*, 32–62. Oxford University Press. URL http://mit.edu/fintel/fintel-gillies-2007-ose2.pdf.

von Fintel, Kai & Anthony S. Gillies. 2009. *Must* ... stay ... strong! URL http://mit.edu/fintel/fintel-gillies-2009-mss.pdf. Ms, MIT and Rutgers University, submitted to *Natural Language Semantics*.

Groenendijk, Jeroen A.G. & Martin J.B. Stokhof. 1975. Modality and conversational information. *Theoretical Linguistics* 2(1/2). 61–112.

Izvorski, Roumyana. 1997. The present perfect as an epistemic modal. *Proceedings of Semantics and Linguistic Theory* 7. 222–239. URL http://www-rcf.usc.edu/~pancheva/evidentialperfect.pdf.

Karttunen, Lauri. 1972. *Possible* and *must*. In J. Kimball (ed.), *Syntax and semantics*, vol. 1, 1–20. New York: Academic Press.

Portner, Paul. 2009. *Modality*. Oxford University Press. Section 4.2.

Westmoreland, Robert R. 1995. Epistemic *must* as evidential. *Proceedings of the Amsterdam Colloquium* 10(3). 683–702.

Westmoreland, Robert R. 1998. *Information and intonation in natural language modality*. Ph.D. thesis, Indiana University.

Willett, Thomas. 1988. A cross-linguistic survey of the grammaticalization of evidentiality. *Studies in Language* 12(1). 51–97.

The Semantics of Clarity

Barker, Chris & Gina Taranto. 2003. The paradox of asserting clarity. *Proceed-*

ings of the Western Conference in Linguistics (WECOL) 14. 10–21. URL http://semanticsarchive.net/Archive/TY0OWM1Z/barker.taranto.clarity.pdf.

Barker, Chris. 2009. Clarity and the grammar of skepticism. *Mind and Language* 24(3). 253–273. doi:10.1111/j.1468-0017.2009.01362.x.

Reducing Deontic Modality to Goal-Oriented Modality

Finlay, Stephen. 2008. Oughts and ends. *Philosophical Studies* doi:10.1007/s11098-008-9202-8.

Some Syntax of Modals

Barbiers, Sjef. 2006. The syntax of modal auxiliaries. In Martin Everaert & Henk van Riemsdijk (eds.), *The blackwell companion to syntax*, vol. 5, chap. 70, 1–22. Blackwell. doi:10.1002/9780470996591.ch70.

Bhatt, Rajesh. 1997. Obligation and possession. In Heidi Harley (ed.), *Papers from the upenn/mit roundtable on argument structure and aspect*, vol. 32, MIT Working Papers in Linguistics, 21–40. URL http://people.umass.edu/bhatt/papers/bhatt-haveto.pdf.

Bhatt, Rajesh. 1999. *Covert modality in non-finite contexts*. Ph.D. thesis, University of Pennsylvania. URL http://repository.upenn.edu/cgi/viewcontent.cgi?article=1033&context=ircs_reports.

Brennan, Virginia. 1993. *Root and epistemic modal auxiliary verbs*. Ph.D. thesis, University of Massachusetts at Amherst. URL http://proquest.umi.com/pqdlink?did=746513971&Fmt=7&clientId=1566&RQT=309&VName=PQD.

Butler, Jonny. 2003. A minimalist treatment of modality. *Lingua* 113(10). 967–996. doi:10.1016/S0024-3841(02)00146-8.

Castañeda, Hector-Neri. 1970. On the semantics of the ought-to-do. *Synthese* 21(3-4). 449–468. doi:10.1007/BF00484811.

Chomsky, Noam. 1977. On wh-movement. In Peter Culicover, Tom Wasow & Adrian Akmajian (eds.), *Formal syntax*, 71–132. New York: Academic Press.

Cinque, Guglielmo. 1999. *Adverbs and functional heads: A cross-linguistic perspective*, Oxford Studies in Comparative Syntax. Oxford: Oxford University Press.

Cormack, Annabel & Neil Smith. 2002. Modals and negation in English. In Sjef Barbiers, Frits Beukema & Wim van der Wurff (eds.), *Modality and its interaction with the verbal system*, 133–163. Benjamins.

Diesing, Molly. 1992. *Indefinites*. Cambridge, MA: MIT Press.

Feldman, Fred. 1986. *Doing the best we can: An essay in informal deontic logic*. Dordrecht: Reidel.

von Fintel, Kai & Sabine Iatridou. 2002. If and when *If*-clauses can restrict quantifiers. URL http://mit.edu/fintel/fintel-iatridou-2002-ifwhen.pdf. Ms, MIT.

de Haan, Ferdinand. 1997. *The interaction of modality and negation*, Outstanding Dissertations in Linguistics. Garland.

Hackl, Martin & Jon Nissenbaum. 2003. A modal ambiguity in *For*-infinitival relative clauses. URL http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.129.889&rep=rep1&type=pdf. Ms, Pomona College and McGill University, accepted for publication in *Natural Language Semantics* with revisions.

Hackl, Martin. 1998. On the semantics of ability attributions. Ms, MIT generals paper.

Hacquard, Valentine. 2006. *Aspects of modality*. Ph.D. thesis, Massachusetts Institute of Technology. URL http://people.umass.edu/hacquard/hacquard_thesis.pdf.

