

Chapter 61

Anankastic conditionals:

If you want to go to Harlem, ...

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Abstract

This article sets out the peculiarities of the type of complex sentence that has become known as anankastic conditionals ($\alpha\nu\acute{\alpha}\gamma\kappa\eta$ = ‘necessity’) and the ways in which these conditionals have been analyzed in the literature. On the surface, they seem to express that wanting one thing is a sufficient condition for another thing being necessary, but at a deeper level they are felt to convey that the second thing is a necessary condition for the first – and it has proven difficult to reconcile these two points of view. Numerous attempts at a compositional analysis have been offered, augmenting the standard Kratzerian theory of modals and conditionals; yet no consensus has been reached on how anankastic conditionals should best be treated.

Keywords anankastic conditional · necessary condition · teleological modality · purpose clause · intention · contraposition · hypothetical imperative

Word count: 10.776

1 Setting the stage

What have since 2005 come to be known as anankastic conditionals are, at a glance, sentences like (1). Such sentences may seem simple and straightforward but are in fact deeply problematic, even though the standard theory of modality in linguistic semantics, developed by Kratzer (1977, 1978, 1981, 1991, 2012), can successfully account for sentences like (2), which are superficially similar:

- (1) If you want to be removed from duty you must be insane.
(In the context of *Catch 22*: it is a necessary condition for your being removed from duty that you are insane.)
- (2) If you want to fly combat missions you must be insane.
(In the same context: it is a necessary conclusion from your wanting to fly combat missions that you are insane.)

Conditionals that are explicitly modalized do not generally present a problem for that theory; on the contrary, its ability to account for cases like (2) is among its strengths. But despite appearances, (1) is not like (2); in general, cases like (1) form a special class.

This article will first describe what is special about anankastic conditionals (henceforth also: ACs), and what unites them, in relatively informal terms (Section 2). This description will include some historical background, citing key sources, as well as a survey of the empirical scope of the phenomenon. Section 3 moves into the standard theory of modals and conditionals to show that it makes wrong predictions about anankastic conditionals, and Section 4 goes on to review and critically discuss proposals that have been made from 1985 onwards to modify it so as to provide for the right predictions after all (Sæbø 2001, von Stechow and Iatridou 2005, von Stechow, Krasikova and Penka 2006, Huitink 2008, Condoravdi and Lauer 2016). Section 5 winds up the article with a comparison of these approaches and a discussion of remaining issues.

2 Recognizing anankastic conditionals

The hallmark of anankastic conditionals is their *conditio sine qua non* meaning: they entail that unless the eventuality described in the consequent clause holds or comes about, the hypothetical goal expressed in the *if* clause cannot or will not be reached. Thus users of English agree that (1) is synonymous with (3) – at least close enough:

- (3) You cannot be removed from duty if you are not insane.

Likewise, (4) is judged to be equivalent with (5). Note the two negations in each paraphrase, and the fact that antecedent and consequent have been swapped.

- (4) The zebra has to outrun the lion if it wants to survive.
- (5) The zebra won't survive if it doesn't outrun the lion.

So ACs express a necessary condition relation between two propositions, and it is this property which has earned them their designation:

A statement to the effect that something is (or is not) a necessary condition of something else I shall call an **anankastic statement**.
(von Wright 1963: 10)

The sentence von Wright used to illustrate anankastic statements was (6).

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

This sentence, he noted, says that heating the house is a **necessary condition** of making the house habitable, and an equivalent formulation would be (7).

(7) Unless the house is heated, it will not be habitable.

The term *anankastic conditional* came into use around 2005, following work by von Fintel and Iatridou (2005) and von Stechow, Krasikova and Penka (2006), to designate a class of conditionals of which (1), (4) and (6) are representatives, a class giving rise to interesting questions. The phenomenon as such and the questions it raises were first identified by Sæbø (1985).

2.1 Contraposition and the volatility of *want*

The most puzzling fact about ACs is that they can express a necessary condition relation between two propositions ψ and ϕ although they do not appear to express a relation between ψ and ϕ at all but one between ψ and the proposition *that someone intends to bring about ϕ* . If (5) is a faithful paraphrase of (4), (4) expresses that the proposition that the zebra outruns the lion is a necessary condition for the proposition that it survives; yet to express this, (4) has to contain the attitude verb *want*. Or more accurately, it has to contain *some* expression of an intention, be it the verb *be* taking a *to* infinitive as in (6), commonly taken to express someone else's than the subject's intention, or any of a range of alternatives.¹ (8) means something different.

(8) The zebra has to outrun the lion if it survives.

Conversely, this *want* has no place in a paraphrase with two negations and the antecedent-consequent relation reversed; (9) means something different again.

(9) The zebra can't/doesn't want to survive if it doesn't outrun the lion.

But note that if we look at (2), not an AC but superficially like one, a paraphrase of the same form as (9) does seem faithful.

(10) You cannot want to fly combat missions if you are sane.

This is in fact as expected on the basis of the inference rule of **contraposition**, valid for material implication and strict implication in propositional and modal logic, *inter alia*: 'if p then q' entails 'if not q then not p' (and *vice versa*).

Now whether natural language (indicative) conditionals obey contraposition is a much-debated issue (see, e.g., Allott and Uchida 2009). But in any case, (2) and (10) are formally each other’s contrapositives, so to the extent that they are good paraphrases of each other, contraposition is valid for them.² (4) and (5), however, are not formally each other’s contrapositives, since, as we have seen, *want* appears and must appear in the antecedent of the anankastic conditional but does not and cannot appear in the consequent of the other conditional. The same holds for (1) and (3) as paraphrases of one another – and still, these are good paraphrases, better than many instances of (formally conform) contraposition.

So what we see with anankastic conditionals is a **pattern** of inference which cannot be reduced to a logical **rule** of inference. Indeed, as I will show in Section 3, it is far from easy to derive the inference pattern even with more fine-grained and sophisticated tools tuned to the semantics of natural language conditionals.

2.2 Non-anankastic readings: Sugar in your soup

It is important to note that the necessary condition interpretation is not the only possible interpretation of conditionals which have the appearance of anankastic conditionals. This is already evident from considering (2) above, which on the face of it is built like (1) (and may or may not in fact be built in the same way); in the context of *Catch 22*, this sentence could not be paraphrased with (11):

(11) You cannot fly combat missions if you are sane.

Now while (2) differs from (1) (on the readings under consideration) in a different so-called **modal flavor** for the necessity modal *must*, ‘epistemic’ versus ‘root’, or, more specifically, ‘teleological’, it is also possible to come across conditionals that look or sound like (1) but do not get an anankastic interpretation although the necessity modal is given a root or even a teleological flavor. A minimal pair of this sort was discussed by Hare (1971: 45f.):³

(12) If you want sugar in your soup, you should ask the waiter.

(13) If you want sugar in your soup, you should get tested for diabetes.

Hare noted that (12) suggests that asking the waiter would be a means to having sugar in one’s soup while (13) does not suggest that getting tested for diabetes is a means to that end, suggesting that the contrast can be traced to the meaning of *if you want* in the two cases: only in (13) does it mean ‘if you have a desire’. It is easier to find cases that parallel (13) with *should* or *ought* than with *must*, but the constructed sentence (14) may serve as an illustration, to be contrasted with (15), which does lend itself to an anankastic interpretation. In both cases, the necessity modal’s meaning could be made more precise by adding “in view of your goals”, indicating a teleological modal flavor.

