

WHAT TO DO IF YOU WANT TO GO TO HARLEM
NOTES ON ANANKASTIC CONDITIONALS AND RELATED MATTERS

Kai von Stechow and Sabine Iatridou

Massachusetts Institute of Technology

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I. INTRODUCTION

The term ANANKASTIC CONDITIONAL was coined by von Wright for sentences like:

- (i) If the house is to be made habitable, it ought to be heated.

“[This sentence] . . . says that heating the house is a *necessary condition* of making the house habitable [. . .] An equivalent formulation . . . would be ‘Unless the house is heated, it will not be habitable.’” (von Wright [11:10f])

Sæbø, in his dissertation and in a recent paper in the festschrift for Arnim von Stechow [8], shows that the analysis of such sentences, even in a sophisticated framework for the semantics of modals and conditionals such as the one developed by Kratzer [6], is far from obvious. He then makes his own proposal for an analysis.

In this paper, we will first show that Sæbø’s analysis is not adequate either and in fact fails in the face of a slight modification of the scenario that he uses to refute the obvious analysis. We will then proceed to develop our own solution to the puzzle. Along the way, we take into account recent contributions by von Stechow et al. [10], Huitink [3, 4], and Nissenbaum [7].

2. THE CONSTRUCTION

Sæbø's paradigm example:

- (2) You must take the A train if you want to go to Harlem.
- (3) To go to Harlem, you must take the A train.

The basic make-up of the construction is:

- A TELEOLOGICAL modal that specifies what can or must be done to achieve a given goal.
- An *if*-clause that contains an expression picking out a goal or intention.

Other than von Wright's brief mention of it, there does not seem to be much earlier work on this construction. Sæbø adduces an interesting quote from Hare [2], which illustrates that superficially similar sentences exist that do not have the anankastic construal:

- (4) If you want sugar in your soup, you should ask the waiter.
- (5) If you want sugar in your soup, you should get tested for diabetes.

The difference ... can be brought out, first, by noticing the entirely different grounds that would be given to justify them. The first would be justified by pointing out that the waiter has the only access to sugar. The second would be justified by arguing that an inordinate desire for sugar is a symptom of diabetes, and that those with diabetes should have it treated. Alternatively, we might bring out the difference in the following way: the first suggests that asking the waiter would be a means to having sugar in one's soup; the second does not suggest that getting tested for diabetes is a means to having sugar in one's soup. (Hare [2:45])

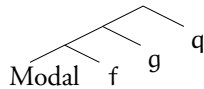
We have found another early mention in a paper by Sloman [9]¹, who gives these examples:

- (6) Smoking brand X is better than smoking brand Y if you want to contract lung cancer as soon as possible.
- (7) If you want to get to London by noon, then you ought to go by train.

3. THE OBVIOUS ANALYSIS AND WHY IT IS INADEQUATE

3.1 A Quick Review of Kratzer's System

We quickly review Kratzer's doubly relative semantics for modals. In her system, modals are sensitive to two CONVERSATIONAL BACKGROUNDS (functions from worlds to sets of propositions), the MODAL BASE and the ORDERING SOURCE. We will assume that each modal at LF takes two covert arguments, which are "pronouns" of the type $\langle s, \langle st, t \rangle \rangle$, which will be given a value by the contextual variable assignment.



- The modal base f assigns to the evaluation world a set of propositions which jointly define the domain of possible worlds that the modal can quantify over.

¹ Sloman's paper is quite remarkably prescient. He advocates a highly context-dependent, "elliptical" analysis of *ought*-statements, according to which *it ought to be the case that p* means that p is the best of the possibilities in the comparison class Z relative to the basis of comparison B – roughly parallel to Kratzer's later modal base / ordering source system. He writes that "Where others claim to see differences in meaning of *ought*, we can now see differences in basis of comparison, as well as differences in comparison class." He further writes:

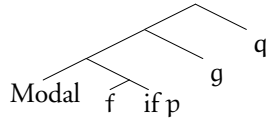
We have noted that without a basis of comparison, a sentence using *ought*, *must*, etc. cannot express a complete true or false proposition. As previous illustrations show, there are various ways in which a basis may be explicit, including the use of such phrases as *From the point of view of . . .*, *In order to achieve . . .*, *If you want . . .*, *If you're the mayor . . .*, or *If there's to be . . .*. Where an *if*-clause specifies a basis of comparison, as in *If you want to travel safely you ought to buy seat belts*, then the statement thus made is not really a conditional statement, since the apparent consequent does not express a complete proposition on its own.