Heim, Irene. 1982. *The semantics of definite and indefinite noun phrases*. Ph.D. thesis, University of Massachusetts at Amherst. URL http://semanticsarchive.net/Archive/TkoZmYyY/dissertation.pdf.

Iatridou, Sabine & Ivy Sichel. 2008. Negative dps and scope diminishment: Some basic patterns. *Proceedings of the North East Linguistics Society* 38. URL http://web.mit.edu/linguistics/people/faculty/iatridou/nels38.pdf.

Iatridou, Sabine & Hedde Zeijlstra. 2009. On the scopal interaction of negation and deontic modals. Ms in progress, MIT and Universiteit van Amsterdam.

Izvorski, Roumyana. 1998. Non-indicative *wh*-complements of existential and possessive predicates. *Proceedings of the North East Linguistics Society* 28. 159–173. URL http://www-rcf.usc.edu/~pancheva/nonindicative.pdf.

Jackendoff, Ray. 1972. *Semantic interpretation in generative grammar*. MIT

Press.

Nauze, Fabrice. 2008. *Modality in typological perspective*. Ph.D. thesis, Universiteit van Amsterdam. URL http://www.illc.uva.nl/Publications/Dissertations/DS-2008-08.text.pdf.

Palmer, Frank Robert. 2001. *Mood and modality*. Cambridge: Cambridge University Press, 2nd edn.

Picallo, M. Carme. 1990. Modal verbs in Catalan. *Natural Language and Linguistic Theory* 8(2). 285–312. doi:10.1007/BF00208525.

Thráinsson, Höskuldur & Sten Vikner. 1995. Modals and double modals in the Scandinavian languages. *Working Papers in Scandinavian Syntax* 55. 51–88. URL http://www.hum.au.dk/engelsk/engsv/papers/vikn95d.pdf.

Wurmbrand, Susi. 1999. Modal verbs must be raising verbs. *West Coast Conference on Formal Linguistics* 18. 599–612. URL http://wurmbrand.uconn.edu/Susi/Papers/WCCFL18.pdf.

Anatomy of a Modal

von Fintel, Kai & Sabine Iatridou. 2006. Anatomy of a modal construction. URL http://web.mit.edu/fintel/anatomy.pdf. Ms, MIT, to appear in *Linguistic Inquiry*.

Franke, Michael. 2006. Teleological necessity and *Only*. *Proceedings of the ESSLI Student Session* 11. URL http://student.science.uva.nl/~mfranke/Papers/TelNecOnly.pdf.

Krasikova, Sveta & Ventsislav Zhechev. 2006. You only need a scalar *only*. *Proceedings of Sinn und Bedeutung* 10. URL http://www.sfb441.uni-tuebingen.de/b10/Pubs/KrasikovaZhechev_SuB05.pdf.

Krasikova, Sveta. 2008. Quantifiers in comparatives. *Proceedings of Sinn und Bedeutung* 12. 337–352. URL http://www.hf.uio.no/ilos/forskning/konferanser/SuB12/proceedings/krasikova_337-352.pdf.

Ought

Copley, Bridget. 2006. What should *should* mean? URL http://hal.archives-ouvertes.fr/docs/00/09/35/69/PDF/copley.should.pdf. Ms, Université Paris 8/CNRS.

von Fintel, Kai & Sabine Iatridou. 2008. How to say *ought* in Foreign: The composition of weak necessity modals. In Jacqueline Guéron & Jacqueline Lecarme (eds.), *Time and modality* (Studies in Natural Language and Linguistic Theory 75), 115–141. Springer. doi:10.1007/978-1-4020-8354-9.

Portner, Paul. 2009. *Modality*. Oxford University Press. pp. 79–81.

Modality and Tense

Abusch, Dorit. 2008. Circumstantial and temporal dependence in counterfactual modals. URL http://semanticsarchive.net/Archive/2NhNGNlZ/Abusch-circumstantial-modals.pdf. Ms, Cornell University.

Borgonovo, Claudia & Sarah Cummins. 2007. Tensed modals. In Luis Eguren & Olga Fernández Soriano (eds.), *Coreference, modality, and focus: Studies on the syntax-semantics interface* (Linguistik Aktuell/Linguistics Today 111), 1–18. John Benjamins.

Condoravdi, Cleo. 2002. Temporal interpretation of modals: Modals for the present and for the past. In David I. Beaver, Luis D. Casillas Martínez, Bardy Z. Clark & Stefan Kaufmann (eds.), *The construction of meaning*. Stanford: CSLI. URL http://semanticsarchive.net/Archive/2JmZTIwO/.

Iatridou, Sabine. 1990. The past, the possible, and the evident. *Linguistic Inquiry* 21(1). 123–129. URL http://www.jstor.org/stable/4178663.

Iatridou, Sabine. 2000. The grammatical ingredients of counterfactuality. *Linguistic Inquiry* 31(2). 231–270. doi:10.1162/002438900554352.

Laca, Brenda. 2008. On modal tenses and tensed modals. URL http://halshs.archives-ouvertes.fr/docs/00/32/33/40/PDF/ChronosTEX.MT_TM.pdf. Ms, Université Paris 8/CNRS.

Portner, Paul. 2009. *Modality*. Oxford University Press. Section 5.1.

Stowell, Tim. 2004. Tense and modals. In Jacqueline Guéron & Jacqueline Lecarme (eds.), *The syntax of time*, 621–636. MIT Press. URL http://www.linguistics.ucla.edu/people/stowell/Stowell-Tense&Modals.pdf.