(14) If you want to kill yourself, you must see a therapist.

(15) If you want to overcome your depression, you must see a therapist.

What this shows is that the anankastic meaning is not a function of the mere presence of *want* or its kin in an *if* clause and *must* or its kin in the matrix: either there is a hidden structural difference between the readings, or there is some distinct non-structural way of interpreting the words *if*, *want* or *must* resulting in the anankastic reading. As we will see in Section 4, both alternatives have been considered in the literature attempting to account for this reading.

2.3 Anankastic variations

ACs do not always display a conditional format with *must* or a similar necessity modal in the *if* clause: there is not always any *if* clause, there may not be a modal in a narrow sense, and if there is, it does not always have the force of necessity. Below, the scope of what can be an AC is broadened along these axes.

2.3.1 Purpose constructions

Normally, purpose clauses express *causae finalis* (final causes, or end causes) and can be paraphrased with causal clauses containing an expression of intention:

- (16) Jimi Hendrix and Neil Young stole a truck in order to get to Woodstock in time to perform.
- (17) Jimi Hendrix and Neil Young stole a truck because they wanted to get to Woodstock in time to perform.

But sometimes, provided the matrix clause contains an expression of necessity, they can be paraphrased with *conditional* clauses containing such an expression, and then they are synonymous with anankastic conditionals. In fact, what has since (Sæbø 2001) become the paradigmatic example of ACs, (18), is a variation over the authentic (19), with a *to* instead of an *if* clause:⁴

- (18) You must take the A train if you want to go to Harlem.
- (19) You must take the A train to go to Sugar Hill way up in Harlem.

Conditional clauses with *be* instead of *want* correspond to purpose clauses with *for*:

- (20) If your marriage is to be valid you must be wed before sunset.
- (21) For your marriage to be valid you must be wed before sunset.

The fact that sentences like (19) convey necessary condition relations was noted by Bech (1957), who also observed that when, as here, the purpose clause is not sentence-initial but sentence-final, this is not the only possible interpretation. German sentences like (22) are in his terms in principle ambiguous between a **determinative** and an **indeterminative** interpretation, where on the former, the purpose clause serves to restrict the meaning of some word in the matrix, typically a necessity modal. It is arguably in the latter, indeterminative sense that Kant (1788: 5:20) intended (22) to illustrate a hypothetical imperative.

- (22) daß er in der Jugend arbeiten und sparen müsse, um im Alter nicht
 that he in the youth work and save must for in age not
 zu darben
 to want
 ‘that he must work and save in his youth in order not to want in his
 old age’

A merely ‘technical’ as opposed to a ‘pragmatic’ hypothetical imperative, as set forth by Kant (1785: 2:20), would be illustrated by the construction where the purpose clause is sentence-initial, saying simply that you will be destitute in old age unless you are industrious and economical when you’re young.⁵

For simplicity, although such sentences are not in a strict sense conditionals, I will nevertheless subsume them under the heading of anankastic conditionals.

2.3.2 The field of necessity

There is rather a broad spectrum of necessity modals that can help form an AC, stretching from what may be regarded as mere syntactic variants of the auxiliary verb *must*, like *have to*, *need* or *necessary*, as in (23) and (24) below, via auxiliary verbs and adjectives that may seem to encode a weakened or more relativized necessity, like *ought*, *should* or *important* (recall (6) and (12) above) and degree adverbs like *too* or (negated) *enough*, (25), to imperatives, (26).

- (23) My father needs a magnifier if he wants to read anything.
 (24) Insulin is necessary if glucose is to be absorbed by the cells.
 (25) Our progress is too slow if we are to reach Svalbard this year.
 (26) Stay away from Chicago if you don’t want to become a victim of crime!

(25) contains an *if* clause typifying a canonical AC, but infinitival *to* clauses, which alternate with *if...want* or *if...be* clauses in ACs, are more common in the role of ‘determining’ *too* or *enough* in the sense of Bech (1957):

- (27) 5 kW is not enough to heat the house in winter.

Sæbø (1985) suggested an analysis of the German counterparts of *too* and *enough* in terms of a necessity component. Since, various analyses have been proposed, some, like Hacquard (2005), building modality into the degree particles, some, like Meier (2003), locating it in the infinitival *to* clause.

An ‘anankastic imperative’ like (26) would seem to entail the corresponding declarative with some necessity modal, but many imperatives of this form only entail the corresponding ‘existential’ anankastic conditional, with a possibility modal (see below). Schwager (2006) and Kaufmann (2012) treat conditionalized imperatives generally and anankastic versions in particular.

It is also relevant in the present context to note that ACs can occur in a subjunctive, counterfactual version, as exemplified by (28).

- (28) We’d have to drain the oceans if we wanted to stop global warming.

A subjunctive conditional usually presupposes that the antecedent is false, so we would expect (28) to presuppose that we do not want to stop global warming, but in fact, the counterfactuality seems to concern the proposition that we do stop global warming, that is, the proposition that will in Section 3.3 be referred to as the ‘internal antecedent’ of the AC.

2.3.3 ‘Existential anankastics’

Nissenbaum (2005) and Werner (2006) draw attention to and try to explain the fact that a sentence like (29), just like the canonical AC (30) except that the modal expresses not necessity but possibility, does not seem to express what it should if, as commonly assumed, *can* is the dual of *must*:

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

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

Instead of just saying that taking the A train is compatible with going to Harlem, (29) seems to say that it is a sufficient condition, or one among a set of conditions jointly sufficient, for going there, thus licensing a paraphrase like (31):

(31) You will get to Harlem if you take the A train (and normal conditions obtain).

Sæbø (1985: 165ff.), discussing this phenomenon, noted that sentences like (29) are ambiguous (although the ‘sufficient condition’ reading tends to be preferred) along a line drawn by von Wright (1970: 161):

To say that something may be...done...has two different...meanings. Either it is simply a *denial* of the statement that the contradictory...is a necessary requirement of something else. Or it is an *affirmation*...that the...doing of the thing...is a sufficient condition...of something else. [...] When [a statement of permittedness] has the second meaning it is often couched as a “can”-statement. I shall refer to the two meanings as the *weak* and the *strong* (meaning of) “may” respectively.

This suggests that the unexpectedly strong reading of ‘existential anankastics’ noted by Sæbø and Nissenbaum is not an exclusive property of conditionals but something that affects possibility modals with a deontic modal flavor generally, where the teleological flavor typically found in anankastics is a special case.

In any case, it is useful to observe that negation seems to tend to target the weak reading of the possibility modal, resulting in a strong reading of the negated possibility, for example in (32).

(32) There is no way we can maintain our lifestyle if we want to stop global warming.

This would seem to indicate that the observed strong reading is not rooted in a lexical ambiguity but is the effect of a pragmatically conditioned strengthening, where the sufficient condition interpretation is opted for unless it actually leads to a weakening of the whole statement, as under negation.

2.3.4 Elliptical anankastics

Sometimes, the proposition for which the argument proposition of the necessity modal is a necessary condition is neither expressed in a conditional clause nor in a purpose clause; it is given contextually. (33) and (34) are two cases in point.

- (33) It is free to all who attend; however, you must be 21, so bring your ID.
- (34) (Committing tax fraud takes some work, because it goes beyond simple ignorance of the tax rules and regulations.) You have to do really bad things like keep two sets of books, alter or destroy documents, . . .

