

Modal Subordination in Japanese: Dynamics and Evidentiality

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1 Introduction

Nonspecific indefinites introduced within the scope of a semantic operator such as negation or a modal are generally not available for coreference with anaphoric expressions in subsequent sentences (cf. (1a,2a)). But, when subsequent sentences also contain semantic operators compatible with the first, coreference can occur (1b,2b). The cover term for situations of this sort is *modal subordination* (Roberts 1989, Frank 1997, Geurts 1999, McCready and Reese 2002). Intuitively, the second sentence in a sense is interpreted in a context ‘subordinate’ to that created by the first modal.

- (1) a. A wolf might come in. # It is hungry. (Roberts 1989)
b. A wolf might come in. It would eat you first.
- (2) a. A thief might break in. # He will take the silver. (Roberts 1989)
b. A thief might break in. He would take the silver

Discourses of this sort in English and other Indo-European languages are fine. But in Japanese similar discourses are not generally so good, as shown by the following example.

- (3) ookami-ga kuru kamosirenai. # \emptyset /soitu anata-o taberu
wolf-NOM come might \emptyset /that-guy you-ACC eat
nitigainai.
surely

‘A wolf_i might come in. It_i would eat you first.’

The goal of the present paper is to clarify the facts about modal subordination in Japanese and to provide an explanation of them. We will first present the facts, and then discuss some properties of Japanese modals, concluding that many Japanese modals have an evidential component. We will then show that the modal subordination facts can be explained in terms of evidential pre-suppositions.

2 Modal Subordination in Japanese

We make use of three modal expressions in our discourses: the possibility modal *kamosirenai* and the necessity modals *nitigainai* and *hazu (da)*. These expressions will be discussed in detail in the next section.

Modal subordination in Japanese turns out to be basically very different from the English case, though speakers seem to vary a good deal as to which cases of modal subordination are found to be felicitous and which are not. We return to this point later. Still, one result is immediate. The basic translation of the Roberts example (1b) into Japanese is infelicitous with a covert pronoun or the pseudo-demonstrative *soitu*, as shown by the following example.¹

- (4) ookami-ga kuru kamosirenai. # \emptyset /soitu anata-o taberu
 wolf-NOM come might \emptyset /that-guy you-ACC eat
 nitigainai.
 surely
 ‘A wolf_i might come in. It_i would eat you first.’

This discourse, however, became perfectly acceptable when we introduced a particular context in which there was *evidence* that the wolf would eat you first. We asked speakers to consider the examples in a situation where (to quote from the instructions) ‘the hearer (you) knows the following facts: a) you are on an island that is having a particularly harsh winter, b) the wolves in the area are ravenously hungry and c) you are sitting closest to the door, so you are the first person any wolf coming in will encounter.’ The introduction of such evidence also made the *nitigainai* . . . *nitigainai* sequence (a variant of the basic Roberts discourse in which both modals are substituted for with *nitigainai*), which was judged largely unacceptable without this context, completely acceptable.

Somewhat marginal but still accepted by more of our informants than not is the variation of our story where the order of modals is reversed: that is, $\square\Diamond(\forall\exists)$ rather than $\Diamond\square(\exists\forall)$:

- (5) ookami-ga kuru nitigainai. # \emptyset /soitu anata-o taberu
 wolf-NOM come surely \emptyset /that-guy you-ACC eat
 kamosirenai.
 might
 ‘A wolf_i will / must surely/ should come in. It_i might eat you.’

¹For some speakers, *soitu* is infelicitous as a bound variable in general. We do not consider the reasons for this fact in this paper.

When *nitigainai* is replaced by *hazu* in (5) the result is very marginal. This is quite different from *must*, which seems to be *hazu*'s closest English equivalent.

Of all the standard modal subordination patterns that we looked at, the only one that was judged acceptable by almost all speakers in an out-of-the-blue context was the sequence of two *might* modals as in:

- (6) ookami-ga kuru kamosirenai. \emptyset /soitu anata-o taberu
 wolf-NOM come surely \emptyset /that-guy you-ACC eat
 kamosirenai.
 might

'A wolf_i might come in. It_i might eat you.'

All the other modal variations on our discourse were rejected by more participants than not.

One may wonder now how Japanese speakers express modal subordination-like concepts; presumably there are times when such things need to be said. It turns out that, in fact, there are a number of different ways to fix discourses like these. We survey them in the remainder of this section.

