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# Two Puzzles About Deontic Necessity*

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**Abstract**

The deontic modal *must* has two surprising properties: an assertion of *must p* does not permit a denial of *p*, and *must* does not take past tense complements. I first consider an explanation of these phenomena that stays within Angelika Kratzer's semantic framework for modals, and then offer some reasons for rejecting that explanation. I then propose an alternative account, according to which simple *must* sentences have the force of an imperative.

## 1 Introduction: Two Puzzles

### 1.1 The First Puzzle

As things stand, obligations frequently go unfulfilled. But even if everyone always did what they were supposed to do, this would be a remarkable contingent fact, not one guaranteed by the semantics of deontic modal operators. Neither *should p* nor *must p* implies *p*.[1] For this reason, the modal logic axiom schema T is not an axiom schema of deontic logic:[2]

T $\quad \mathrm{O}p \rightarrow p$

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[1] I am sloppy about my use of the variable/schematic letter '*p*': sometimes it should be read as a variable ranging over propositions, sometimes as a variable ranging over sentences, sometimes as a schematic letter whose substituends are sentences. Italics are sometimes ordinary quotes, sometimes quasi-quotes. *Should p* and *must p* are shorthand ways of writing *It should be that p* and *It must be that p*.

[2] For an introduction to, and overview of, deontic logic, see (Chellas, 1980, Ch. 6).

($O$ is any deontic necessity operator.) Given these obvious observations, we should find true and assertable counter-instances to T, and we do.

I am speaking to Sam's mother, and recounting to her some of Sam's sins. She thinks Sam is thus obliged to confess his sins, but that, given his stubborn nature, he's unlikely to do so. So Sam's mother says:

(1) Sam should/ought to go to confession, but he's not going to.

Uttered in that context, (1) could express a truth, if indeed this is what moral or religious duty requires Sam to do, and if stubborn Sam will not go to confession. Similarly, in a guilty moment, Sam might say:

(2) I should/ought to go to confession, but I'm not going to.

And Sam's mother might express her disappointment to Sam himself by saying:

(3) You should/ought to go to confession, but you're not going to.

All of (1)-(3) are fine.

But, somewhat unexpectedly, we see a contrast in this respect with *must*. For example, it would be odd for Sam's mother to attempt to convey the information that Sam is obliged to go to confession and that he will not do so, by uttering (4):

(4) # Sam must go to confession, but he's not going to.[3, 4]

Sam's mother cannot utter (4); most English speakers would find (4) odd in these (and almost any) circumstances. Similarly, Sam's mother could not express her disappointment to Sam himself by saying:

(5) # You must go to confession, but you're not going to.

Likewise, in his soul-searching moment, Sam is unlikely to say:

(6) # I must go to confession, but I'm not going to.

(In what follows, I will refer to the contrast between (1)-(3) on the one hand, and (4)-(6) on the other, as 'the contrast between (1) and (4)'.) Assuming the logical form of both (1) and (4) is:

$$Op \wedge \neg p$$

[3] The contrast between *should* and *must* exhibited by (1) and (4) is also noted in (Palmer, 1986, 100) and in (Werner, 2003, 125-126). Palmer offers a brief explanation of the contrast, but I'm not sure I understand his explanation. Werner takes examples like (4) to show that *must* $p$ entails $p$ (see (Werner, 2003, 123ff.)), a claim I discuss and reject below.

[4] It is worth noting that the order of the conjuncts doesn't seem to matter:

(1′) Sam is not going to go to confession, but he should.

(4′) # Sam is not going to go to confession, but he must.

the infelicity of (4) should seem puzzling, if there are false instances of T for the operator *must*. And if *must* really is a *deontic* necessity modal it would seem that it simply couldn't satisfy axiom schema T, since obligations can go unfulfilled. If T is not an axiom schema for deontic *must*, then sentences like (4) can be true in the appropriate circumstances.

What supports the intuition that an utterance of (4) can be true in the appropriate circumstances? Consider Sam's mother's utterance of (4). Suppose that Sam really is obliged to go to confession: in all the deontic alternatives to the actual world, Sam goes to confession. Thus, the first conjunct of Sam's mother's utterance – *Sam must go to confession* – seems true. But suppose that, as a matter of fact, Sam is never going to go near another priest. In fact, years go by, and Sam dies, never having stepped foot in the confessional booth. In that case, the second conjunct of Sam's mother's utterance, *He's not going to [go to confession]*, is true. Since both conjuncts of her utterance are true, Sam's mother's utterance of (4) is true.[5] Nevertheless, (4) is not assertable, even in these circumstances.[6] What accounts for this?

That is the first puzzle about deontic necessity.

## 1.2 The Second Puzzle

The second puzzle involves another, seemingly unrelated contrast between *must* and *should*: *should* can receive a deontic reading when it occurs with the perfect/past *have*, whereas *must* plus *have* forces an epistemic reading of the modal:

(7) Sam should/ought to have gone to confession. (*Deontic reading available.*)

(8) Sam must have gone to confession. (*Epistemic reading mandatory, deontic reading unavailable.*)

On the assumption that simple *must* sentences simply carry information about obligations this looks puzzling. It can be true now that Bill had an obligation to take care of his mother, even though he no longer has such an obligation, perhaps because his mother has died. *Bill should have taken care of his mother* is thus true, as is *Bill was obligated to take care of his mother*.[7] If one can report past obligations and *must* expresses obligation, why can't one use *must* to report a past obligation?

[5] (Werner, 2003, 123ff.) denies that (4) could ever be true—on his account, *must p* entails *p*. Since the present scenario is clearly one in which *Sam must go to confession* is true, while *Sam is going to go to confession* is false, Werner's claim is simply false. He offers little evidence for it other than the infelicity of sentences like (4); what other evidence he offers is equally well explained by the hypothesis that assertions of *must p* entail or implicate or presuppose that the speaker doesn't know that *p* is false.

[6] When I say that a sentence is (not) assertable, I mean that the proposition that would be expressed by an assertive utterance of the sentence is (not) assertable. I also often speak of sentences, rather than utterances or sentence-context pairs, as expressing propositions, though this is, strictly speaking, incorrect. I take a proposition to be a function from possible worlds to truth values.

[7] *Bill should have taken care of his mother* weakly implicates or presupposes that he didn't do so. We set this fact aside.

This is the second puzzle about deontic necessity.

### 1.3 Preview

Both puzzles involved puzzling features of *must*. *Should* behaves as it should; it behaves as we would expect. It is *must* that requires examination. My aim in this paper is to explain why sentences like (4) are never assertable, even though they can express truths, and to explain why deontic *must* doesn't take a past tense complement. I present two solutions to the puzzles. Each solution solves both puzzles, but both have their drawbacks. I prefer the second of the two solutions and offer some reasons in support of this preference.

I begin by considering a solution that stays within the standard possible worlds semantics for modal operators due to Angelika Kratzer.[8] The idea driving this proposal is that *must* is a deontic modal with a special kind of epistemic/metaphysical content. According to this proposal, the epistemic aspect of *must* gives rise to the unassertibility of (4), while the metaphysical aspect of *must* explains why (8) only has an epistemic reading. I argue that this approach, while promising and attractively conservative, faces some objections. These objections motivate the search for a different solution.