There are different ways to describe this phenomenon. That it is a case of ellipsis in a structural sense – the sentence containing a covert clause recoverable from the context – is perhaps less plausible than assuming that the context supplies an antecedent for a propositional null anaphor that can somehow fill the same function as an overt anankastic clause. As evident from (33), this proposition can be given in a subtle and indirect way, and, as (34) shows, the context does not have to entail that it is a goal, the object of somebody’s intention.

Note the similarity to cases of ‘obligatory modal subordination’ like (35), discussed by Klecha (2011), where the *will* sentence can be taken as elliptic for a non-anankastic conditional (see also Chapter 59).

- (35) Don’t drink that coffee. You’ll burn your mouth.

2.4 ACs cross-linguistically

Anankastic conditionals have to date almost exclusively been studied in relation to Germanic languages (English and German).⁶ The few probe samples of other languages given below show that by and large, the same patterns can be found in Romance, in Slavic and in Chinese, in the sense that the canonical locutions identified above are here, too, used to express necessary condition relations. (36)–(38) are attested examples from Spanish, Russian and Mandarin.

- (36) Para ir a Machu Picchu hay que tomar un tren de Cuzco.
for go to Machu Picchu has to take a train of Cuzco
‘To go to Machu Picchu one has to take a train from Cuzco.’
- (37) Yesli vy khotite poluchit’ lyubov’, vam nuzhno darit’ ee.
if you want receive love you.DAT necessary give her
‘If you want to receive love you have to give love.’
- (38) Nǐ rúguǒ yào qù shànghǎi, nǐ bìxū yǒu qián mǎi huǒchē piào.
you if want go Shanghai you must have money buy train ticket
‘If you want to go to Shanghai you need money to buy a train ticket.’

Such data should be treated with care, though. The relative frequency of these locutions may vary, as may their frequency vis-à-vis other means of expressing necessary condition relations. Besides, there may still be a majority of languages which do not use the anankastic format for expressing such relations.

2.5 Summing up

Let us recapitulate the challenges that ACs pose for any theory. To predict the pattern of mutual entailment instanced by judgments of (39) and (40), one must answer the question why *want* or some other expression of intention must appear in the first sentence but cannot appear in the second. To that end, it is necessary to spell out what *want* contributes to the meaning of the AC. At the same time, one must also permit conditionals which sound just alike (recall the ‘non-anankastic readings’ of Section 2.2) to have a meaning where the expression of intention behaves in a more predictable way.

(39) If we want to eat, we must work.

(40) If we do not work, we cannot eat.

The relationship between this entailment pattern and (standard) contraposition should also be clarified – and the fact that purpose clauses can alternate with conditional clauses containing a word of intention should find an explanation.

3 ACs in the theory of modals and conditionals

The dominant paradigm of research on the semantics of modals, developed by Angelika Kratzer during the late nineteen-seventies (Kratzer 1977, 1978, 1981), stresses the relative nature of modals. Whether something must or can be done or be the case depends not only on the situation of evaluation but crucially also on the context of utterance. More specifically, in addition to their propositional arguments, modals are assigned propositional set arguments. When, as is mostly the case, these arguments are unarticulated, they are, depending on the way the theory is formulated, contextual parameters or free variables.

This paradigm is at the same time a type of theory of conditionals; in fact, *if* clauses are seen as constraining the extra arguments that modals take. In a general way, this property of the theory makes it well-suited to explicating the meaning of ACs, which are modalized conditionals. Moreover, expressions like ‘in view of what you want’ are ascribed a theoretical significance by the theory; specifically, the phrase ‘what you want’ articulates a typical set-of-propositions type argument for a modal, and this would seem promising too.

Still, ACs have proven resistant to a straightforward account in this framework. This will be explained in the next subsections. I base the explanation on a standard version of the theory, building on Kratzer (1991) but supplying a compositional formulation in the style of Huitink (2008).

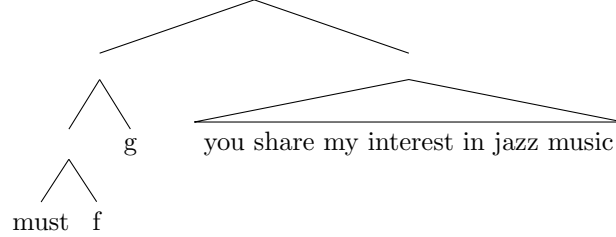
3.1 Modal base and ordering source

In this formulation, a modal takes two arguments denoting sets of propositions before it gets to its complement clause. These two arguments are free variables, to be assigned values by the contextual assignment function; call it *h*.

A Logical Form for the simple modalized sentence (41) could look like (42).

(41) You must share my interest in jazz music.

(42)



The modal has the highly complex logical type $(s((st)t))((s((st)t))((st)t))$, i.e., its denotation at a world w maps a set of propositions in intension $h(f)$, call it f , to a function that maps another set of propositions in intension $h(g)$, call it g , to a set of propositions – those that are necessary relative to $f(w)$ and $g(w)$:

(43) $\llbracket \text{must} \rrbracket_w = \lambda f \lambda g \lambda \psi. \psi$ contains all the worlds v in $\bigcap f(w)$ that are best according to $g(w)$.⁷

There is a division of labor between the two ‘conversational backgrounds’ f , the ‘modal base’, and g , the ‘ordering source’, in the meaning definition of the necessity modal (and a parallel division of labor in the meaning of a possibility modal, usually defined as the dual): while the argument proposition must cover a part of the intersection over $f(w)$, it need not cover a part of the intersection over $g(w)$; the latter may be empty or the intersection between the two may be, in which case priority is given to the modal base, f .

This asymmetry is matched by a difference in substance between f and g : while the modal base will always assign to a world a set of propositions true in that world – a set of relevant **facts** (or **circumstances**),⁸ the ordering source will typically assign to a world a set of propositions some of which are not true. These may be **stereotypes**, over-generalizing normal courses of events, or they may be **norms**, **ideals** or **goals**, and since there can be conflicting goals, $\bigcap g(w)$ may be empty. Ordering sources with propositions of the former sort give rise to modality with an **epistemic** flavor; ordering sources with propositions of the latter sort give rise to modality with a **teleological** or **deontic** flavor.

Let us now return to the sentence (41) to ask what functions from worlds to sets of propositions the assignment function h might assign to the free variables f and g . Actually, this sentence lends itself naturally to two different scenarios: on the one hand, we may conceive of the argument proposition ψ as a conclusion from the relevant facts and stereotypes where the facts are known to the speaker; on the other hand, we may think of ψ as a condition that the hearer must meet to attain a goal, according to the terms set down by the speaker. The first case would constitute an **epistemic** use, the second a **teleological** use.

To be more specific about the second case, let us suppose that

$g(w) = \{ \text{that I agree to date you} \}$ and

$f(w) = \{ \text{that [I agree to date you} \rightarrow \text{you share my interest in jazz music}] \}$

Because there is no inconsistency in $f(w) \cup g(w)$ here – $\bigcap(f(w) \cup g(w)) \neq \emptyset$, the complex definition of *must* in (43) can be simplified to (44):

$$(44) \quad \llbracket \text{must} \rrbracket_w = \lambda f \lambda g \lambda \psi. \bigcap(f(w) \cup g(w)) \subseteq \psi \quad (\text{simple necessity})$$

Then we see that (41) is true with respect to h and w – the truth condition that ψ includes the intersection over $f(w) \cup g(w)$ instantiates **modus ponens**: from $\phi \rightarrow \psi$ and ϕ we conclude ψ .