- But before the modal can do that, the ordering source intervenes. It also assigns a set of propositions to the evaluation world. This set of propositions, however, serves to assess the worlds in the modal base as to how close they come to some point of comparison, some ideal.
 - In the end, the modal quantifies over those worlds in the modal base that are assessed as “as good as possible” by the ordering source.
- (8) For any set of propositions P , we define a strict partial order $<_P$:
 $\forall w', w'' : w' <_P w''$ iff $\forall p \in P (w'' \in p \rightarrow w' \in p)$ and $\exists p \in P (w' \in p \wedge w'' \notin p)$
 w' is better than w'' according to P iff all propositions in P that hold in w'' also hold in w' but some hold in w' that do not also hold in w'' .
- (9) For a given strict partial order $<_P$ on worlds, define the selection function \max_P that selects the set of $<_P$ -best worlds from any set X of worlds:²
 $\forall X \subseteq W : \max_P(X) = \{w \in X : \neg \exists w' \in X : w' <_P w\}$.
- (10) $\llbracket \text{must} \rrbracket^{w,g} = \lambda f. \lambda g. \lambda q. \forall w' \in \max_{g(w)}(\cap f(w)) : q(w') = \text{I}$.
- (11) THE DRIVEWAY: *John has to pay a \$100 fine*
- a. Modal base f : assigns to each w the set of propositions describing *what happened until now*
 - b. Ordering source g : assigns to each w the set of propositions describing *what the bylaws of Cambridge demand*.
 - c. $f(w)$ includes the proposition that John obstructed his neighbor’s driveway
 - d. $g(w)$ includes the propositions that (i) nobody obstructs driveways and that (ii) anybody who obstructs a driveway pays a \$100 fine.
 - e. Among the worlds in $\cap f(w)$, all of which are worlds where John obstructed his neighbor’s driveway, the best ones according to $g(w)$ are the ones where he pays a \$100 fine.

We add conditionals:

- (12) If John obstructs his neighbor’s driveway, he has to pay a \$100 fine.

² This is only legitimate under what Lewis calls the LIMIT ASSUMPTION.



- We assume that the modal base f and the ordering source g are as before.
- The *if*-clause adds the proposition that John obstruct his neighbor's driveway to the modal base. Henceforth, no world in the modal base is ideal: in all of them John obstructs his neighbor's driveway (even though this need not be the case in the actual world, that's what makes conditionals "hypothetical").
- The best worlds in the modal base are those where John pays the fine.

3.2 *The Hoboken Problem – First Version*

(I3) If you want to go to Harlem, you must take the A train.

The Obvious Analysis:

- The *if*-clause would modify the modal base of the modal *must*.
- the modal base would presumably be a CIRCUMSTANTIAL one pairing the evaluation world with a set of propositions describing relevant circumstances (of geography, facts about transportation systems, facts about how much money you have to spend on transportation, your current location, etc.).
- To this, the *if*-clause now adds the proposition that you want to go to Harlem.
- the salient ordering source is a teleological one, which pairs the evaluation world with the set of propositions describing your goals in that world.

The Hoboken Scenario I:

- Assume that in the actual world $w@$, you want to go to Hoboken.
- I, however, do not know that. I am uncertain as to whether you want to go to Hoboken or to Harlem.
- The best way to Hoboken is the PATH train, the best way to Harlem is the A train.

4.2 *Why he is wrong*

Sæbø's analysis in fact makes false predictions in a scenario similar to the one that killed the obvious analysis.