I begin this search by looking at some data similar to (4), data concerning imperatives and promises. The data help us motivate some conversational maxims that guide *practical speech*—utterances that in some sense involve intentions rather than beliefs. Combined with the claim that utterances of simple *must* sentences are attempts to get someone to do something, this proposal solves both puzzles in a natural way. I consider one problem for the proposal, and then conclude with a brief discussion of two questions raised by this proposal: (i) what happens when simple *must* sentences are embedded in larger constructions? and (ii) what should we say about *may*, the dual of *must*?

## 2 An Orthodox Proposal

### 2.1 A Deontic Modal with Epistemic Content

One way to explain how (4) can be true despite being necessarily unassertable is to posit some epistemic content in *must*. For example, if *must p* entailed *might p*, then (4) would entail:

(9) # Sam might go to confession, but he's not going to.

Thus, the infelicity of (4) would derive from the fact that (4) entails the infelicitous (9). If an utterance by S of *might p* means something like *S does not know that p is false*, then (4) is infelicitous on the grounds that one must not assert something that one does not know.

[8] See Kratzer (1981) and Kratzer (1991).

We can actually make this point without making any assumptions about the correct semantic analysis of *might*, which is currently a matter of controversy.[9] We do however need to assume two things: (i) that a speaker S's utterance of *must p* entails that S does not know that *p* is false, and (ii) that one cannot flat-out assert *p* while admitting that one does not know *p*. One recent explanation of this latter fact, due to Timothy Williamson, is that knowledge is the *norm* of assertion: speakers should assert only what they know.[10]

This approach yields the following explanation of (4)'s infelicity: If *Sam must go to confession, but he's not going to* were assertable, then one would be in a position to know it. But if one knows the first conjunct, then one does not know that Sam won't go to confession. But then one does not know the second conjunct. So if one knows the first conjunct, one cannot know the second conjunct, since knowledge of the first conjunct entails lack of knowledge of the second. It follows that the conjunction cannot be known. By the knowledge account of assertion, the conjunction is not assertable. One cannot assert (4) because one is never in a position to know the proposition such an assertion would express.

What would the semantics of deontic *must* have to be like in order for us to give this explanation of the infelicity of (4)? Here is an 'orthodox proposal' for how to build epistemic content into the truth-conditions of *must p* (I call the proposal 'orthodox' since it stays within Kratzer's framework). We assume that *must p* takes as its modal base the epistemically accessible worlds, the worlds compatible with what one knows in the evaluation world. The ordering source then orders the epistemically accessible worlds according to a contextually determined deontic ordering source (morality or legality or religious duty, etc.). Those worlds which are most highly ranked according to this ordering source are the ones that the modal *must* quantifies over. On this view, Sam's mother's utterance of (4) entails (10):

(10) # I do not know that Sam is not going to go confession, but Sam is not going to go to confession.

(where *I* refers to Sam's mother). Since (10) is an epistemic version of Moore's paradox, this account assimilates (4) to a familiar kind of infelicity: Moore-paradoxical sentences.[11] Thus, the present account holds out the possibility that there is a common explanation for various kinds of possibly true but necessarily unassertable sentences. More importantly though, the present proposal allows us to treat the puzzle without modifying or going outside Kratzer's semantic framework for modals.

[9] The 'standard analysis' of *might p* is that an utterance by S of *might p* is true iff S does not know that *p* is false. This account, and slight variations on it, has been disputed by Egan *et al.* (forthcoming) among others.

[10] See Williamson (1996) and (Williamson, 2000, Ch.11). See also Hintikka (1962). The norm has something like the status of a Gricean maxim.

[11] The classic Moore's paradox sentence is of the form *p but I don't believe that p*. For discussion of Moore's paradox and its epistemic counterpart, see Moore (1942), and the references in footnote 10.

## 2.2 A Puncture and a Patch

Despite these advantages, this specific account should be rejected on the grounds that it yields a false prediction. The main problem is that an utterance by S of *must p* comes out false whenever S knows that *p* is false. If S knows that *p* is false, then *p* is false in all the worlds compatible with what S knows. So the worlds in the modal base which are most highly ranked by the deontic ordering source will all be worlds in which *p* is false, since *every* world in the modal base is one in which *p* is false. Since S's utterance of *must p* is true just in case *p* is true in all those most highly ranked worlds, S's utterance is false. But this is a bad result.

Consider again Sam's mother. Suppose she says, "Sam must go to confession" even though she knows that Sam will not go to confession—she knows that his contrarian nature will prevent him from going. Is what Sam's mother said *false* in this scenario? It doesn't seem so—her utterance may well be true, even if she knows he won't go to confession. It seems that the only things relevant to determining whether her utterance of *Sam must go to confession* is true are (i) the non-normative facts about Sam's past actions, and (ii) what morality or religious duty requires. It doesn't seem that what Sam's mother knows is relevant to whether or not Sam must go to confession.

Similarly, an utterance of *must p* will turn out *true* whenever one knows *p*. If one knows *p*, then *p* is true throughout the modal base. Thus, *p* is true in all of the worlds most highly ranked by the ordering source. So if I know that Sam is going to shoot the fish-monger, then I can truly say, "Sam must shoot the fish-monger." But this is clearly wrong; my knowing that Sam is going to do something is simply irrelevant to whether or not Sam is *obliged* to do that thing.

An easy fix might be waiting in the wings. Since the problem cases only occur when *p* is true or false *throughout* the modal base, perhaps we should say that *must p* presupposes that *p* is *contingent with respect to* the modal base. On this view, *must p* only gets a truth-value if *p* is true at some but not all of the worlds in the modal base. Call this presupposition *the diversity condition* on the modal base.[12]

The patched-up proposal tells us that if Sam's mother says, "Sam must go to confession" when she knows that Sam will not go to confession, then her utterance suffers from a presupposition failure, and is thus neither true nor false. Since *Sam will go to confession* is false throughout the modal base, *Sam must go to confession* lacks a truth-value. Similarly, if I know that Sam is going to shoot the fish-monger, my utterance of *Sam must shoot the fish-monger* likewise suffers from a presupposition failure. The revised version of the orthodox proposal thus eludes the bad consequence that dogged the initial one.[13]

[12] The name is taken from (Condoravdi, 2002, 84), where the condition is a proposed as a presupposition of 'metaphysical' modal operators. Werner (2003) discusses this sort of condition at length; he proposes that some such condition holds for *all* modal terms.

[13] One might worry that the fix is a bit *ad hoc*. This worry would be assuaged to some extent if we could show that many or most modals come with a presupposition like the diversity condition, a claim others have argued for (see footnote 12).

## 2.3 Interlude: Modality and Tense

Before discussing the orthodox proposal and the second puzzle, I ought to make explicit an assumption I'm making about (7)-(8). The assumption is that the modal takes a tensed complement. On this view, although *have* bears perfect morphology, it is really a past tense in these sentences. This assumption is not uncontroversial.[14] One alternative view is that of Condoravdi (2002), in which the temporal interpretation of these sentences is derived from the interaction between the modal and the perfect, both of which are temporal operators. Adopting Condravdi's view, rather than the tensed complement view, could have important consequences for how we approach the second puzzle.

