

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

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I. INTRODUCTION

The term ANANKASTIC CONDITIONAL¹ was coined by von Wright for sentences like:

- (1) 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 [9:rof])

Sæbø, in his dissertation and in a recent paper in a festschrift for Arnim von Stechow [6], 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 [4], is far from obvious. He then makes his own proposal for an analysis.

In these notes, we will 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 proceed to sketch three more or less adequate solutions to the puzzle.

2. THE CONSTRUCTION

Sæbø’s prime example of an anankastic conditional is:

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

The basic make-up of the construction is:

* We unleashed this material on our “Topics in Semantics” seminar in February 2004 at MIT. We thank the participants in this seminar for very fruitful discussions. We came across this topic during our investigation of the modal construction that we analyze in our “Anatomy of a Modal” (in progress). We thought that the material in these notes is of sufficient independent interest to warrant a separate exposition. This is as yet a rough draft based on class notes. We would welcome comments and criticisms.

¹ From the Greek ἀνάγκη = “necessity”. See also <http://www.theoi.com/Khaos/Ananke.html> for the myth of Ananke.

- 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.

Sæbø points out that the construction has a (near?) equivalence in the combination of a teleological modal with a purpose *to*-clause:

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

There is also the possibility of finding a contraposed paraphrase:²

- (4) If you do not take the A train, you cannot go to Harlem.

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:

- (5) If you want sugar in your soup, you should ask the waiter.
- (6) 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 [7]³, who gives these examples:

² Note that the contraposed form is not:

- (i) If you do not take the A train, you do not want to go to Harlem.

³ Sloman's paper is quite remarkable. 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:

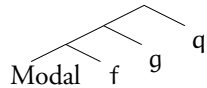
We have noted that without a basis of comparison, a sentence using *ought*, *must*, etc. cannot express a complete true or false proposition. As previous illustrations show, there are various ways in which a basis may be explicit, including the use of such phrases as *From the point of view of . . .*, *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

- (7) Smoking brand X is better than smoking brand Y if you want to contract lung cancer as soon as possible.
- (8) 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.
 - 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.
- (9) For any set of propositions P , we define a strict partial order $<_P$:
 $\forall w', w'' : (w' <_P w'' \text{ iff } \forall p \in P (w'' \in p \rightarrow w' \in p) \text{ and } \exists p \in P (w' \in p \wedge w'' \notin p))$
 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'' .
- (10) 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:⁴
 $\forall X \subseteq W : \max_P(X) = \{w \in X : \neg \exists w' \in X : w' <_P w\}$.
- (11) $[[\text{must}]]^{w,g} = \lambda f. \lambda g. \lambda q. \forall w' \in \max_{g(w)}(\cap f(w)) : q(w') = \mathbf{1}$.
- (12) 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*

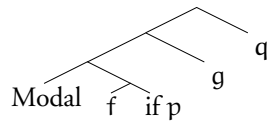
statement, since the apparent consequent does not express a complete proposition on its own.

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

- 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:

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



- 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

Take Sæbø's paradigmatic example:

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

According to the standard Kratzerian Analysis the *if*-clause would modify the modal base of the modal *must*. Without it, 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. A natural reading of the sentence would seem to be one where the salient ordering source is a teleological / practical necessity one, which pairs the evaluation world with the set of propositions describing your goals in that world.

The analysis makes wrong predictions. Assume that in the actual world $w@$, you want to go to Hoboken.⁵ I, however, do not know that. I am uncertain as to whether

⁵ Sæbø uses Brooklyn, but there are too many ways to get to Brooklyn for the scenario to be realistic. For a very cool map of the New York subway system, see <http://www.columbia.edu/~brennan/subway/>.

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 should take the A train.

But the obvious analysis falsely predicts that (15) is false. Even in a world where you want to go to Harlem, the best way to achieve the goal that you actually have (namely, to go to Hoboken) is to take the PATH train.

(16) $\forall w' \in \max_{g(w)} (\cap (f(w) \cup \lambda w. \text{you want}_{w'} \text{ to go to Harlem})) :$
you take the A train in w' .