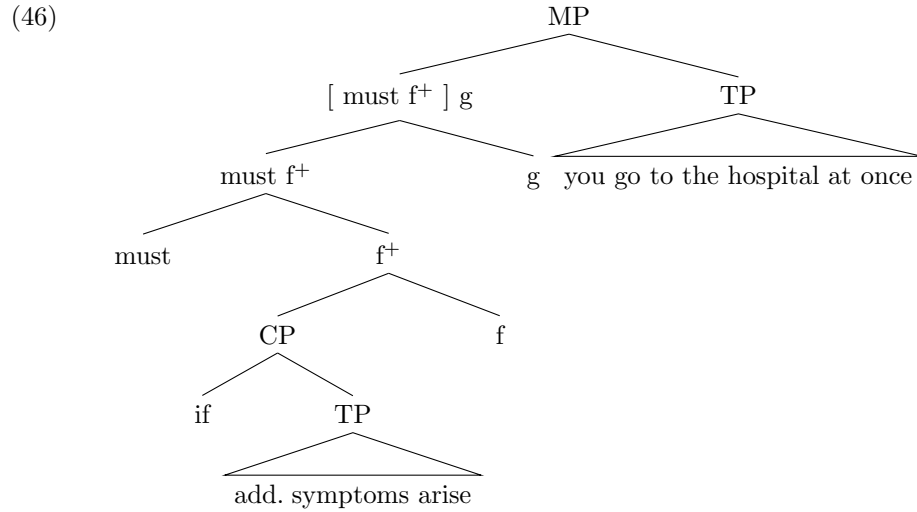
The instance is a maximally simple case where a modal base and an ordering source interact to make a necessity statement true at w , and actually occurring cases are not necessarily (much) more complex. It may in fact seem a bit trivial, but note that both $g(w)$ and $f(w)$ are dependent on w , the world of evaluation: while f and g are contextually determined and thus known to the interlocutors, what these values are in actual fact ‘filled with’ is in principle an open issue.

3.2 Adding conditionals

Some conversational backgrounds have a **constant member**. More precisely, there are modal bases f and propositions ϕ such that $\phi \in f(w)$ for all worlds w . This is in fact the result when a modal base variable is modified by an *if* clause expressing ϕ . The key idea is that when we utter, for example, (45), we add the proposition that additional symptoms develop to the modal base for the modal, regardless of whether it is true.

(45) If additional symptoms develop, you must go to the hospital at once.

More precisely, there is a preliminary modal base f , and after the antecedent ϕ has been taken into account, there is a final modal base f^+ assigning to any world a set of propositions containing it. In Huitink’s compositional formulation (2008: 118), an *if* clause adjoins to a modal base variable f as seen in this LF:⁹



There are different ways to compose the semantic value of f^+ , resulting in (47).

$$(47) \quad \lambda w \{ \text{that additional symptoms arise} \} \cup f(w)$$

To complete the picture of how the *if* clause influences the meaning of (45), we need to make some simple assumptions about the contents of $f(w)$ and $g(w)$ for a given f , g and w . Let us say that $f = \lambda w$.the relevant facts in w and $g = \lambda w$.what is good for you in w ; suppose further that w is such that

- $g(w) = \{ \text{that you avoid serious concussion effects} \}$
- $f(w) = \{ \text{that [you avoid serious concussion effects } \wedge$
additional symptoms develop] \rightarrow you go to the hospital at once } }

Then (45) is true with respect to h and w according to the definition of simple necessity in (44) (which can be used here because there are no inconsistencies), though (48) is not:

$$(48) \quad \text{You must go to the hospital at once.}$$

The difference between (45) and (48) is the difference between f and f^+ :

- $f^+(w) = \{ \text{that [you avoid serious concussion effects } \wedge$
additional symptoms develop] \rightarrow you go to the hospital at once ,
that additional symptoms develop } }

The truth of (45) can be described as a combined effect of the $g(w)$ proposition, your avoiding serious concussion effects, and the member of $f^+(w)$ expressed by the *if* clause: together, they trigger modus ponens, ensuring that the argument proposition follows from the premises.

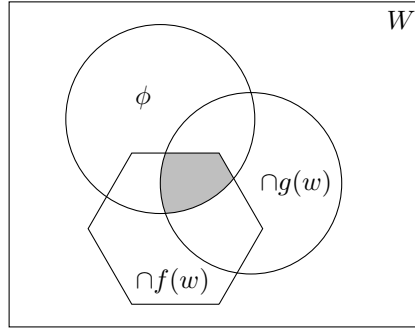


Figure 1

This Venn diagram can illustrate the truth condition of (45) according to (44): the proposition that you go to the hospital at once must include the shaded area, the intersection between $\cap f(w)$, ϕ and $\cap g(w)$ and thus between $\cap f^+(w)$ and $\cap g(w)$, which it does in the given scenario.

Note that any conditional is essentially a modalized sentence in this theory: antecedents always modify arguments of modals – ‘preliminary’ modal bases. This entails that conditionals that, like (49), do not contain any **overt** modal have to contain a **covert** modal, which is per definition a **necessity** modal.

- (49) If the Chinese enter the Vietnam conflict, the United States will use nuclear weapons. (Stalnaker 1968: 100)

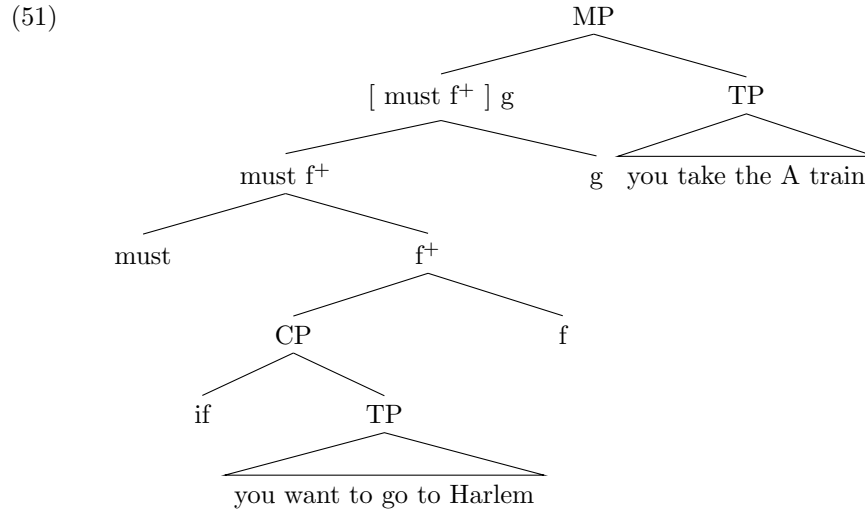
Now it has been noted – by Kratzer (1978: 259f.) and others – that it can make a significant difference whether a conditional actually displays a necessity modal or not. The covertly modalized conditional (49) is thus far from synonymous to the overtly modalized conditional (50). While the former is a neutral prediction based on facts and beliefs, the latter would seem to argue a course of action.

- (50) If the Chinese enter the Vietnam conflict, the United States must use nuclear weapons.