Condoravdi proposes her view as way to derive the epistemic and (what she calls) the 'metaphysical' reading of the modal *might*. While her theory might be fruitfully applied to deontic modals, the tensed complement view is quite simple and seems to make some of the right predictions for deontic modals. For example, the following semantics for *should* and the past tense seem to predict the right truth-conditions for (8) (worlds are of type $s$, times of type $i$, $R$ denotes a contextually determined accessibility relation on worlds (we ignore ordering sources)):

- $[\![should\ R]\!]^{w,t} = \lambda p_{\langle s,t\rangle}.\forall w'(wRw' \rightarrow p(w') = 1)$
- $[\![PAST]\!]^{w,t} = \lambda a_{\langle i,t\rangle}.\exists t' < t(a(t') = 1)$

This gives us the following meaning for *Sam should have gone to confession*:

> $[\![Should\ R\ PAST\ Sam\ goes\ to\ confession]\!]^{w,t} = 1$ iff
> $\forall w'$( if $w'$ compatible with what religious duty requires in $w$, then
> $\exists t' < t$( Sam goes to confession in $w'$ at $t'$))

Thus, we press on with the assumption that the modals in (7)-(8) take past tense complements.[15]

## 2.4 Orthodoxy and the Second Puzzle

Even with the §2.2 patch in place, the orthodox proposal still doesn't solve the second puzzle—it doesn't predict that *must* followed by the past *have* never receives a deontic interpretation. Recall the data that generate the second puzzle:

[14] For different views, see Condoravdi (2002) and Werner (2003).

[15] If we adopted a Condoravdi-inspired view of deontic modals and tense, and assumed (i) that *must* took a 'metaphysical' modal base and (ii) that it had a diversity condition presupposition, then we could show that when *must* takes wide scope over the perfect, the epistemic reading is forced. (A 'metaphysical' modal base, in Condoravdi's sense, is the set of worlds whose past is identical to the actual past, but whose futures differ from the actual future.) But the semantics would predict a coherent reading for the scope resolution PERFECT(MUST $p$). The sentence would mean that in the past it was obligatory that $p$. Since *must have p* doesn't have this reading, the application of Condoravdi's theory to the deontic case wouldn't solve the puzzle by itself; we would need to stipulate that the perfect always takes wide scope over *must*. But the stipulation is more of a re-description of the problem rather than a solution to it.

(7) Sam should/ought to have gone to confession. (*Deontic reading available.*)

(8) Sam must have gone to confession. (*Epistemic reading mandatory, deontic reading unavailable.*)

The orthodox proposal says that *must p* has an epistemic modal base and a deontic ordering source. But take any case where I don't know some fact about the past. For example, suppose I do not know whether or not Sam went to confession: both possibilities are compatible with my knowledge. According to the present version of the orthodox proposal, if Sam had had a religious obligation to go to confession, then (8) should have a true deontic reading. But (8) only has an epistemic reading.

Is there a natural extension of the orthodox proposal which would explain why (8) lacks the deontic reading? The needed proposal would incorporate into the meaning of *must* some information about the past, and do so without upsetting the explanation of the first puzzle that we have in place. The following conjecture might work: the modal base of (deontic) *must* is not epistemic, but *historical*.[16] A historical modal base is one which contains the set of all worlds $w$ such that $w$ is exactly like the evaluation world up until time $t$, the evaluation time (perhaps the $w$'s should also be governed by roughly the same laws of nature as the evaluation world). If we fix on the actual world and a fixed time $t$, a historical modal base for the actual world at $t$ consists of those worlds whose past is identical to the actual past up to $t$ and whose post-$t$ future represents a way the actual world might go on from $t$. A proposal that incorporated a historical modal base for deontic *must* would then require that the the worlds in the base be ordered by a deontic ordering source. *Must* universally quantifies over the worlds ranked most highly by the ordering source.

We continue to assume that a diversity condition governs the modal base: an utterance of *must p* is only felicitous if $p$ is true at some, but not all, worlds in the modal base. The new proposal still solves the first puzzle, since the historical modal base is, arguably, a subset of the epistemic modal base. Here is how Condoravdi puts this point:

> If an issue has not been settled by the course of events up to a given time, then the future is open with respect to that issue and, consequently, it cannot be known at that time which way it will be settled.[17]

'Future contingents' – propositions that are true in some but not all of the historical alternatives to a world $w$ at a time $t$ – cannot be known in $w$ at any time $t'$, $t' < t$. If deontic *must* takes a historical modal base, then by the diversity condition, *must p* is felicitous only if $p$ is a future contingent. By the

[16] What I call 'historical modality', Condoravdi calls 'metaphysical modality'. But her terminology is unfortunate, since philosophers tend to reserve the phrase 'metaphysical modality' to refer to necessity and possibility *simpliciter*, i.e. modals that quantify over the unrestricted domain of all possible worlds (if such there be).

[17] (Condoravdi, 2002, 74).

claim that future contingents cannot be known, we have that *must p* is felicitous only if *p* is not known (by the speaker). Assuming still that knowledge is the norm of assertion, it follows that sentences like (4) are not assertable. So the 'historical' version of the orthodox proposal preserves our solution to the first puzzle.

What about the second puzzle? The solution provided by this approach might seem obvious by now. Facts about the past are settled, so, for any proposition *p* that concerns the past, *p* is either true or false throughout the historical modal base. Thus, by the diversity condition alone, *must p* will be bad when *p* concerns the past. Since *have p* always concerns the past, *must have p* will never be felicitous if the modal receives a deontic interpretation. Hence the impossibility of a deontic reading of (8). Second puzzle solved.

I think this final version of the orthodox proposal has much to say for it. Indeed, it may be correct. Nevertheless, I think there are a few considerations that tell against it, and which suggest that another solution is at least worth looking for.

## 2.5 Against the Orthodox Proposal

I have three reasons for being dissatisfied with the orthodox proposal. I present them in ascending order of importance.

Recall one of our imagined scenarios involving Sam's mother. Sam's mother says, "Sam must go to confession" even though she knows he won't. According to the orthodox proposal, Sam's mother's utterance is neither true nor false. My first complaint about this proposal is that in this imagined scenario Sam's mother's utterance strikes me as true (if misleading) rather than neither true nor false. I agree with the orthodox account that her assertion is bad in some way, but I think it's still true. It seems to me that the truth-conditions of *Sam must go to confession* and *Sam is obliged to go to confession* stand and fall together. *Ex hypothesi*, Sam is obliged to go to confession. Thus, it seems to me that Sam's mother's utterance of *Sam must go to confession* is true, rather than neither true nor false.

My second reason for wanting to explore other options is that the present account fails to capture the intuition that *must* carries with it an imperative-like force. Of course, the mere intuition that *must* has an imperative-like force would be too unspecific to carry much weight, but the difficulty emerges more sharply when we notice that imperatives behave in a parallel fashion to simple *must* sentences in that neither imperatives nor simple *must* sentences permit a denial of the embedded clause. Parallel to (4), we have:

(11) # Go to confession! You're not going to go to confession.[18]

The parallel is striking. It would be desirable to find a generalization that explained both the infelicity of (4) and that of (11). As we'll see, the account I

[18] Of course, the infelicity depends on holding the addressee fixed across the utterances.

favor enables us to formulate a generalization that gives a unified explanation of this data.