2.1 Discourse Markers and Conditionals

Interestingly, the standard $\diamond\Box$ pattern of modal subordination when *nitigainai* is chosen to express the \Box operator is felicitous when licensed by discourse markers (7a) or conditional clauses (7b). However, the pattern remains bad when *hazu* is used to express the \Box operator, as shown in (8). The discourse marker we checked in most detail, *so-si-te* 'that-do-CONT', is similar.

- (7) a. ookami-ga kuru kamosirenai. sosite \emptyset /soitu anata-o
 wolf-NOM come might then \emptyset /that-guy you-ACC
 taberu nitigainai.
 eat surely
 'A wolf_i might come in. Then it_i would eat you.'
- b. ookami-ga kuru kamosirenai. mosi \emptyset kitara \emptyset /soitu
 wolf-NOM come might if \emptyset came-COND \emptyset /that-guy
 anata-o taberu nitigainai.
 you-ACC eat surely
 'A wolf_i might come in. If (one) did, it_i would eat you.'

- (8) a. ookami-ga kuru kamosirenai. # sosite \emptyset /soitu anata-o
 wolf-NOM come might then \emptyset /that-guy you-ACC
 taberu hazu da.
 eat surely COP
 ‘A wolf_i might come in. Then it_i would eat you.’
- b. ookami-ga kuru kamosirenai. # mosi \emptyset kitara \emptyset /soitu
 wolf-NOM come might if \emptyset came-COND \emptyset /that-guy
 anata-o taberu hazu da.
 you-ACC eat surely COP
 ‘A wolf_i might come in. If (one) did, it_i would eat you.’

The case most different from English is that in which a particle is used for licensing. Modal subordination is possible even without a modal when certain sentence-final emphatic particles are used, such as *yo*. Note that the tense of the second sentence is nonpast, meaning that a futurate interpretation is available (example due to Ken-ichiro Shirai). We cannot discuss this case in detail, but see McCready (2005) for a full analysis.

- (9) ookami-ga kuru kamosirenai. \emptyset /soitu anata-o taberu yo.
 wolf-NOM come might \emptyset /that-guy you-ACC eat YO
 ‘A wolf_i might come in. It_i (will) eat you, man (rough gloss).’

Let us now sum up briefly. *Might-might* sequences are fine in Japanese. The standard pattern requires a marker of subordination—a discourse marker or conditional—to be felicitous; but this only works with *nitigainai*. *Hazu* doesn’t support modal subordination at all at least not in the standard cases. *Nitigainai* can support modal subordination only marginally in out-of-the-blue contexts, though it works much better with discourse particles or conditionals.

We now consider in detail the semantics of our three modal expressions.

3 Modal Expressions in Japanese

All of the expressions we made use of—*kamosirenai*, *hazu-da*, and *nitigainai*—are invariably sentence-final.

- (10) a. neko-ga sakana-o taberu kamosirenai
 cat-NOM fish-ACC eat might
 ‘A cat might eat the fish.’
- b. neko-ga sakana-o taberu hazu-da
 cat-NOM fish-ACC eat must-COP

‘A cat will (definitely) eat the fish.’

- c. *neko-ga sakana-o taberu nitigainai*
 cat-NOM fish-ACC eat must

‘A cat will (definitely) eat the fish.’

Two of these modals, *kamosirenai* and *nitigainai*, are morphologically complex, though the sequences seem to be largely grammaticalized (in that it seems impossible to derive the correct modal meanings from these sequences of morphemes in a compositional way, at least as far as we can tell). The morphological breakdown is as shown below.

- (11) a. *ka-mo-si-re-na-i*: Q-also-know-be.able.to-NEG-PRES
 b. *ni-tigai-na-i*: DAT-wrong-NEG-PRES

Kamosirenai is very similar in meaning to English *might*. The necessity modals are more complicated in that they appear to have an evidential component. Johnson (2003), for instance, states that *hazu* is used when the speaker has good evidence for the claim being made, while *nitigainai* is associated with conclusions obtained by inference. Some evidence for this claim comes from the following examples. Consider first the examples with *hazu* immediately below. When one makes a statement about how the weather will be at some future point, one is unlikely to have *direct* evidence for one’s claim. If it is the case that *hazu* requires direct evidence and *nitigainai* requires only indirect evidence (that, together with known facts about the world, lead to some conclusion about tomorrow’s weather), it should be infelicitous to use *hazu* in such contexts. And this prediction is in fact borne out by the facts.