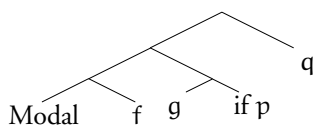
Let us be clear on the lesson to draw from the Hoboken Problem: *In the correct analysis of anankastic conditionals, we need the “hypothetical” goal expressed in the if-clause (that you want to go to Harlem) to override or take precedence over any conflicting goals that you actually have.*

We proceed to consider Sæbø’s proposal for how to achieve this task. We then show that his proposal does not achieve the task. And then, we present three proposals that do work as required.

4. SÆBØ’S ANALYSIS AND WHY IT’S INADEQUATE AS WELL

4.1 Sæbø’s Analysis

The basic insight of Sæbø’s discussion is that the antecedent of the anankastic conditional serves to change the ordering source of the teleological modal. In our syntacticized version of Kratzer’s system, the initial idea can be implemented quite perspicuously. Instead of attaching to the modal base pronoun f , the *if*-clause attaches to the ordering source pronoun g :



It is immediately clear that the simplest such analysis won’t do. If we add the proposition that you want to go to Harlem to the ordering source, we would be making it a goal of yours that you want to go to Harlem, in other words: you want it to be the case that you want to go to Harlem.

What needs to happen is that the proposition that you go to Harlem is added to the ordering source. This is non-compositional. The interior modal *want* is zapped and instead interpreted as a signal as to what kind of ordering source is intended.

This procedure will have considerable trouble with examples like this one:

(17) If you hate Dr. Smith, you ought to stay away from the office today.

This is an anankastic conditional, we maintain.⁶ Nevertheless, there does not seem to be an obvious way of transforming *you hate Dr. Smith* into an appropriate goal to add to the ordering source. While in the right context it might follow from your hatred of Dr. Smith that you want to avoid him, this cannot be seen as a case of the verb *hate* being a grammatical marker for anything involving avoidance goals.⁷

But the non-compositionality is not the only problem with this analysis.

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:

(18) If you want to go to Harlem, you should 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:

(19) 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.

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, (18) 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*

⁶ (17) has non-anankastic neighbors (as in Hare's pair) such as:

(i) If you hate Dr. Smith, you ought to have your head examined.

⁷ As someone in our seminar pointed out, if you hate Dr. Smith and you know that he will receive his come-uppance in the colloquium on Friday, you should go to the talk rather than avoid him. This clearly illustrates that what goes on in anankastic conditionals is not a matter of verbs like *want* serving as mere grammatical markers of what kind of ordering source is involved.

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. ANALYSIS #1: 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 necessity modal (*have to, must, should, ought*). Instead, it restricts a covert modal, presumably epistemic, which is located above the overt modal.

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

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

We derive truth-conditions as follows:

(21) (20) 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 accessible 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 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,⁸ although the best arguments come from coun-

⁸ "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."

terfactual 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:

(22) 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. (22) 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:

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

We suggest that the LF for this looks as follows:

(24) 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:⁹

(25) 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,

(26) 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, (25) and (26) 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.

Another possible problem is that to derive the right meaning, it is important here that what you want in the epistemically accessible worlds w' stays the same in all of the worlds w'' circumstantially accessible from w' . Can this be ensured? Otherwise, the lower modal may be sensitive to competing goals again.

⁹ This issue was raised by Tamina Stephenson in our seminar.

We are not convinced that these problems are insuperable. But we find it opportune to cast around for alternatives.

6. ANALYSIS #2: SPECTOR'S ALTERNATIVE

In class discussion, Benjamin Spector suggested an alternative analysis which relied on a different meaning for the modal. We think that what follows is what he had in mind:

- The standard analysis looks among the worlds in the modal base for the ones that best satisfy the goals/rules/etc. in the evaluation world.
- But why not look among the worlds in the modal base for those that best satisfy the goals/rules/etc. *in those worlds themselves?*
- Then, assuming that the *if*-clause restricts the worlds in the modal base to those where you want to go to Harlem, the ordering source can find those where you get what you want.

Technically, the meaning for the modal would look like this:

$$(27) \quad \llbracket \text{must} \rrbracket^{w,g} = \lambda f. \lambda g. \lambda q. \forall w' \in \max_{g(w')}(\cap f(w)) : q(w') = \mathbf{I}.$$

To see what would be happening, it might help to reformulate this as follows:

$$(28) \quad \llbracket \text{must} \rrbracket^{w,g} = \lambda f. \lambda g. \lambda q. \forall w' \in \cap f(w) : \neg \exists w'' (w'' <_{g(w')} w') \rightarrow q(w') = \mathbf{I}.$$

Using this meaning (in conjunction with the assumption that the conditional restricts f) will give the right result for the Harlem sentence.