My final reason for thinking that we ought to explore other possible ways of solving the puzzles is that the present approach seems insufficiently explanatory. Why does a *deontic* modal require a historical modal base? After all, according to Kratzer (1991),

> Not every kind of modal base can combined with every kind of ordering source. Epistemic modal bases take ordering sources related to information: What the normal course of events is like, reports, beliefs. Circumstantial modal bases take ordering sources related to laws, aims, plans, wishes. (649)

The present proposal says that deontic *must* has a historical modal base, but a deontic ordering source. This itself calls out for an explanation. Why is *must* special in this way?

These considerations, while not conclusive, constitute a *prima facie* case against the orthodox proposal. At the very least, they motivate the search for another theory. After the details of another account are on the table, the reader can assess the relative merits of these two analyses.

# 3 *Should* and *Must*

## 3.1 Uniqueness

We begin our search for a new theory by reviewing some previous work on the contrast between *should* and *must*. In this literature, two main ideas have emerged. The first is that whereas *should p* indicates that *p* is one of the better - perhaps even the best - option(s), *must p* indicates that *p* is the *only* permissible option.[19] Call this feature which *must* possesses and *should* lacks *the uniqueness feature*. *Must* indicates that there is only one option consistent with the relevant deontic alternatives.

Kai von Fintel and Sabine Iatridou (2005) account for the uniqueness feature in Kratzer's framework.[20] On their view, an utterance of *should p* is true at a world just in case *p* is true at all the best worlds (as ordered by the contextually determined ordering source) in the modal base, and an utterance of *must p* is true at a world just in case *p* is true throughout the modal base. Here the modal base *and* the ordering source are deontic. This seems the right way to formally implement the uniqueness feature: if Sam should mop the floor but doesn't absolutely have to, then there are *acceptable* worlds in which he doesn't

[19] This idea can be found in Sloman (1970), (White, 1975, 158), and (Williams, 1981, 125).

[20] I should note that von Fintel and Iatridou make their proposal for teleological or practical necessity modals, the sort that appear in the following kind of construction: *If you want to go to Harlem, you should/must take the A-train.* But the proposal seems applicable in the deontic case (if these are different).

mop the floor, but *those* worlds are not the very *best* ones. Additionally, the proposal easily accounts for the feeling that *must* is somehow stronger than *should/ought to*, since the domain *must* quantifies over is a superset of the domain *should/ought to* quantifies over.

I mention this difference between *should* and *must* only to set it aside. I don't think it will solve our puzzle, because it only serves to make *must* stronger than *should* by allowing *must* to ignore the ordering source. But it is difficult to see how this could solve either of our two puzzles, since *must* and *should* have the same basic semantics, except that the domain of worlds that *must* quantifies over is a superset of the domain of worlds *should* quantifies over. On this proposal, (12) is equivalent to (13), and (8) is equivalent to (14) .

(12) John must go to confession.

(13) Religious duty absolutely requires John to go to confession.

(8) John must have gone to confession.

(14) Religious duty absolutely required John to go to confession.

But note two things: (8) lacks, while (14) possesses, a past tense deontic reading; and (15), unlike (4), is felicitous:

(15) Religious duty absolutely requires John to go to confession, but he's not going to go.

Thus, the fact that *must* is stronger than *should* does not explain either of our two puzzles.

## 3.2 Practicality

The second difference between *should* and *must* is that *must*, but not *should*, seems to involve some sort of *speaker authority* or some attempt by the speaker to *initiate action*.[21] We'll call this idea the *practical feature* of *must*. The claim that *must* possesses the practical feature is motivated by the sense that *must* has an imperative-like force. For example, there is little felt difference between utterances of *You must stop smoking* and *Stop smoking*—both seem like orders the speaker makes to the addressee. Writers who have noted this point have thus tended to focus on simple *must* sentences with second person subjects. But the general sense is that in uttering a simple *must* sentence, the speaker is attempting to initiate action—she's either trying to get someone to do something or committing herself to doing something. This suggests that part of the semantic story about *must* will be a speech act story about what one is doing when one utters a simple *must* sentence.

The practical feature of *must* suggests an explanation of our first puzzle along the following lines. In uttering a sentence of the form *must p*, the speaker

[21] This idea can be found in (Leech, 1971, 72ff.), (Coates, 1983, 32ff.), and (Palmer, 1986, 104).

is undertaking action that she hopes will result in the truth of $p$. The speaker wants a certain state of affairs to be brought about. Thus, if I say, "You must stop smoking", I am undertaking an action – the action of uttering that sentence – in order to bring it about that you no longer smoke. Ordinarily, it is rational to undertake an action A to achieve some goal G only if one thinks that there is some chance that one will achieve G if one performs A. So if I say, "You must stop smoking" in order to get you to stop smoking, I must think there is some chance that you will stop smoking if I tell you to stop. In that case, I don't believe that you won't stop smoking. But if I don't believe that you won't stop smoking, I'm not in a position to say that you won't stop smoking.

The practical feature of *must* also suggests a simple explanation of our second puzzle. Since in uttering *must* $p$ the speaker is undertaking an action that she hopes will result in the truth of $p$, it would be odd if $p$ concerned a past state of affairs. Again, it is only rational to undertake an action in order to achieve some goal if one believes that there is some chance that the action in question will achieve the goal in question. On the assumption that it is (generally believed to be) impossible for anyone to bring about a past state of affairs, it would be irrational to undertake an action in order to bring about a past state of affairs. Thus it would inappropriate to utter *must* $p$ if $p$ concerns a past state of affairs (and the intended reading of the modal is deontic).

These explanations need to be expanded and clarified in many ways. The next two sections of the paper are devoted to that task.

# 4 Imperatives, Promises, and To-Do Lists

In this section, I present some data concerning imperatives (briefly mentioned in §2.5) and promises, introduce some theoretical machinery needed for explaining these data, and then propose an explanation. The hope is that the data presented in this section are instances of the same phenomenon exhibited by (4), and that the explanation of these data will suggest a solution to our first puzzle. In §5 we see whether this hope can be realized.

## 4.1 Imperatives and Promises

One might think that when one asserts *must* $p$, it would somehow undermine the force of one's assertion if one went on to assert that it won't be that $p$ (similarly if one did things the other way around: asserted that it won't be that $p$ followed by an assertion of *must* $p$). A similar phenomenon seems to occur with imperatives and promises:[22]

(16) # Shut the door! You're not going to shut the door.

[22] I use *promises* ambiguously: sometimes I use it to refer to promises, sometimes I use it to refer to sentences used to make promises, i.e. sentences of the form *I/We promise to* $\phi$ (where '$\phi$' is replaced by a verb phrase headed by a bare infinitive). Context should disambiguate.

(17) # We're not going to go for a walk. Let's go for a walk.[23]

(18) # I promise to mop the floor, but I'm not going to.