The answer usually given to this is in terms of **constraints on conversational backgrounds**: different modals, while synonymous as far as their modal force is concerned, may lexicalize different such constraints – and a covert modal is just another necessity modal in this regard. Constraints on **ordering sources** are relevant here; in fact, Sæbø (1985: 154f.) argued that a covert modal requires the ordering source to be empty: $h(g)(w) = \emptyset$ for any w . This would account for the non-normative flavor of (49), as opposed to the normative flavor of (50) stemming from a normative ordering source.

3.3 Trying to add anankastic conditionals

The zero hypothesis about ACs is that here too, the content of the *if* clause is added to the modal base; specifically, that (30) has the structure in (51):



It is clear, however, this is not the right, or at any rate not the full, picture. Consider first the role of the overt versus a covert modal. If we eliminate the *must* or replace it by *will* in (30), the sentence ceases to be an AC:

(52) If you want to go to Harlem, you will take the A train.

This suggests that the ordering source is not empty.

But conjecturing that $h(g)$ is nonempty is far from an analysis that predicts the anankastic interpretation. As noted in Section 2.2, when superficially similar sentences have non-anankastic readings, the modal may well have a teleological flavor, so the ordering source contains something – in the ‘diabetes’ case, what is in your best interest regarding your health. So it is not enough to assume that the ordering source is nonempty – some way must be found to distinguish the anankastic from the non-anankastic interpretation.

Intuitively, what characterizes the former is that the proposition that you **go** to Harlem, minus *want*, plays a central role. It is essential for a theory, set within or augmenting the standard theory, to explain how this comes about.

Before turning to the various analyses that have been proposed, it is useful to consider closely what the standard theory predicts for (30) as it stands, given the LF in (51). Suppose that the ordering source is ‘what you want’:

$$- g = \lambda w \{ \varphi \mid \text{you want } \varphi \text{ in } w \}.$$

This might well be the case in a context, especially if the context is sensitive to the occurrence of *you want* in the *if* clause.

It might now be thought that this is sufficient to produce the desired reading: if the proposition that you want to go to Harlem is among the facts of f^+ , then ‘what you want’ will select the proposition that you do go to Harlem, won’t it? Unfortunately, no; the set of propositions contributed by g = ‘what you want’ depends on the world of evaluation w , and this world may well not be included in ϕ , the proposition that you want to go to Harlem; it must, however, for the embedded proposition that you go to Harlem, call it ϕ^- , to be included in $g(w)$.

Figure 2 can serve to illustrate the situation:

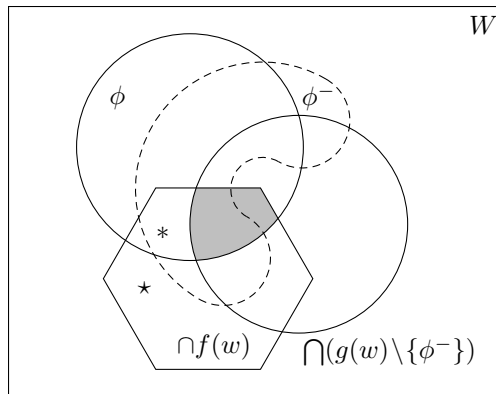


Figure 2

If the dashed proposition ϕ^- (that you go to Harlem) is in $g(w)$, the proposition that you take the A train only has to cover the left side of the grey area for the sentence to be true. But that depends on where the world w is situated: if it is at $*$, inside ϕ (that you want to go to Harlem), ϕ^- is in, but if w is at \star , it is out and the proposition that you take the A train must fill the whole grey area.

Let us say that $w \notin \phi$, i.e., it is not true in w that you want to go to Harlem. For simplicity, suppose that what you do in fact want in w is to go to Hoboken, and that the relevant circumstances consist of just $f(w)$ as specified below:

- $g(w) = \{ \text{that you go to Hoboken} \}$
- $f(w) = \{ \text{that } [\text{you go to Harlem } (\phi^-) \rightarrow \text{you take the A train } (\psi)] \}$
- $f^+(w) = \{ \text{that } [\text{you go to Harlem } (\phi^-) \rightarrow \text{you take the A train } (\psi)] , \text{ that you want to go to Harlem } (\phi) \}$

The key observation is now that according to these specifications, (30) is false – ψ must fill the whole grey area in Figure 2 but it only fills the left side of it – whereas according to our judgments, (30) should be true on the strength of the specified modal base and the as yet unspecified contribution of the *if* clause.

If instead we suppose that $w \in \phi$, i.e., it is true in w that you want to go to Harlem, then $g(w)$ will contain the ‘internal’ antecedent ϕ^- , the proposition that you go to Harlem, and (30) will come out true (as before, ψ only covers the left side of the grey area in Figure 2, but now it does not need to cover more). But the truth of (30) should not be dependent on the actual truth value of the ‘external’ antecedent ϕ .

The next section surveys some proposals that have been made for analyzing anankastic conditionals in such a way as to predict that the ‘internal antecedent’ is relevant to their interpretation regardless of whether the ‘external antecedent’ is true and to ensure, in particular, that (30) comes out true in a scenario where $f(w)$ is specified as above, providing there is no inconsistency in $f(w) \cup g(w)$.

4 Below the surface of anankastic conditionals

From Sæbø (1985) to Condoravdi and Lauer (2016), a variety of attempts have been made at a more adequate treatment of anankastic conditionals than what follows from the standard assumptions reviewed above. Some of these consist in positing hidden elements in the Logical Form of the sentence: on the one hand, a hidden second modal, on the other, a hidden extra subclause; some assign a crucial role to *you want* in making an ordering source ‘what you want’ salient, and some assume that also the ordering source can be modified by an *if* clause.

4.1 Ordering source modification: Sæbø (1985; 2001)

Note how three puzzle bits would fall into place if in a conditional like (53), the same sentence as (30) but schematized to make the structure more transparent,

$$(53) \quad \text{If } \underbrace{\text{you want you go to Harlem}}_{\text{internal antecedent } \phi^-}, \underbrace{\text{must you take the A train}}_{\text{consequent } \psi}$$

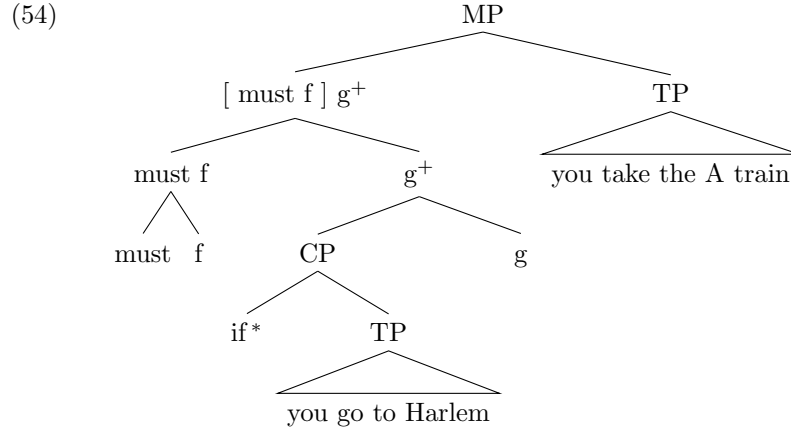
external antecedent ϕ

the *if* clause could be assumed to contribute the ‘internal antecedent’ ϕ^- to the **ordering source** in the same way that in an ordinary, non-anankastic conditional, the *if* clause contributes the antecedent to the modal base:

- it would not be mysterious that the sentence expresses a relation between ϕ^- and ψ ,
- the expression of intention in the *if* clause would not be superfluous, for without it ϕ^- would enter the modal base
- the necessity of an overt modal would be explained, on the hypothesis that a covert modal requires an empty ordering source.