Assume again, that in the actual world $w_{@}$, you want to go to Hoboken. I, however, do not know that. I am uncertain as to whether you want to go to Hoboken or to Harlem. The best way to Hoboken is the PATH train, the best way to Harlem is the A train. So, I say, correctly it seems:

(15) If you want to go to Harlem, you have to take the A train.

As before we assume that the modal base is the set of worlds compatible with the relevant circumstances (of geography, facts about transportation systems, facts about how much money you have to spend on transportation, your current location, etc.). What is the ordering source? A function g that assigns to a world the set of propositions that you want to be true. But now Sæbø's system modifies g by adding to it the proposition that you go to Harlem:

(16) For any w : $g^+(w) = g(w) \cup \{\text{that you go to Harlem}\}$.

But now see what happens when we apply g^+ to $w_{@}$: we get at least the set of propositions that contains the two propositions that you go to Hoboken and that you go to Harlem. The former is in there because that is your actual goal in $w_{@}$ and the latter is in there because it was added by the anankastic conditional.

The Hoboken Scenario II: Assume now that that going to Hoboken and Harlem are inconsistent goals, which they may well be if we are talking about what to do this afternoon (there simply isn't enough time to go to both places). In the best worlds in the modal base, you either go to Hoboken or to Harlem. The best you can do is go to one of them. It is not true that in all of them you take the A train. So, (15) is predicted to be false, contrary to fact.

Recall the lesson we drew from the Hoboken Problem earlier: *In the correct analysis of anankastic conditionals, we need the "hypothetical" goal expressed in the if-clause (that you want to go to Harlem) to override or take precedence over any conflicting goals that you actually have.* The problem with Sæbø's analysis is that it doesn't do the trick. His analysis *adds* the goal of going to Harlem to whatever goals you actually have. What we need to do is to get rid of or at least demote your actual goal (of going to Hoboken) and to make your hypothetical goal (of going to Harlem) be the one that counts.

5. NESTED MODALITY?

Our task is to find an analysis where the fact that the ordering source delivers the goal of going to Hoboken (which is your goal in the actual world) does not interfere with the contribution of the anankastic conditional. In this section, we show that if we assume that the construction involves two nested modals, the Hoboken Problem goes away. Assume then that in the anankastic construction, the *if*-clause does not actually restrict the overt teleological necessity modal (*have to, must, should, ought*). Instead, it restricts a covert modal, presumably epistemic, which is located above the overt modal.

(17) [MUST if you want to go to Harlem] [have-to (you take the A train)]

In the relevant reading, the lower modal has the teleological interpretation, that is, its modal base will be circumstantial, its ordering source will be goal-based.

We derive truth-conditions as follows:

(18) (17) is true in w iff
 for all worlds w' such that w' is epistemically accessible from w and in w'
 you want to go to Harlem:
 for all of the worlds w'' among the worlds which are circumstantially acces-
 sible from w' and which best satisfy your goals in w' :
 you take the A train in w'' .

The trick is that we first let the higher modal together with the *if*-clause take us to worlds where you want to go to Harlem. At this point, worlds where you want to go to Hoboken instead are simply not among the worlds where the embedded modal statement is evaluated. Now, the lower modal finds the best worlds relative to your goals in the worlds where you want to go to Harlem. The claim is that all of those are worlds where you take the A train.

How is this better than Sæbø's analysis? The main differences are (i) it is compositional, (ii) the Hoboken Problem does not arise here. Any world w' in which we assess the truth of the embedded modal claim will be one where you want to go to Harlem (and not to Hoboken).

A precedent: in the dissertation of Frank [1], she argues for a doubly-modalized analysis of *all* deontic conditionals,³ although the best arguments come from counterfactual deontic conditionals. Here is a non-counterfactual example of ours that makes the point that at least some deontic conditionals need to be doubly modalized:

(19) If jaywalking is illegal in this town, that guy over there has to be punished.

Imagine that we're saying this in a town where jaywalking is actually completely legal, but we are uncertain about the law. Further, that guy over there is blatantly crossing the street right in the middle of a block, ignoring two perfectly fine crosswalks, and making two lines of traffic come to a screeching halt. (19) appears true. But under a single modal analysis, it will come out false.