(12) In null contexts:

- a. *asita ame-ga furu nitigainai*
 tomorrow rain-NOM fall must
 ‘Tomorrow it will rain.’
- b. # *asita ame-ga furu hazu da*
 tomorrow rain-NOM fall must COP
 ‘Tomorrow it will rain.’

However if the speaker is someone who can be taken to have enough knowledge about the weather that the current state of the sky etc. provide him *direct and clear* evidence for how the weather will be tomorrow, use of *hazu* should be fine. And this is in fact the case, as shown by the following example which makes use of a special kind of speaker.

- (13) Context: speaker is a 75-year-old farmer who can invariably predict the next day's weather from the look of the sky on the previous evening.
Then:

- a. asita ame-ga furu nitigainai
tomorrow rain-NOM fall must
'Tomorrow it will rain.'
- b. asita ame-ga furu hazu da
tomorrow rain-NOM fall must COP
'Tomorrow it will rain.'

This fact makes it look very much like *hazu* is at least in part an evidential (cf. the *best possible grounds for assertion* needed for use of the Quechua evidential clitic *-mi* (Faller 2002)). As noted by Faller in this context, what counts as direct evidence depends both on speaker and context: what may be direct evidence for an aged farmer may not be direct evidence for a city-bred linguist. One conclusion that can be drawn here is that the evidentiality requirement is pragmatic in nature. We will pursue one way to interpret this conclusion below by making use of presuppositions in our analysis.

Another piece of evidence is that it is odd to use *hazu* in sentences that express the speaker's certainty based on inferencing (example from Moriyama 2001). Here, use of *nitigainai* is preferred.

- (14) a. kare-wa sootoo nemu-soo da. sakuya tetuya sita
he-TOP very sleepy-looks COP. last.night all-nighter did
nitigainai
MUST
'He looks very sleepy. He must have pulled an all-nighter last night.'
- b. kare-wa sootoo nemu-soo da. # sakuya tetuya sita
he-TOP very sleepy-looks COP. last.night all-nighter did
hazu-da
MUST-COP
'He looks very sleepy. He must have pulled an all-nighter last night.'

We now move to a formal analysis of the evidentiality in the modals in terms of presupposition.

4 Modals and Evidentiality

I assume the modal semantics of Asher and McCreedy (2004). This logic is complex and space considerations do not allow providing a full discussion here; details of the system can be found in the above-cited paper and in McCreedy (2005). For the discussion in this paper, we simply note that the logic is dynamic and operates on sets of epistemic states, and that it contains the modal operators *might* and *would*. This section provides a semantics for the Japanese modals that, in conjunction with our modal semantics, accounts for the modal subordination facts.

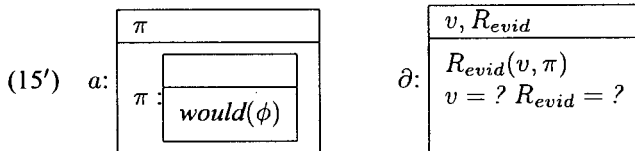
The Japanese existential modal *kamosirenai* behaves similarly to its English counterpart with respect to both modal subordination and evidentiality. We take both to be translated by the operator *might*, which predicts that they behave similarly with respect to modal subordination. And since our logic predicts English modal subordination to be unproblematic (at least in Roberts-style contexts), we also predict the Japanese cases to work out identically.

The \square modals (*hazu* and *nitigainai*) are more complex. Neither *hazu* nor *nitigainai* have a reading dependent upon a \diamond modality in out-of-the-blue or null contexts. In certain contexts, however, *nitigainai* does have a modally subordinate reading, though *hazu* does not. We hypothesize that the infelicity of the modal subordinations comes from a failure of the evidential presuppositions of the \square modals. As this suggests, we will treat the evidential components of the Japanese \square modalities as presuppositions, in contrast to Faller's (2002) analysis, which takes evidentials to introduce conditions on speech acts (cf. Vanderveken 1990).