These considerations led Sæbø (1985) to assume that a subordinate clause can add a proposition to the modal base **or** the ordering source for a modal (where the latter may or may not be empty to begin with), but that to add a proposition to the ordering source, an *if* clause (in German, a *wenn* clause) must contain an expression of intention (in German the auxiliary verb *sollen* or *wollen*) which is not interpreted in the usual way but syncategorematically.

This wasn’t a compositional analysis: it assumed that *if* and *want* etc. form a unit *if** defining a conventional format for a modifier of the ordering source, alongside the bare *if* defining the format for a modifier of the modal base:



That analysis was refined by Sæbø (2001), who took the paraphrase of (30) given in (55) as a point of departure:

- (55) In view of what you want if you want to go to Harlem,
you must take the A train.

Here, the ordering source for the modal *must* is evidently ‘what you want’ – but not simply what you want *in w*, the world of evaluation; rather, the paraphrase suggests that the ordering source is ‘what you want in those worlds where you want to go to Harlem’, a set of propositions resulting from the intersection over ‘what you want’ at w' for all w' in the external antecedent proposition.

Now effectively, because what all the values of ‘what you want’ at the worlds in the external antecedent have in common is the internal antecedent, that set reduces to { that you go to Harlem }.¹⁰ Recall the reason that the idea discussed in Section 3.3 was not tenable: the relevance of the internal antecedent depends on the truth of the external antecedent in the world of evaluation. That would now be fixed: as far as the (added) ordering source goes, the world of evaluation is now replaced by the worlds in the external antecedent.

The way this idea is modelled by Sæbø (2001), the ordering source described in (55) is added to the possibly nonempty preexisting one. This is important because the final ordering source for the modal may well consist of norms, goals or ideals, even stereotypes, that are not mentioned in any *if* clause; (39) in Section 2.5 would be an example, as would anankastic conditionals with ‘weak’ necessity modals like *ought* or *should*; see also Section 4.4 and Chapter 60.

In the notation and framework of semantic composition used in Section 3.2, the proposal could take the form in (56).

$$(56) \quad \llbracket \text{if } \alpha \rrbracket_w = \lambda H_{s((st)t)} H(w) \cup \bigcap_{v \in \llbracket \alpha \rrbracket} \mathcal{H}(v)$$

where $\begin{cases} \text{if } H \text{ is } f & \mathcal{H} \text{ is the general modal base ('what is the case')} \\ \text{if } H \text{ is } g & \mathcal{H} \text{ is the ordering source, if any, expressed in } \alpha \end{cases}$

The first case would take care of the *if* clause rule present in the standard theory, where the antecedent is added to the modal base, while the second would make sure that the internal antecedent is added to the ordering source if the latter is targeted at all; the option still exists that a clause of the form *if you want to...* can contribute its content in full, the external antecedent, to the modal base.

This analysis has been criticized as non-compositional; in particular, the formulation “the ordering source...expressed in α ” would seem to require us to ‘look into’ the *if* clause.

4.2 Ellipsis theories: a second subclause

Recall from Section 2.3.1 that purpose constructions like (57) are alternatives to anankastic conditionals in a narrow sense. In fact, both von Stechow and Iatridou (2005) and von Stechow, Krasikova and Penka (2006) regard such constructions as the elementary means of expressing anankastic conditional relations.

$$(57) \quad \text{To go to Harlem you must take the A train.}$$

The thought behind this view is that clauses like *to go to Harlem* do not oblige us to treat your intention to go to Harlem as a hypothetical fact – there is no *if*

nor is there any (visible) *want* etc. there, so we are free to treat the clause as a device to modify the modal.

On this approach, the anankastic conditional in the narrow sense is elliptical, containing a covert purpose clause which copies the internal antecedent, or “the goal made contextually salient by the *if* clause” (von Fintel and Iatridou 2005). The LF of (30) is according to von Stechow, Krasikova and Penka (2006: 163):

- (58) If you want to go to Harlem
[you must (to go to Harlem) take the A train]

This manoeuvre is criticized by Huitink (2008: 124) as somewhat stipulative. One might add that it is an accident of English that a purpose clause can be formed with a bare *to* infinitive (without *in order*); in a language like Spanish, you need a preposition of destination or purpose:

- (59) Para ir a Harlem hay que tomar el tren A.

The problem of isolating the ‘internal antecedent’ thus persists; the meaning of *para* seems as irreducible as that of *want*.

Besides, in order to locate the proper antecedent for the silent *to* clause, it seems necessary here, too, to ‘look inside’ the *if* clause. To see this, consider a case like (60) where one intention is embedded under another, or one like (61) where an intention is not stated but can be inferred:

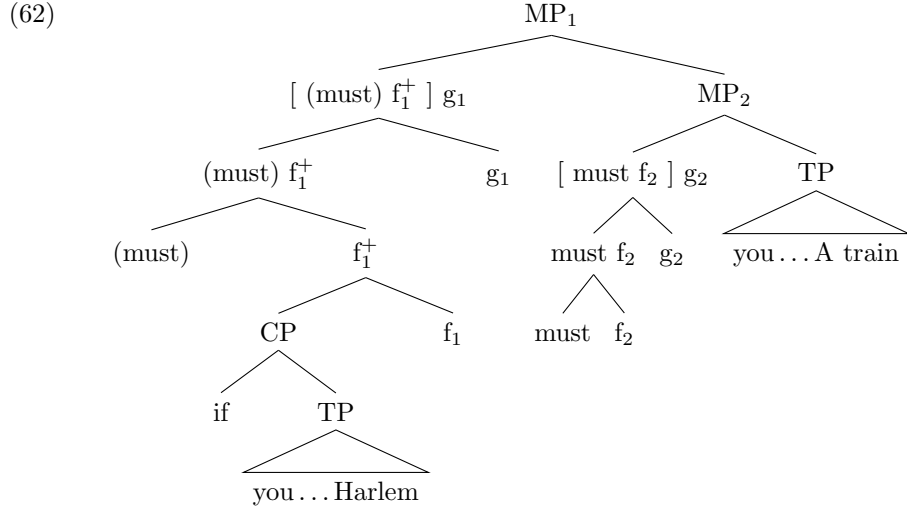
- (60) If John wants Mary to want to be with him
[he must (Mary to want to be with him) show interest].
(61) If you win the lottery, you must be cautious.

In (60), two goals could be argued to be made salient by the *if* clause, but only the ‘higher’ one is relevant; to ensure this, one would need a rule referring to the internal structure of the clause. In (61), the *if* clause could be argued to make the goal of winning the lottery salient, but the interpretation that you must be cautious to win the lottery seems to depend not just on a goal being salient but on it being declared one. Thus as it stands, the ellipsis theory appears too loose, and attempts at tightening it would seem likely to render it non-compositional.

von Stechow, Krasikova and Penka (2006) and von Fintel and Iatridou (2005) give different roles to the purpose clause: the former treat it as a modal base modifier, on a par with *if* clauses, the latter treat it as a separate argument of the modal, over and above the modal base. The *if* clause is also treated differently: the former regard it as expressing a conditional speech act, while the latter consider two options without concluding: one, it modifies the modal base for the modal in the usual way, two, it modifies the modal base for a higher covert necessity modal. This latter option is actually part of another approach put forth by von Fintel and Iatridou, discussed in the next subsection.