It may be instructive to compare the analysis sketched here to what happens in examples such as the following:

(20) Everybody who wants to go to Harlem has to take the A train.

We suggest that the LF for this looks as follows:

(21) every $(\lambda x. x \text{ wants}_w \text{ to go to Harlem})$
 $(\lambda x. \text{ has to } (f(w)) (g(x, w)) \lambda w'. x \text{ takes}_{w'} \text{ the A train}).$

Note that here the Hoboken Problem doesn't arise. The higher quantifier over individuals picks out just those individuals who want to go to Harlem (shucking aside all those who want to go to Hoboken or other places). The modal embedded under that quantifier then claims that for each of those individuals his or her actual goals are best achieved by taking the A train. Similarly, the idea of the nested modal analysis of the anankastic construction is that the higher modal (together with the *if*-clause) shucks aside worlds where you want to go to Hoboken or other places.

One objection to the nested modals analysis is that it is not easy to make the putative higher modal explicit:⁴

³ “These observations lead us to the conclusion that there are in fact no truly *deontically modalized if* conditionals. Instead we assume conditionals with a deontic modal operator in the consequent clause to be analyzed throughout in terms of an implicit or explicit epistemically (or circumstantially) based modal operator. The deontic modal is then to be analyzed within the scope of the ‘higher’ epistemic modal operator.”

⁴ This issue was raised by Tamina Stephenson in our seminar.

- (22) If you want to go to Harlem, you must have to take the A train.

This has a distinctly different flavor from the sentence without *must*. Furthermore, its possibility counterpart,

- (23) If you want to go to Harlem, you may have to take the A train,

shares the same flavor. It appears that these sentence are most easily read as signalling a deduction (from some unstated pieces of evidence) that someone who wants to go to Harlem has to take the A train. That is, (22) and (23) feel like they have an epistemic modal *on top of* the entire anankastic construction, rather than making explicit the putative epistemic modal *inside* the anankastic construction.

But who is to say that the covert epistemic modal has the same “deductive flavor” that overt epistemic modals of English have? What threatens the nested modality analysis much more is that it doesn’t really solve our problems.

6. THE MAYOR

von Stechow et.al. point out that the nested modality analysis fails to account for a scenario discussed by Kratzer:

- (24) You want to become mayor.
 You want to not go to the pub regularly.
 You will become mayor only if you go to the pub regularly.

- (25) If you want to become mayor, you have to go to the pub regularly.

Having the *if*-clause modify a higher epistemic modal doesn’t help here. The two goals – while incompatible – can coexist in one person. So, even in the worlds where you want to become mayor, you can still want to not go to the pub regularly.

In fact, upon further reflection, the nested modality analysis doesn’t even account for the Hoboken Problem, as soon as we admit the possibility that one can have two incompatible goals (going to Harlem and going to Hoboken). Just going to worlds where you want to go to Harlem doesn’t mean that the Hoboken goal has been zapped.

We need the goal in the *if*-clause to override *any other* goal. This is what we propose to do now.

7. DESIGNATED GOALS

Let's forget the conditionals for a moment and turn to the *to*-infinitive version of our sentence:

(26) To go to Harlem, you have to take the A train.

7.1 *Strength*

There is a persistent feeling of a difference in strength between two sets of teleological/deontic modals. For example, Sæbø writes: "Some [modals], like *ought* and *should*, express a necessity that may seem weaker than *must*" (p. 433). He does not, however, make a proposal for how to capture this difference.

Sloman [9] proposes that *ought* says what is *best*, or *better* than all alternatives, while *must* picks out the *only* candidate.⁵

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. [9: 391]

Here is some evidence for the difference in strength:⁶

(27) You ought to take the train, but you don't have to.