We take the main question to be answered to be why evidential presuppositions can apparently be accommodated in the antecedent of a conditional (notice how *nitigainai-kamosirenai* and *hazu-kamosirenai* sequences are good with conditionals) and in the presence of *sosite* but not in the null context. In considering an answer to this question, one thing that is apparent is that these modals have evidential presuppositions of differing strength. The evidential presuppositions of *nitigainai* are easily accommodated or bound in contexts where there is information sufficient, together perhaps with modal assumptions given by \diamond updates, to support the proposition under *nitigainai*'s scope. This is shown by the *kamosirenai* ... *nitigainai* in the scenario with added background, where the relevant sort of evidence is supplied by the context.

We thus give *nitigainai* the following semantics (stated in a DRT-style representation).

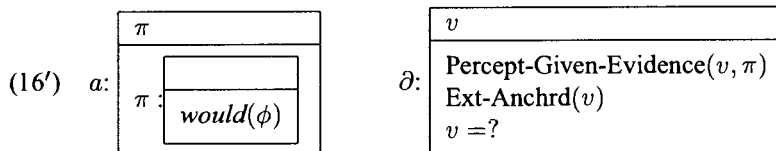
$$(15) \quad \textit{nitigainai}\phi$$



Nevertheless, it appears difficult for many Japanese speakers to accommodate this evidential presupposition, which we'll write for short as $\partial nitigainai\phi$. Perhaps there is just less of a general willingness to accommodate presuppositions for some speakers of Japanese (cf. Kurafuji 1999 and Beck et al. 2004). But $\partial nitigainai\phi$ does seem to be unproblematic in the presence of a conditional or discourse particle (of the right sort). We return to this issue in the next section.

Hazu has a presupposition that the evidence is deictically given in the context (like the *-mi* particle of Quechua discussed by Faller 2002), i.e. the evidence is external and perceptible. This presupposition cannot be bound to anything other than some situation in the context. The external anchoring device from DRT serves as a place holder for determining how this link to the context is made. *Hazu* then is given the following semantics.

(16) *hazu* ϕ



The basic route to an explanation of the Japanese modal subordination facts, then, is a consideration of the interaction of the evidential component of the modals with the semantics of the things that license modal subordination. We will argue that conditionals and discourse particles each serve in some way to provide a way to 'bind' the evidential presupposition associated with the modal. The case of the sentence-final particle *yo* is different, however.

5 Explaining the Facts

In this section we will use the dynamic system just discussed and the presuppositional analysis of evidentials to give an account of Japanese modal subordination.

We will make use of SDRT (Asher and Lascarides 2003), a dynamic theory of discourse structure, in this discussion. SDRT makes use of discourse

relations. In SDRT, each clause introduces a *speech act referent*, written π_i ; these clauses are connected by discourse relations, written $R(\pi_1, \pi_2)$. We forgo giving more background on SDRT here for reasons of space.

5.1 $\diamond\Box$

How to understand the data relating to the $\diamond\Box$ pattern? In particular, why are continuations with *hazu* and *nitigainai* bad in the simple cases? And why does *nitigainai* improve when additional context is added?

The answer to the first question simply relates to the evidential component of the modals. Both \Box modals require that a certain kind of evidence exist in the context to be felicitously asserted. *Nitigainai* needs information—possibly hypothetical—that can serve as evidence for φ with inferencing. *Hazu* needs perceptually given, external facts. If the right information is not forthcoming then modal subordination crashes due to a conflict between evidentiality and the modally dependent nature of the host proposition. Nothing about the modal subordination contexts themselves satisfies either type of presupposition. Without additional context, they are not necessarily satisfied.

As this suggests, additional context can feed the evidential component of *nitigainai*. *Nitigainai* simply needs for the context to have the right information to support φ in its scope. If the context, along with the content in the scope of the first modal, then supports the inference of φ , modal subordination becomes felicitous because the presuppositions are satisfied. This is why the modal subordination discourses with *nitigainai* improved when additional contextual information was presented. *Hazu*, on the other hand, needs a perceptually given fact (in the cases we are concerned with). Additional context in the form of general information cannot satisfy its presupposition, explaining why it is still bad even with the sort of extra context we provided.

5.2 No Particle vs. Discourse Particle

The basic idea here is that Japanese doesn't support a discourse relation between the first and subsequent sentences of modal subordination constructions due to lack of a suitable inference rule; the connective, however, enables construction of the right kind of relation.