4.3 Nested modality: a second *must*

The idea of a ‘nested modality’ analysis of ACs brought up by von Fintel and Iatridou (2005) is pursued by Huitink (2008) and Condoravdi and Lauer (2016). Over and above the Modality Phrase (MP) formed by joining the overt modal, appropriately saturated, with its argument, there is a second layer where the lower MP acts as the argument of a covert necessity modal, and it is the modal base of this modal that the *if* clause modifies, in the usual way. On this kind of analysis, (30) has something like the following LF:



The main attraction of this type of analysis is that what counts as the evaluation world for the overt modal is a set of worlds w' where you want to go to Harlem, so that if g_2 is ‘what you want’, $g_2(w')$ will be certain to contain the internal antecedent, that you go to Harlem.

If g_2 is ‘what you want’, that is – and there is no guarantee that it will be. But then, no guarantee is needed – if g_2 does not tune in with an ordering source indicated in the *if* clause, then an anankastic reading simply fails to surface and a non-anankastic reading surfaces instead (recall the ‘diabetes’ case in Section 2.2). The anankastic interpretation only arises if g_2 coincides with an ordering source indicated in the *if* clause; in the words of Condoravdi and Lauer (2016: 47), “the top-ranked effective preferences of the same agent”.

The covert modal is assumed to have an epistemic flavor, with a modal base consisting of knowledge and an ordering source which is empty or stereotypical.

Extra motivation for the nesting analysis comes from independent evidence, provided by Frank (1997: 195ff.), that many, if not all, conditionals containing an overt modal with a normative flavor should have this kind of structure.

4.4 Non-singleton ordering sources and possible conflicts

The analyses advocated by Huitink (2008) or by Condoravdi and Lauer (2016) presuppose that the ordering source is teleological, consisting of a person’s or a group’s goals, and the other analyses do not exclude such an ordering source. There is nothing to prevent this ordering source from selecting other goals than the one mentioned in the purpose or conditional clause, one or more of which could be in conflict with it – provided the person or group in question entertains such goals in the world(s) under consideration.

This is a potential concern, first expressed by von Fintel and Iatridou (2005). The most pressing worry has been over scenarios in which the AC is easily predicted to be false although it is judged to be true.

4.4.1 Conflicting goals

Such a scenario is presented in the Gospels, according to Mark (10:17), Matthew (19:16) and Luke (18:18): the rich man asking Jesus what he must do to inherit eternal life receives the answer (63) but is not prepared to follow the advice.

- (63) If you want to inherit eternal life, you must sell all you own and give it to the poor.

Let us say that in the world of evaluation w , the rich man wants two things: to inherit eternal life and to not sell all he owns and give to the poor, and that the relevant ordering source is ‘what the rich man wants’. Then both a simple ‘nested modality’ analysis and any analysis where the internal antecedent is added to the ordering source will, by the definition of necessity (43) from Section 3.1, require the consequent to be true in worlds where the latter goal (if compatible with the relevant facts) is true, which is impossible, this goal being the **complement** of the consequent. Yet, there is a strong intuition that Jesus could have been right – and indeed was if the facts were that the man either sells all he owns and gives it to the poor or fails to inherit eternal life.

For such reasons, efforts have been made to ensure that the goal mentioned in the conditional or purpose clause takes priority over any others, or at least over any conflicting goals (goals that do not overlap with the intersection of the ‘primary’ goal and the modal base facts).

As we saw in Section 4.2, von Fintel and Iatridou (2005) posit a covert purpose clause in the AC (in the example above, ‘to inherit eternal life’), treating this clause as a separate argument of the modal, the **designated goal** argument. Effectively, they propose a new definition of (teleological) necessity:

$$(64) \quad \llbracket must \rrbracket_w = \lambda f \lambda d \lambda g \lambda \psi. \psi \text{ contains all the worlds in } \bigcap f(w) \cap d \\ \text{that are best according to } g(w).$$

The proposition d is the designated goal and takes priority over any other goal. However, as Huitink (2008: 135) points out, it does so because it is made to act like a fact. Designated goals are only nominally hypothetical ideals; effectively,

they are hypothetical facts and could as well be taken to modify the modal base.

And in fact, this is what von Stechow, Krasikova and Penka (2006) propose: to treat the covert *to* clause as if it were an *if* clause, adding its content to the facts of the modal base. In addition, they propose to treat ACs as instances of counterfactuals, with an empty preliminary modal base and a ‘totally realistic’ ordering source. This theory raises some problems discussed by Huitink (2008: 139ff.), but it does succeed in conferring a preferred status on the internal antecedent without modifying the argument structure of modals like *must*.

A third and arguably more natural way to deal with conflicting goals is to follow Condoravdi and Lauer (2016) in attributing a special reading to *want*: “on the relevant reading, *a wants p* reports on a preference that the agent assigns a special status to: an action-relevant preference” (p. 25), and appealing to a consistency constraint on effective preferences (p. 50).

4.4.2 Secondary goals

Some scholars have contended that the goal mentioned in the antecedent of an AC is not only more important than other possible goals but that no other goals are possible: there cannot be anything else in the ordering source. Evidence comes from scenarios like (65) (presented by Huitink 2005), which is judged to make (30) false even though the theory will easily make it true:

- (30) If you want to go to Harlem, you must take the A train.
- (65) You are in love with the Dutch soccer star Ruud van Nistelrooy, and you would like nothing more than to kiss him. It so happens that he is on the A train. However, the A train is not the only way to get to Harlem. You can also take the B train there.

Suppose it is a relevant fact that you want to kiss Mr. van Nistelrooy (N); then on a nested modality analysis, the ordering source for *must* (take the A train), if set to ‘what you want’, will select the proposition that you go to Harlem and the proposition that you kiss N in all the worlds that count, and if the relevant facts in those worlds include the fact that taking the A train is the only way to go to Harlem while getting to kiss N, (30) comes out true.

Two responses have been given to this dilemma. On the one hand, von Fintel and Iatridou (2005: 13ff.) follow Sloman (1970: 391) in distinguishing between *must* and *have to* on the one hand and *ought* and *should* on the other in terms of strength. Specifically, they adopt, in effect, a definition of (teleological) *must* without a *g* ordering source argument and a definition of *ought* with one:

- (66) $\llbracket \textit{must} \rrbracket_w = \lambda f \lambda d \lambda \psi . \psi$ contains all the worlds in $\bigcap f(w) \cap d$.
- (67) $\llbracket \textit{ought} \rrbracket_w = \llbracket \textit{must} \rrbracket_w$ according to (64).

The other response is less categorical. It has been noted that ACs with *must* or *have to* do allow interpretations relative to other goals; von Stechow, Krasikova and Penka (2006) report that (68) can be judged true even if the Chinese train is not the only train to Vladivostok, just the by far most comfortable one.

(68) If you want to go to Vladivostok you have to take the Chinese train.

As a matter of fact, judgments vary: Some speakers find that (68) can be true, while others would have to substitute *should* or *ought*. Now while most reject (30) in the scenario (65), all accept (39) in one where in view of the circumstances alone, we could steal. This shows that an ordering source of a normative nature can coexist with the articulated goal even when the modal is *must* or *have to*.