⁵ Sloman also makes the rather interesting remark that what we would call epistemic uses of *it ought to be the case that p* could be analyzed as "Among the possible alternatives, p is the one which best fits the available evidence or known facts". (The difference between epistemic *ought* and *must* may be parallel to what he suggests for their teleological readings.) He ends with the following delightful suggestion: "However, it may be that in addition this use can be construed as having overtones to the effect that nature, or the world (or God?) is some sort of agent which ought to produce this particular state of affairs in order to keep its promises to us!"

⁶ A deontic example:

- (i) You really should take out the garbage, but of course you don't have to.

Or the sign in the bathroom of a Boys Scout Camp on Cape Cod:

- (ii) Everyone ought to wash their hands, employees have to.

7.2 How to Implement Sloman

To implement Sloman’s insight, we propose two modifications to the standard semantics of teleological modals:

- We will distinguish between a designated goal and considerations that measure how good a particular way of achieving the goal is. That is, in *To go to Harlem, you ought to take the A train*, going to Harlem is the designated goal and all other “goals” or considerations (you want to spend as little money as possible, you want to get there in time for the movie, you want to avoid exercise, etc.) are subordinate and serve to rank the worlds in which you achieve the designated goal. This is one particular instance of a general issue for modal ordering semantics: whether and how to rank the propositions in the ordering source.⁷ Here, we will just employ a binary distinction between designated goal and ancillary considerations.
- We follow Sloman in making a distinction between *ought*-type expressions and *must*-type expressions as to their strength. Here is how we could do this:

- (28) a. *to p, ought to q* is true in w relative to modal base $f(w)$ and ordering source $g(w)$ iff all the $g(w)$ -best worlds in $f(w)$ where p is achieved are q -worlds.
- b. *to p, must q* is true in w relative to modal base $f(w)$ iff all the worlds in $f(w)$ where p is achieved are q -worlds.

⁷ Here is what Kratzer [5] says about this topic:

Actually, it is simplification to assume that there is never more than one ordering source involved in modal reasoning. Suppose I draw conclusions which involve established facts, the Encyclopedia Britannica, the local newspaper and the gossip I picked up at the corner. And suppose further that the established facts have priority over the Encyclopedia Britannica, the Encyclopedia Britannica has priority over the local newspaper and the local newspaper has priority over the gossip I picked up at the corner. How do we reason in such a case?

I think that the semantics of modals which I have presented so far can be extended in a straightforward way to handle these cases. The interpretation of a modal expression would have to depend on a modal base f and a finite sequence of ordering sources g_1, \dots, g_n . For any world w , $g_1(w)$ would induce an ordering on $\cap f(w)$ in the usual way. $g_2(w)$ would – if necessary – refine this ordering in undoing the “ties” left by its predecessor and so on for every successive member in the sequence.

Probably, we can’t assume that the different ordering sources form a natural sequence with respect to having priority over each other. There may be ordering sources which have equal priority. This all sounds as if it were the beginning of my next paper.

Unfortunately, it wasn’t. It is certainly time to revisit this topic.

As you can see, this analysis would treat the *to*-infinitive as an argument of the teleological modal. Other variants that maintain an adjunct-analysis could be explored.

7.3 *Anankastic Conditionals Again*

With this kind of semantics for teleological modals, what happens to the analysis of anankastic conditional?

(29) If you want to go to Harlem, you ought to take the A train.

We might treat (29) as “elliptical” (in an informal sense) for

(30) If you want to go to Harlem, you ought to take the A train (to go to Harlem).

The idea is that we fill in the designated goal argument with the proposition that you go to Harlem, because that is precisely the goal made contextually salient by the *if*-clause.

So far so good, but what is the compositional role of the anankastic *if*-clause? Well, we are tempted to maintain a nested modal analysis and say that first we are taken to epistemically accessible worlds where you want to go to Harlem, and then we evaluate in those worlds the claim that to go to Harlem, you ought to take the A train.⁸

7.4 *Success*

We have solved all of our problems in a way that is (almost) compositional, modulo the appeal to contextual filling in of the designated goal.