(19) # I'm not going to mop the floor, but I promise to.

In these examples, it again seems that denying the embedded clause (*You shut the door*, *We go for a walk*, *I mop the floor*) undermines the force of the other clause (the imperative or the promise). Speakers who sincerely utter imperatives seem to presuppose that the embedded clause expresses a state of affairs that might be realized. This seems connected to the fact that in uttering an imperative, one seeks to get one's audience to do something. Similarly, speakers who utter sentences of the form, *I promise to* $\phi$ seem to presuppose that they might $\phi$, i.e. if sincere, they don't believe that they won't $\phi$. I think we can explain what's going on in (16)-(19) by paying close attention to pragmatic features of these sentences, and how utterances of imperatives and promises represent the intentions of the participants of a conversation.

## 4.2 Common Ground and To-Do Lists

In this subsection we introduce some theoretical machinery needed for explaining examples (16)-(19). We begin by reviewing a well-known apparatus for modeling conversations due to Robert Stalnaker.[24] Ordinarily, conversations take place against a background of shared information. Speakers take for granted that they and their interlocutors believe or assume certain things. If such assumptions were not made, it would be difficult to see how communication would even be possible. Stalnaker calls this shared information the *common ground*. The common ground can be modeled as a set of propositions: a definition of when a proposition is a member of the common ground of a speech context says that a proposition $p$ is common ground iff all accept $p$, all believe that all accept $p$, all believe that all believe that all accept $p$, and so on (to *accept* a proposition is to treat it as true for some purpose or other). In some contexts it will be useful to make the stronger assumption that common ground is *common belief*, in which case the 'base' attitude is belief rather than mere acceptance. We will assume that common ground is common belief, unless otherwise noted.

An assertion is an act that can be defined in terms of common ground: to assert $p$ is to add the proposition $p$ to the common ground. If a participant of a conversation successfully asserts $p$, all participants come to believe $p$, believe that all believe $p$, believe that all believe that all believe $p$, and so on. In this way, as participants make assertions, the common ground grows. This is a model for how speakers exchange information. (Sometimes participants will

[23] An example similar to (16) is presented in Han (1998), but she writes that "...it is infelicitous to *follow* an imperative with a sentence that expresses the speaker's belief that the situation described by the proposition of the imperative will not be realized." (168, emphasis added). (17) shows that the infelicity does not depend on the order.

[24] See, for instance, Stalnaker (1972, 1978, 2002).

have false beliefs; the information they convey by some assertions will thus be misinformation.)

One of the things one does when one sincerely utters a declarative sentence is express a belief that one has. Which belief one expresses depends on the content of the declarative. One of things one does when one sincerely utters an imperative is express a desire that one has. Which desire one expresses depends on the content of the imperative. When one utters a declarative one is trying to get one's addressee to share one's belief. When one utters an imperative one is trying to get one's addressee to satisfy one's desire.

One way to model these apparent truisms about imperatives is to associate a *To-Do List* with each participant of a conversation, an idea we adopt from Paul Portner's work on imperatives.[25] We can think of a To-Do List for a participant S as the set of propositions such that it is common ground that S intends to make those propositions true.[26] To-Do Lists are tied closely to specific contexts, just as common ground is. One important difference between To-Do Lists and common ground is that whereas the latter is common to all participants, To-Do Lists are participant-specific. If S and R are having a conversation, there is one common ground, but two To-Do Lists (S's List and R's List). It is important to note that a participant S's To-Do List is not necessarily co-extensive with S's actual intentions, since To-Do Lists are essentially public: a proposition $p$ is on a To-Do List L only if it is common ground that $p$ is on L. (If the participants are sincere, then a participant's To-Do List will be a subset of her actual intentions.)

Just as declaratives are used to make assertions, we can say that imperatives are used to make *requirements*. Just as the essential function of an assertion is to add a proposition to the common ground, so the essential function of a requirement is to add a proposition to someone's To-Do List. In most languages, imperatives are the standard clause-type used to make requirements, and when one uses an imperative to make a requirement, it is essentially addressee-directed. But in some languages, such as Korean, different clause-types can be used to make a requirement: a *promissive* is a clause-type which makes a requirement directed towards the speaker; an *exhortative* is clause-type which makes a requirement directed towards both the speaker and the addressee.

An important feature of both common ground and To-Do Lists is that there are many ways for a proposition to become common ground, and many ways for a proposition to land on a To-Do List. Assertions are not the only way for a proposition to become common ground; requirements are not the only way for a proposition to be added to a To-Do List. Stalnaker (2002) gives the following example of how a proposition can be added to the common ground as the result

[25] See Portner (2004).

[26] I have amended Portner's account in certain ways. On his account, To-Do Lists are lists of *properties*, properties which are also the semantic values of imperatives. The difference is important for his purposes, since he attempts to individuate clause types in terms of the type of their respective semantic values, a project which would be hopeless if both declaratives and imperatives had the same kind of semantic value. But none of this matters for my purposes, and assuming that To-Do Lists are lists of propositions is more convenient for me. Also, Portner doesn't stipulate, as I do, that a proposition is on a particular To-Do List just in case it is common ground that is on that List.

of a non-linguistic event:

> ...two Californians are sitting in a room together in the evening, and suddenly there is an unexpected power outage, and all the lights go out. Assuming that the two are mutually aware of each other, when the event happens it will immediately be common belief that it has happened. (708)

In Stalnaker's example, a totally non-linguistic event adds propositions to the common ground: in the example, the proposition that the lights went out is among the propositions added to the common ground after the lights go out. An example of how to use words to add something to the common ground without asserting anything: if I say, "George, do the dishes you left in the sink," my utterance (if accepted) makes it common ground that George left dishes in the sink, if this wasn't common ground already. So making a requirement can add a proposition to the common ground.

Similarly, a proposition can be added to a To-Do List through the occurrence of a totally non-linguistic event: in the appropriate circumstances, if I point at the door and give George a stern look, the proposition that George leaves the room might get added to George's To-Do List. One can also put something on a To-Do List by asserting: e.g. I may be able to put the proposition that George moves his foot onto George's To-Do List simply by telling him that he is standing on my foot.

## 4.3 To-Do Lists and Two Maxims

How does the common ground interact with the To-Do Lists of the participants of a conversation? How do the beliefs of the participants interact with their intentions? We can get a handle on this by looking at two cases: (i) the case in which a speaker attempts to put a proposition on *someone else's* To-Do List (e.g. when one utters an imperative); and (ii) the case in which a speaker attempts to put a proposition on *her own* To-Do List (e.g. when one utters a sentence of the form *I promise to* $\phi$).

**Case (i):** Suppose I say to Bill, "Mail these letters for me, please." Normally, I would only say this if I wanted a certain state of affairs to obtain: I want Bill to mail the letters. In order to achieve this goal, I take a certain action—the action of uttering the imperative *Mail these letters for me.* In general, it is rational for me to undertake an action A in order to achieve some goal G only if I believe my performing action A has some chance of bringing about G. To put this in Bayesian terms: it is rational for me to undertake A in order to achieve G only if my probability for G given A is non-zero. Thus, in the normal case, I will only ask Bill to mail the letters for me if I think there is some chance that Bill *will* actually mail the letters, conditional on my asking him to. (The "conditional on" clause is important here, since I might well think that Bill won't mail the letters unless I ask him to.) To avoid talking in terms of fine-grained belief, we

could say that it is rational for me to ask Bill to mail the letters only if I *don't* believe that Bill *won't* mail them if I ask him to.