Nevertheless, we do not think this is the way to go. The reason is that the standard semantics will still be needed for other cases. And so, we would be in a position of having to posit widespread ambiguity in modals.

- (29) THE DRIVEWAY AGAIN
 We are uncertain as to what the penalty for John's obstructing his neighbor's driveway is.
- a. A: He has to pay a fine.
 - b. B: No. He has to pay restitution to his neighbor.

In some worlds in the modal base (which is a superset of the epistemically accessible worlds, assuming that we have some kind of circumstantial modal base), the Cambridge bylaws say that anybody who obstructs a driveway pays a fine. In other worlds in the modal base, the bylaws say that anybody who obstructs a driveway pays restitution to the owner of the driveway. Now, to determine whether (29a) or (29b) is true, we care about what the bylaws in the actual world say. Spector's meaning would not deliver this.

EXERCISE 1: Can you think of a scenario which shows the same point with respect to a teleological modal? \square

7. ANALYSIS #3: DESIGNATED GOALS

7.1 *First Steps*

To get to our third analysis, we turn to the purpose clause paraphrase of anankastic conditionals. What does the *to*-infinitive do? Is there a Hoboken Problem with purpose clauses?

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

To a first approximation, it turns out that the absence of a *want* in the adjunct avoids all the problems we had earlier. Arnim von Stechow in his intensional semantics lecture notes [8] proposes that we can just treat the *to*-infinitive as adding a proposition (the proposition that you go to Harlem) to the *modal base*. All of the worlds in the modal base will now be worlds where you go to Harlem (not just worlds where you *want* to go to Harlem). Consequently, if you actually want to go to Hoboken, that wish is made irrelevant by the facts (you don't go there but to Harlem). The best worlds in the modal base are those where your other considerations (of saving money, of being safe, etc.) are best satisfied. All of those are claimed to be worlds where you take the A train.

Can we turn this success into a triumph by applying it to the analysis of anankastic conditionals? Well, von Stechow does indeed propose that the *if you want to go to Harlem*-antecedent adds the proposition that you go to Harlem to the modal base, just as we just did with the *to*-infinitive. The suggestion is that the modal expression *want* in the *if*-clause is semantically idle. It merely marks the kind of goal that the entire modal is sensitive to, here a wish of the subject. He speculates that one might in some tricky way treat this as a presuppositional ingredient of this construction.

We do not see how this could work. The main problem comes from the fact that the *if*-clause can contain a plethora of intentional predicates. An analysis that does not use the meaning of those predicates is unlikely to work. Recall for example our example with *hate*:

(31) If you hate Dr. Smith, you ought to stay away from the office today.

We thus conclude that we cannot transfer this particular analysis of the teleological *to*-infinitive construction to the puzzle of anankastic conditionals.

In fact, we think that the proposed analysis of the contribution of *to*-infinitives to the teleological construction is not correct in the first place. It appears to incorrectly predict the following two sentences to be good paraphrases of each other:

- (32) a. If you go to Harlem, you have to see the Apollo Theatre.¹⁰
 b. To go to Harlem, you have to see the Apollo Theatre.

¹⁰ See <http://www.apollotheater.com/about.shtml>, in case you actually do go to Harlem, which you may well want to.

Now, (32a) is quite arguably true, while (32b) is absurd. Seeing the Apollo Theatre is not a way of getting to Harlem. Adding the proposition that you go to Harlem to the modal base seems to mis-analyze its role. It is not a hypothetical assumption, but the designated goal that the teleological modal then tells us how to achieve.

7.2 *Strength*

We would like to develop an analysis of teleological modality that does not make the proposition in the *to*-infinitive part of the modal base, but treats it as a distinguished element in the ordering source, as the DESIGNATED GOAL. We will now approach this idea from an odd angle.

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 [7] proposes that *ought* says what is *best*, or *better* than all alternatives, while *must* picks out the *only* candidate.¹¹

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. [7: 391]

Here is some evidence for the difference in strength:

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

It is easy to multiply such conjunctions.¹²

7.3 *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

¹¹ 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!”

¹² A deontic example:

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

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.¹³ 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:¹⁴

- (34)
- 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.

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.

¹³ Here is what Kratzer [3] 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.