⁸ We could explore other options for the *if*-clause. It may be a “biscuit conditional” or a “factual conditional”. von Stechow et.al. say that our *if*-clauses share some of the properties of both of these species, but that neither is a perfect match. Also, as pointed out to us by Marketa Ceplova, we might in fact be able to let the *if*-clause restrict the modal base of the teleological modal itself. The crucial step of demoting your actual goals is achieved by the designated goal and does not need to be effected by the *if*-clause directly. We won't pursue this issue today.

8. RUUD VAN NISTELROOY

Huitink [3, 4] presents the following scenario: both the A train and the C train go to Harlem, the C train will have Ruud van Nistelrooy on it, you want to meet Ruud van Nistelrooy.

(31) To go to Harlem, you have to take the C train.

According to Huitink, our analysis falsely predicts (31) to be true. Actually, we predict it to be false, since not all of the worlds where you achieve the designated goal are worlds where you take the C train.

What we do predict is that the *ought/should* version of (31) is true:

(32) To go to Harlem, you ought to take the C train (because then you might meet Ruud van Nistelrooy).

We think that is in fact a good prediction.

9. PEDRO MARTINEZ

Nissenbaum [7] presents a devastating version of Huitink's problem: both the A train and the C train go to Harlem, the C train will have Pedro Martinez on it, you want to kiss Pedro Martinez.

(33) #To go to Harlem, you ought to kiss Pedro Martinez.

This absurd sentence is one we incorrectly predict to be true.

Nissenbaum proposes that in these cases the *to*-clause does not in fact combine with the modal, supplying a designated goal. Instead, the teleological modal takes scope over a sentence where the *to*-clause is a "non-modal" modifier. Consider that we can in fact say:

(34) He took the A train to go to Harlem. (= with the goal of going to Harlem)

So, the LF of one of our prime examples would be:

(35) ought [you take the A train to go to Harlem]

Nissenbaum's Pedro Martinez sentence is absurd for the same reason that the following is absurd:

(36) #He kissed Pedro Martinez to go to Harlem.

We do not think that we can adopt Nissenbaum's proposal.

An empirical problem: Nissenbaum conflates two different kinds of rationale clauses: the ones that are in construction with a teleological modal and the ones that modify a (non-modal) VP. The distinction was clearly identified by Gunnar Bech, as reported by von Stechow et.al. Here is a data point to illustrate the difference:

(37) To get this job, you have to be fluent in Spanish.

(38) #I am fluent in Spanish to get this job.

Rationale clauses at the VP-level seem to need to attach to agentive VPs, but the complement of "have to" can be non-agentive.

The main complaint we have: the LF in (35) doesn't represent the meaning of the example correctly. To go to Harlem, you do *not* have to take the A train with the goal of going to Harlem. What you need to do is take the A train. It doesn't matter whether you take it with the goal of going to Harlem (as long as you get off at the right stop).

But what about the awful Pedro Martinez example? We conjecture that the teleological modal construction (*to p, ought to q*) signals that *q* is an *essential part of a way of achieving p*. Kissing Pedro Martinez is not an essential part of a way of achieving *p*. You can still get to Harlem by just getting on the A train and refraining from kissing Pedro.

(39) *q* is an essential part of a way of achieving *p*
 iff there is a set *P* of propositions such that $q + P \Rightarrow p$ but $P \not\Rightarrow p$.
 more precisely: $\exists P : f(w) + P + q \Rightarrow p$ but $f(w) + P \not\Rightarrow p$.

(40) To go to Harlem, you ought to take the C train and kiss Pedro Martinez.

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Authors' Addresses

Professor Kai von Fintel
Department of Linguistics & Philosophy
Massachusetts Institute of Technology
77 Massachusetts Avenue, 32-D808
Cambridge, MA 02139-4307

Email: fintel@mit.edu

Web: <http://web.mit.edu/fintel>

Professor Sabine Iatridou
Department of Linguistics & Philosophy
Massachusetts Institute of Technology
77 Massachusetts Avenue, 32-D808
Cambridge, MA 02139-4307

Email: iatridou@mit.edu

Web: <http://web.mit.edu/linguistics/www/iatridou/index.html>