This suggests that if one attempts to put a proposition $p$ on someone else's To-Do List, one does not believe that the owner of the List will not make $p$ true if one attempts to put $p$ on the List.[27] This suggests that when one utters an imperative – or does something else to put a proposition on someone else's To-Do List – one does not believe that the owner of the List will not make the relevant proposition true. Assuming that this is known to all participants of the conversation, uttering an imperative makes it common ground that the speaker doesn't believe that his addressee will not make the relevant proposition true.

I think the above account is more or less right, but it is subject to at least one qualification. I may well ask or order someone to do something when I know full well that he won't comply with my request. In such a case, I likely have some alternative purpose in making the request: perhaps I'm trying to highlight my addressee's laziness, obstinacy, contrariness, etc.. And of course one could imagine many other cases in which one accomplishes some purpose by asking or ordering someone to do something when one knows that one's addressee will fail to comply with one's request. But since we are interested in first getting the story right for 'normal' cases not involving deception, we we will ignore such complications in what follows.

**Case (ii):** The second case we need to consider is when one puts a proposition on one's own To-Do List. In putting a proposition on one's own To-Do List – and in allowing someone else to put a proposition on one's To-Do List – one is representing oneself as intending to make that proposition true. Thus, when one promises to do something by uttering a sentence of the form *I promise to* $\phi$, one represents oneself as intending to $\phi$. The notion of *representing oneself as* is difficult to explicate, but I think it should be clear what is meant by it in this context. Perhaps a better way to put this point is to say that if one is *sincere* in uttering a sentence of the form *I promise to* $\phi$, then one intends to $\phi$. So when one asserts that one promises to $\phi$, one puts the proposition that one will $\phi$ on one's own To-Do List.

Philosophers have speculated about the connection between intention and belief. Some have defended the claim that if one intends to do something, then one believes that one will do that thing, but this claim is controversial in the philosophical literature.[28] However, even those who doubt the intention-entails-belief thesis concede that a weaker thesis *is* true: that if one intends to do something, then one does not believe that one won't do it.[29] This perhaps explains why we find the following sort of exchange odd:[30]

[27] In this sentence, 'if' is in the scope of 'believes': one does not believe that (the owner of the List will not make $p$ true if one attempts to put $p$ on the List).

[28] Supporters of the intention-entails-belief thesis include: Grice (1972), Harman (1986), and Velleman (1989). Detractors include: Davidson (1978), and Bratman (1987).

[29] See (Bratman, 1987, 37ff).

[30] Adapted from (Davidson, 1978, 92-93).

A: I intend to go to that concert on Tuesday.
B: You'll enjoy that.
A: I'm afraid I won't be there.

Participant B would no doubt be wondering what A is up to. If A believes that he won't be at the concert on Tuesday how can he be said to *intend* to be there?

If one sincerely asserts that one promises to $\phi$, then one intends to $\phi$. If one intends to $\phi$, one does not believe that one will not $\phi$. Thus, if one sincerely asserts that one promises to $\phi$, then one does not believe that one will not $\phi$. When one utters a sentence of the form *I promise to* $\phi$, one puts the proposition that one $\phi$'s on one's To-Do List.[31] This suggests the following generalization: if one puts a proposition $p$ on one's own To-Do List, then one does not believe one will not make $p$ true (cases of deception aside). Assuming that this generalization is known to all parties of a conversation, uttering a promise makes it common ground that the speaker doesn't believe that he won't make the relevant proposition true (by way of making it common ground that the speaker intends to make the relevant proposition true).

Our discussion of Cases (i) and (ii) suggests that the following two maxims govern speech acts that attempt to put propositions on To-Do Lists:

- Do not attempt to put a proposition $p$ on someone else's To-Do List if you believe that she will not make $p$ true even if asked or ordered to do so.
- Do not attempt to put a proposition $p$ on your own To-Do List if you believe you will not make $p$ true.

(We could probably state these two maxims as one, but I won't bother to do so.) Since in the normal case the maxims are common ground – participants take them for granted – disobeying either maxim misleads one's audience. More could be said about the relationship between To-Do Lists and common ground, but I'll leave further exploration of this topic for another time. What we have in place is sufficient for explaining the data we're interested in.

## 4.4 Explaining the Data

With these maxims in place, we can now offer an explanation of the infelicity of (16)-(19). First, consider (16).

(16) # Shut the door! You're not going to shut the door.

Suppose I were to utter the sentences in (16), in the order they appear there. After uttering the imperative, "Shut the door," I will have made it common

[31] My claim that utterances of sentences of the form *I/we promise to* $\phi$ put propositions on To-Do Lists is supported by the fact that promissives and imperatives are so closely related in languages that have both. Additionally, other languages (e.g. Sanskrit) have 'first-person' imperatives which seem to be interpreted as promises. See Portner (2004) for details and references.

ground that I don't believe that my addressee won't shut the door, since it is assumed that I am obeying the first maxim. But now suppose I utter the second sentence, "You're not going to shut the door" (we assume my remarks are addressed to the same person). If the assertion is successful, then it will become common ground that my addressee won't shut the door. By the definition of common ground (= common belief), all believe that my addressee won't shut the door, all believe that all believe this, and so on; in particular, all believe that *I* believe that my addressee won't shut the door. But it can't be common ground that I both believe and don't believe that my addressee won't shut the door. Thus, one cannot utter the sentences in (16) successfully, since the utterances can't both be accepted. Speakers cannot coherently update their beliefs in response to these two utterances.

A similar explanation of (17) can be given.

(17) # We're not going to go for a walk. Let's go for a walk.

The problem in (17) is that one first denies a certain proposition, thus making it common ground that the speaker doesn't believe that proposition. The speaker then attempts to add the very same proposition to the speaker's and the addressee's To-Do Lists (such is the force of "Let's..."). The speaker is thus violating both maxims; hence the infelicity of (17).

The explanation of (18) and (19) is similar, but it also depends on a special feature of the verb 'promise'. I take it that it is a feature of *promise* that if one utters something of the form *I promise to* $\phi$, then one thereby adds the proposition that one will $\phi$ to one's To-Do List. This, to be sure, isn't the only thing one does when one utters such a sentence; but it is, nevertheless, one of the things one does. I also assume that when one says, "I promise to $\phi$" one *asserts* that one promises to $\phi$ and that one's assertion somehow makes itself true. So when one utters a sentence of the form *I promise to* $\phi$ one does two things to the discourse context: one adds a proposition to the common ground and one adds a proposition to one's To-Do List.

Given this assumption, it should be clear what our explanation of (18) and (19) will be, but let's go over this quickly. Let's focus on (19).

(19) # I'm not going to mop the floor, but I promise to.