¹⁴ We should also consider a slightly different proposal, according to which *ought* triggers a presupposition that there is more than one way to achieve the goal, while *must* has no such presupposition and is thus typically chosen when there is no such choice. Here are the entries we would have:

(i) PRESUPPOSITIONAL VERSION

- 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 *plus* a presupposition that there are worlds in $f(w)$ where p is achieved that are not q -worlds.
- b. *to p, must 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. *No presupposition.*

At the moment, we will not pursue this option.

7.4 *Anankastic Conditionals Again*

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

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

We might treat (35) as “elliptical” (in an informal sense) for

(36) 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 could maintain our previous 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.

But as pointed out in class discussion by Marketa Ceplova, the designated goal analysis of the anankastic conditional does not depend on the nested modal analysis. We could in fact let the expression *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.

This move would help us avoid the problems we noted for the nested modal analysis, in particular the fact that the putative higher modal cannot easily be made explicit.

7.5 *Assessment*

At the moment, we are quite comfortable with the Designated Goal Analysis. We believe that it is an adequate solution to the puzzle of anankastic conditionals. Along the way, we have introduced a concrete proposal capturing long-standing intuitions about the different strengths of *ought/should* versus *must/have to*. We end with a note of caution.

The proposal as it stands is perhaps still too unsophisticated. Recall the contrast noted earlier between the following two sentences:

- (37) a. If you go to Harlem, you have to see the Apollo Theatre.
 b. To go to Harlem, you have to see the Apollo Theatre.

What makes (37a) true? A set of goals that entail that when you go somewhere for touristy reasons, you should see the major sights of that place. So, we can truthfully say that among the worlds where you go to Harlem, the ones that best satisfy those goals are all worlds where you see the Apollo Theatre. Now, for (37b), our analysis makes such goals subservient to the designated goal of going to Harlem. But as long as there is no inconsistency between the designated goal of going to Harlem and the ancillary considerations, we would still predict (37b) to be true. What our analysis

still doesn't quite capture is that in the teleological case, the modal chooses between different ways of *achieving* the designated goal. The modal is not engaged in further trip planning. We don't quite see yet how to implement this. It may be that we have to think more seriously about temporal matters.¹⁵

BIBLIOGRAPHY

- [1] FRANK, Anette: 1996. *Context Dependence in Modal Constructions*. Ph.D. thesis, Universität Stuttgart. URL <http://www.dfki.de/~frank/papers/header.ps.gz>.
- [2] HARE, Richard: 1971. "Wanting: Some Pitfalls." In Richard Hare (Editor) *Practical Inferences*, pages 44–58. London: Macmillan.
- [3] KRATZER, Angelika: 1981. "The Notional Category of Modality." In H. J. Eikmeyer & H. Rieser (Editors) *Words, Worlds, and Contexts. New Approaches in Word Semantics*, pages 38–74. de Gruyter. Reprinted in Portner & Partee [5], 289–323.
- [4] KRATZER, Angelika: 1991. "Modality." In Arnim von Stechow & Dieter Wunderlich (Editors) *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*, pages 639–650. Walter de Gruyter Berlin.
- [5] PORTNER, Paul & PARTEE, Barbara H. (Editors) : 2002. *Formal Semantics: The Essential Readings*. Oxford: Blackwell.
- [6] SÆBØ, Kjell Johan: 2001. "Necessary Conditions in a Natural Language." In Caroline Féry & Wolfgang Sternefeld (Editors) *Audiatur Vox Sapientiae: A Festschrift for Arnim von Stechow*, pages 427–449. Berlin: Akademie Verlag. Preprint <http://vivaldi.sfs.nphil.uni-tuebingen.de/~arnim10/Festschrift/Saebøe-8-komplett%20fertig.pdf>.
- [7] SLOMAN, Aaron: 1970. "Ought and Better." *Mind*, 79(315): 385–394.
- [8] VON STECHOW, Arnim: 2004. "Schritte zur Satzsemantik." Unpublished lecture notes, <http://vivaldi.sfs.nphil.uni-tuebingen.de/~arnim10/Lehre/index.html>.
- [9] VON WRIGHT, Georg Henrik: 1963. *Norm and Action*. London: Routledge.

¹⁵ Sæbø has some possibly relevant remarks about temporal dependencies in these constructions, but we have yet to work our way through his ideas successfully.

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