(39) If we want to eat, we must work.

As it appears, the secondary goals we tend to take into account are more self-evident than those we tend to discount when using a modal like *must*. According to Condoravdi and Lauer (2016: 51), a non-conflicting goal is taken into account just in case it is a salient fact that it is among the agent’s effective preferences.

By contrast, ‘weak’ necessity modals like *ought* and *should* seem to actually require more contingent secondary goals. It is natural to try to trace this on the one hand and the ‘strong’ necessity modals’ low tolerance for secondary goals on the other to Kratzer’s (1981) conjecture that the former presuppose a nonempty ordering source while the latter place no constraints on its ordering sources.

5 Discussion and conclusions

The proposals reviewed in the last section fall into three classes according to what strategy they rely on to solve the prime problem identified in Section 3: how to ensure that the proposition that you go to Harlem is relevant for the interpretation of (30) irrespectively of whether you **want** to go to Harlem.

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

1. Sæbø (1985, 2001) pursued the idea of letting the conditional clause modify the ordering source in a similar way as ordinary conditional clauses modify the modal base;
2. von Stechow, Krasikova and Penka (2006) and von Fintel and Iatridou (2005) assume a covert purpose clause ‘to go to Harlem’, modifying the modal base or saturating a special argument of the modal, respectively;
3. Huitink (2008) and Condoravdi and Lauer (2016) assume that the conditional clause modifies the modal base of a covert higher modal, thus ensuring that the ordering source for the overt lower modal selects the proposition that you go to Harlem if it includes what you want.¹¹

Descriptively, these three approaches give rise to rather similar predictions. Leaving possible conflicts of intention and other potential inconsistencies aside, the ‘internal antecedent’ is consistently treated as a constant member of some conversational background (the modal base, the ordering source for the (lower) modal), but this is achieved in different ways theoretically.

On two approaches, the ‘external antecedent’ ϕ is assigned a semantic role in identifying ϕ^- , the internal antecedent. Sæbø (2001) added the intersection over

what you want in every world in ϕ to the ordering source; Huitink (2008) and Condoravdi and Lauer (2016) use the *if* clause to shift the world of evaluation for the ordering source to ϕ worlds. On approach 2., the *if* clause plays a more pragmatic role, helping to identify ϕ^- by making it salient.

As for the theoretical ideal of simplicity, approaches 2. and 3. both make use of covert structure: a covert purpose clause (anaphoric on or elliptic for the sentence embedded under *want*) or a covert higher modal. There is independent evidence for the latter – other conditionals containing modals with a normative flavor have been argued to be doubly modalized – but scarcely for the former. Besides, the Designated Goal (DG) variant of 2. is committed to what amounts to an ambiguity in the modal: one (the ‘teleological’) variant which takes a DG argument and one which does not.

Finally, regarding compositionality, while approach 1., as formulated so far, is not compositional and the compositionality of approach 2. may be debatable, approach 3. is compositional.

However, there is a residue of non-compositionality in all analyses given so far: a purpose preposition like English *for* as in (21) or Spanish *para* as in (59), or a purpose subjunction like German *damit*, will have to be either treated as a grammatical marker for a DG argument, as von Stechow and Iatridou (2005) do, or decomposed into *if* and *want*, as, in effect, Condoravdi and Lauer (2016) do.

The various proposals should also be confronted with a descriptive criterion, identified in Section 2.5, which has faded into the background since Sæbø (2001): an adequate analysis should predict that (30) and (69) entail each other.

(69) You cannot go to Harlem if you do not take the A train.

The DG analysis as encoded in (66) meets this ideal.¹² So does Sæbø’s analysis on an assumption of nontriviality (no inconsistencies), while a nested modality analysis would seem to depend on extra assumptions concerning the stability of the modal base facts.

Perhaps, as von Stechow and Iatridou (2005) speculate, ACs

are another example of a construction that raises the possibility that not all natural language semantics is compositional.

In that case, they would not be alone in displaying a grammaticalization effect in connection with expressions like *want*. For one thing, such words easily develop into markers of future tense (cf. Bybee, Pagliuca and Perkins 1991). Moreover, *wh*- and equative phrases with *want* etc. have been noted to be used in a ‘free choice’ sense difficult to derive from their literal meaning (Sæbø 2004: 210ff.). Should it turn out that paradigmatic ACs are not universal (cf. Section 2.4), that might strengthen the case for a grammaticalization view, where the various proposals for analyzing them would emerge as more or less successful attempts at tracing the development.

On the other hand, though a consensus may not have crystallized, there is a convergence on the idea of a doubly modalized structure where the *if* clause only indirectly interacts with the overt modal. Note that this essentially means

dissociating the *if* clause from the modal, as if there were a separate conditional operator, in line with more traditional theories of conditionals like Stalnaker (1968). In fact, as discussed by Kaufmann and Kaufmann (2015), an analysis in terms of two modals is closely similar to an analysis in terms of a variably strict conditional operator with a modalized consequent. In this sense, the final and consensual solution to the problems posed by anankastic conditionals may turn out not to turn on any specific theory of conditionals.

Notes

¹Such as *aim*, *expect*, *hope*, *intend*, *plan*, *wish*, or *be supposed*. As we will see in Section 2.3, it is possible to replace the *if* clause by a purpose clause, where the intention is built in, and retain the anankastic meaning.

²The necessity modal in (2) and the possibility modal in (10) are generally not considered to form parts of the consequent but to explicate the conditional operation, cf. Section 3.2.

³Note that ‘teleological’ is used in a wide sense here, not implying that the modalized sentence describes an action, or a means; as (1) already shows, and pace Fernando (2005), anankastic conditionals are not always about actions as means to reach goals.

⁴(19) renders the first two lines of the lyrics of Billy Strayhorn’s song *Take the A train*, the signature tune of the Duke Ellington Orchestra for 33 years, written by Joya Sherrill.

⁵“Ob der Zweck vernünftig und gut sei, davon ist hier gar nicht die Frage, sondern nur was man tun müsse, um ihn zu erreichen.” ‘Whether the end is sensible and good is not at issue here, just the question what one has to do to attain it.’ (Kant 1785: 2:20)

⁶One exception is the study of Chinese necessity modals by Sparvoli (2012). Also, Louie (2015) brings an example of an anankastic conditional of the *if*...*want* type in Blackfoot.

⁷I omit the contextual assignment function *h* as a superscript on the interpretation function $[\![\cdot]\!]$ when it is superfluous. Note that the vague formulation “that are best according to $g(w)$ ” can be made absolutely precise; cf. Kratzer (1981: 47f.) or Huitink (2008: 117).

⁸The term ‘fact’ is here used in the simple sense of a true proposition.

⁹MP = Modal Phrase, TP = Tense Phrase, CP = Complementizer Phrase.

¹⁰Plus perhaps, depending on your logic of wanting, the supersets of the internal antecedent.

¹¹Recall that von Stechow and Iatridou (2005) also put forth this idea.

¹²It also predicts an equivalence between (69) and *you take the A train if you go to Harlem* (standard contraposition), a problem that faces any theory generally: it is difficult to explain why contraposition works better between an AC and an ordinary conditional than between two ordinary conditionals without invoking a temporal dimension; cf. Sæbø (2001: 444ff.).

SEE ALSO: Chapter 59; Chapter 60; Chapter 62

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