In uttering the first clause, I assert that I'm not going to mop the floor. Assuming that my assertion is accepted, it becomes common ground that I'm not going to mop the floor, and it becomes common ground that I believe that I'm not going to mop the floor. But if I promise to mop the floor, then it becomes common ground that I don't believe that I'm not going to mop the floor, by the second maxim. Thus, my utterance of (19) makes incompatible demands on the common ground, and is for that reason infelicitous. A similar sort of explanation can ben given for the infelicity of (18).

# 5 A Speech Act Solution to the Puzzles

## 5.1 *Must* and To-Do Lists

If we assume that what's going on in (4) is an instance of basically the same phenomenon that we see in (16)-(19), then it should be clear how to extend the explanation of (16)-(19) to (4). The obvious move to make here is to hypothesize that an utterance of a sentence of the form *must p* puts *p* on a To-Do List. Utterances of *must p* are similar to sentences of the form *I promise to* $\phi$, in that both add a proposition to the common ground *and* put a proposition on a To-Do List. An utterance of *S must* $\phi$ asserts that S must $\phi$ and adds the proposition that S $\phi$'s to someone's To-Do List.

For example, if I assertively utter (20):

(20) I must apologize to Sue.

we can assume that I am, in addition to asserting that I am obliged to apologize to Sue, putting the proposition that I apologize to Sue on my To-Do List. If I utter a sentence of the form *I must* $\phi$, I am, among other things, expressing my intention to $\phi$. For reasons mentioned in our discussion of Case (i), this requires that I do not believe that I won't $\phi$. This makes (21) unacceptable for me to utter:

(21) # I must apologize to Sue, but I'm not going to.

One can see how to extend this explanation to the second person case (*You must do such-and-such*), since one of the effects uttering a sentence of that form has on the context *just is* the effect uttering an imperative has on the context. (The two do not, however, make identical contributions to the context, since an utterance of *must p* also makes an assertion.) Thus, our explanations of (16) and (17) apply here.

It is less obvious how to do extend the proposal to third-person cases, such as (4). The main problem is that if the third-person subject is not party to the conversation, then he or she does not have a To-Do List relative to our conversation. The main way to get around this, as I see it, is to suggest that when one utters a third-person simple *must* sentence, one is either putting the proposition expressed by the complement clause on one's own To-Do List, or on the To-Do List of one's addressee, or on both.

An example will prove instructive. Suppose I am speaking to Billy's mother, and I'm upset that her child is bullying my nephew, Jacob. In the course of our conversation, I say to Billy's mother, "Billy must not hit Jacob." Plausibly, what I'm doing here is (among other things) instructing Billy's mother to see to it that Billy does not hit Jacob; that is, I am putting the proposition that Billy does not hit Jacob on Billy's mother's To-Do List. I am telling her to make that proposition true.

Other possible cases include those in which one's utterance of *must p* (i) puts the relevant proposition on one's own To-Do List, and (ii) puts the relevant proposition both on one's own and on one's addressee's To-Do Lists.

This, then, yields an explanation of our first puzzle sentence – *Sam must go to confession, but he's not going to* – along the following lines: In uttering the first conjunct of (4), one (among other things) puts the proposition that Sam goes to confession on someone's To-Do List. If Sam is present, one perhaps puts that proposition on his List; if Sam is absent, one puts it on one's own List and/or on the List of another conversational participant. In either case, one's utterance of *Sam must go to confession* makes it common ground that one doesn't believe that Sam won't go to confession, given the two maxims. But then when one utters the second conjunct, one is attempting to make it common ground that Sam won't go to confession, and that all believe this. In particular, one's utterance of the second conjunct would have the effect of making it common ground that one believes that Sam won't go to confession. Thus, one's audience cannot update their beliefs coherently in response to one's utterance of (4). For this reason, the utterance is unacceptable.

First puzzle solved.

## 5.2 Solving the Second Puzzle

Recall the nature of the second puzzle: why can't deontic *must* take a past tense complement, given that deontic *should/ought to* can?

(7) Sam should/ought to have gone to confession. (*Deontic reading available.*)

(8) Sam must have gone to confession. (*Epistemic reading mandatory, deontic reading unavailable*)

The hypothesis that *must* is associated with putting propositions on To-Do Lists explains why the deontic reading is unavailable for (8). If an utterance of *must* $p$ puts $p$ on a To-Do List L, then it is only reasonable for someone to utter *must* $p$ if the owner of L is able to make $p$ true. But if $p$ is a proposition about the past, then the owner of L can't reasonably be expected to make $p$ true, since we can't bring about past states of affairs. No one can now make it the case that Sam went to confession in the past, so the proposition that Sam went to confession in the past can't be placed on a To-Do List. This is why the deontic reading of *must* is unavailable in (8).[32]

The contrast between (7) and (8) is explained by the hypothesis that whereas *must* is associated with putting things on To-Do Lists, *should* and *ought to* are not. If *should* and *ought to* are not associated with putting things on To-Do Lists, then (7) simply makes a claim about what's going on in the relevant deontic alternatives, and there is no reason why such claims cannot concern the past. So our hypothesis that deontic *must* possesses the practical feature and that *should* and *ought to* do not helps explain why only the latter two can take past tense complements.

Second puzzle solved.[33]

[32] Palmer makes a similar suggestion; see (Palmer, 1986, 104).

[33] The data that generate the second puzzle also seem relevant to teleological/practical necessity versions of the modals *should* and *must*, as we see in the past tense of 'anankastic

## 5.3 Complications

A potential problem arises with sentences of the form *must p* which have a third person subjects. The problem is that it's not clear that the strategy suggested in §5.1 generalizes to cover all cases. Suppose we are having a casual conversation with friends about the the present Bishop of Rome and his various moral/political views. I say,

(22) The pope must change his position on contraception.

Given who I am, and given who my friends are, it may not be plausible to suppose that I expect any of us to undertake action whose goal is to change the pope's mind on contraception. Thus, it may be implausible to claim that in uttering (22), I am attempting to put the proposition that the pope change his position on contraception on someone's To-Do List. Nevertheless, my utterance might nevertheless be perfectly felicitous.

The problem is that if (22) is appropriate in such a context, then the explanation we gave of the infelicity of sentences like (4) will not apply to:

(23) ? The pope must change his position on contraception, but he's not going to.

This is because the explanation I've offered of such sentences depends crucially on the claim that utterances of clauses of the form *must p* put the proposition *p* on someone's To-Do List. But if an utterance of (22) is appropriate in the imagined scenario, then it seems that not all utterances of *must p* put *p* on someone's To-Do List. In that case, the present theory is unable to explain the (alleged) infelicity of (23).

My response to this challenge is slightly equivocal, in part because I'm uncertain about the data. First suppose – as the objector does – that it is okay to utter (22) in a context in which it is common ground that none of the participants of the conversation can or will do anything aimed at bringing about a change in the pope's position. My response here is that if you think that there could be such a context, then I think you should find (23) assertable in that context as well.

Sometimes when you say something of the form *S must* $\phi$, where *S* is a third-person subject, you or one of your conversational partners has sufficient authority or causal power to bring it about that S $\phi$'s. In this sort of case, a successful utterance of *S must* $\phi$ puts the proposition that S $\phi$'s on someone's To-Do List. But in a context in which no conversational participant has such

conditionals' (which are the focus of study in von Fintel and Iatridou (2005)):

(a) If you wanted to go to Harlem, you should have taken the A train. (*Teleological reading available/mandatory.*)

(b) If you wanted to go to Harlem, you must have taken the A train. (*Epistemic reading mandatory, deontic reading unavailable*)

((b) is thus not an anankastic conditional at all.)

authority or causal power over S, an utterance of *S must* $\phi$ is *not* an attempt to put a proposition on a To-Do List, precisely because it is common ground that no one present can bring it about that S $\phi$'s. Thus, if (22) is okay in the imagined scenario, I conjecture that (23) will likewise be appropriate. And, indeed, those who find (22) acceptable in this sort of scenario generally accept (23) as well.

But there is some question as to whether (22) really is assertable in such a context. Suppose it isn't. Then when you assert (22) in a context, either you are attempting to commit yourself (or someone else present) to a course of action aimed at getting the pope to change his position, or your assertion is infelicitous. In the former case, you needn't think that the course of action has a high probability of success, but you must not think it doomed to failure either, i.e. you must think that you have *some* chance of success. And you needn't think that if a proposition $p$ is on someone's To-Do List then she is expected to be able to make $p$ true by herself, especially in an example like the pope case. All she is committed to is undertaking action whose aim is to bring about the state of affairs represented by $p$. Moreover, one is merely committed to doing *something*; no particular action seems required. These qualifications are meant to suggest that a proposition $p$ can be on a To-Do List even if the owner of the List can do very little to help make $p$ true.

So there are two possibilities here, depending on whether or not (22) is assertable in such a context.[34] The proposal I've been developing predicts that (22) is not assertable in such a context. But we have seen how the proposal can be amended to accommodate contrary judgments.

I'm a bit uneasy about this amendment, not least because it seems slightly *ad hoc*. My own suspicion is that if it *really* is common ground in a context that none of the conversational participants can or will do anything to attempt to bring about a change in the pope's position, then we would find (22) a strange thing to say. It would be much more appropriate and natural to say, "The pope really should change his position on contraception" (or perhaps: "The pope has to change his position on contraception").[35] Thus, the official line taken here is that one can only felicitously assert *must p* if it makes sense to put $p$ on some participant's To-Do List.[36]

[34] I am excluding as a possibility that (22) is assertable in the relevant sort of context, but (23) isn't. The only possibilities are that both are assertable in the relevant sort of context or neither is.

[35] The parenthetical option using the modal *have to* would work only if *have to* lacks the practical feature. See (Lakoff, 1972, 925) for some relevant discussion about the difference between *must* and *have to*.

[36] A further complication with the data is that in many contexts it might be most natural to understand an assertion of (22) as a 'hypothetical imperative'. That is, in uttering (22) one might be saying, "The pope must change his position on contraception [or the church will come to ruin]." In this case, it is not clear that the modal *must* is really deontic at all.

# 6 Conclusion: Two Open Questions

## 6.1 Embedding

I have remained silent on what the status of *must*'s practical feature is. How do simple *must* sentences put propositions on To-Do Lists? Is this part of the lexical meaning of *must*? Or is this feature of the use of *must* a pragmatic feature? It seems to me that what I have said is neutral on this important question, though I confess that I don't see how to derive this feature of *must* from a Kratzer semantics for the modal plus Gricean principles.

Whatever the correct story is, we will have to confront the question about what happens to the feature when a simple *must* sentence is embedded in a larger construction. In some cases, e.g. conjunctions, the consequent of certain conditionals, *must* retains that feature:

(24) You stole the money and you must turn yourself in.

(25) If you stole the money, you must turn yourself in.

In other cases, e.g. in the scope of attitude verbs and in the antecedents of certain conditionals, the feature is 'stripped off':

(26) Sam believes that he must go to confession.

(27) If Sam must go to confession, he did something wrong.[37]

Thus, whatever mechanism we posit to explain how utterances of simple *must* sentences put propositions on To-Do Lists, it must accommodate the fact that the feature can be stripped off in certain linguistic contexts.

This consequence of my account may seem unattractive, especially since I have no concrete story about how this works. I agree that this is an important problem that needs to be dealt with, but let me suggest that it is a problem we are going to have to face in any case when we consider other lexical items. For example, as noted earlier, the word *promise* is similar in this respect: when a simple present tense promise sentence with a first-person subject is uttered, the speaker has put a proposition on her own To-Do List. We saw this earlier in §4.1, where we motivated the claim that such sentences put propositions on the speaker's To-Do List by appeal to the following examples:

[37] If the practical feature of *must* is stripped off when *must p* occurs in the antecedent of a conditional, then (part of) my account might yield a false prediction. On my account, the reason why deontic *must* can't take a past tense complement is that it has the practical feature; so we should expect that when the practical feature is stripped off, deontic *must* will be able to take a past tense complement. But this is not so:

(27′) # If Sam must have gone to confession, he did something wrong.

This is an important objection, but the issue seems rather complicated. Unlike (8) (*Sam must have gone to confession*), which forces an epistemic reading on the modal, (27′) has *no* felicitous reading.

(18) # I promise to mop the floor, but I'm not going to.

(19) # I'm not going to mop the floor, but I promise to.

But of course this feature can be 'stripped off':

(28) I promised to mop the floor, but I didn't get around to it.

(29) Jim promises to mop the floor, but he's not going to.

Thus, whether or not we choose to adopt my theory of deontic *must*, we are stuck with the problem of explaining how the practical feature is associated with a lexical item which possesses it, as the case of *promise* demonstrates. These remarks don't solve the problem, but they do show that my account of *must* does not *create* a new problem which we could otherwise avoid.

## 6.2 *Must* and *May*

What is the relationship, on my account, between deontic *must* and its dual, *may*? Loosely speaking, requirements are commands. The contrary of commanding is permitting. Thus, we hypothesize that, in addition to asserting that $p$ is permissible, utterances of *may p* grant permission. The hypothesis may help explain an apparent similarity between *must* and *may*—neither takes a past tense complement:

(8) Sam must have gone to confession. *(Epistemic reading mandatory, deontic reading unavailable.)*

(30) Sam may have gone to confession. *(Epistemic reading mandatory, deontic reading unavailable.)*

If we assume that an utterance of *S may* $\phi$ (where *may* is given a deontic interpretation) grants permission for S to $\phi$, we can explain why deontic *may* cannot take a past tense complement. It may be impossible to grant someone permission to do something they cannot do; but even if this is not impossible, it is hard to imagine a case in which one would have a reason to permit someone to do something they cannot do. On the assumption that no one can now or in the future perform actions that took place in the past, the speech act analysis of *may* predicts that sentences like (30), in which *may* takes a past tense complement, will require an epistemic interpretation. An account of deontic *may* along these lines would seek to implement this intuition using the machinery for describing conversations discussed in §4.[38]

[38] It is worth noting that other authors have, for quite independent reasons, been led to a speech act analysis of deontic *may*. I have in mind Hans Kamp's solution to the problem of free choice permission. See Kamp (1973, 1978). See also Lewis (1975).

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