The argument for this analysis goes as follows. The evidential presuppositions of *nitigainai* are similar to those of *would*. So why do they behave so differently with respect to modal subordination? An answer is forthcoming if we examine the discourse connections in Japanese. These are crucial for satisfying the evidential presupposition, which is relational. Now if it's the

case that *nitigainai*'s evidential presuppositions, as we have already argued, must be inferentially linked to the proposition under *nitigainai*'s scope, then it appears that both in English and Japanese that one has to form the inferential link and that inferences about discourse relations are crucial. This observation leads to the core of the discourse relation-based analysis. On this analysis, Japanese is taken to lack a defeasible rule of the right sort to infer a discourse relation that can support the evidential presupposition. The lack of such a rule would also explain why $\square\Diamond$ sequences are unavailable with a modally subordinated reading unless there are explicit discourse cues to indicate the appropriate relation—the presence of a discourse particle being one example.

Now, lacking a rule to connect modalized utterances, it is impossible to connect the content in the scope of the two modals in any way other than with a contentless, 'junk' relation which we'll call Continuation, which simply states that the second segment in some way 'continues' the first, but in a way that's free of semantic content. Supporting the evidential content requires a certain kind of information flow, which is what the discourse structure gives us—whether as in Narration it's certain enabling relations (i.e. *occasion*) or as in Result it's a causal or inferential dependency or as in Elaboration a type of dependency based on subtype relations. Only in the presence of such relations can the right connection between the evidential presuppositions of *nitigainai*(ϕ) (or *would* ϕ) and ϕ be constructed. But in Japanese these relations must be explicitly marked in the discourse—not so in English. If this derivational link is explicitly made, the discourse becomes acceptable. This fact suggests that it is indeed the difficulty of inferring discourse relations that causes problems in the modal subordination examples.

On the other hand, when given a context that provides evidence for the relevant statements under *nitigainai* the felicity of the discourses improves dramatically (see the survey results at the end of the chapter). In this case, *hazu*'s deictic presupposition isn't met even when the first modality is by hypothesis anchored. The difficulty involves the *best possible grounds* presupposition of *hazu*: dependency on another modal, regardless of its evidential status, is insufficient to satisfy the presupposition, which must be anchored in a genuinely external and certain fact, which thus cannot be modal.

Thus, the explanation for why $\Diamond\square$ sequences are bad in general is that Japanese lacks a rule that allows inference of a discourse relation that can support the evidential content of the \square modals. Adding additional context as in the 'bare2' case, however, allows the evidential content to be contextually bound *independently* of the content of the first sentence; and use of a discourse particle forces monotonic inference of a more contentful relation such as Narration that can in fact support the evidential link. A nice side effect of this analysis

is that it explains why we have no problem in $\diamond\diamond$ (*kamosirenai-kamosirenai*) discourses; since *kamosirenai* lacks evidential content, it doesn't matter if a contentful discourse relation is present or not, since there's no need to bind any evidential presuppositions.

5.3 Conditional Dependence

In the conditional case, the repeated content serves to restrict the set of epistemic possibilities to those verifying the proposition in the scope of the first modal, and can also serve to bind the evidential presupposition of *nitigainai*. How does this work? Gillies (2004) argues that conditionals have a modal flavor: more specifically, they should obey the following equivalence:

- $\neg(\phi \Rightarrow \psi) \leftrightarrow \diamond(\phi \wedge \neg\psi)$

Conditionals also enable modal subordination in English.

- (17) a. A wolf might come in.
 b. If one did, it would eat you first.

Here, the content of the conditional antecedent is anaphoric on the content of the first sentence.

If it's correct that conditionals allow duplication of S1 content, then it makes sense that they permit the binding/accommodation of the evidential requirements of *nitigainai*. The information in the antecedent can serve as a binder for the evidential presupposition of *nitigainai* in a theory of presupposition like that of van der Sandt (1992), or allow it to accommodate, in a theory like that of Beaver (2002), just as in the discourse particle case. In contrast, *hazu* has a presupposition which must be bound deictically to some external fact, which again generates a conflicting implicature with the deictic presupposition, resulting in infelicity of modal subordination. Thus this case works out in some ways like that of the discourse particles.

5.4 $\diamond\diamond$ and $\square\diamond$

Because we give no special evidential status to *kamosirenai*, we predict that a $\diamond\diamond$ sequence should work just as in English and should be felicitous. However, that doesn't explain why the other *kamosirenai* continuations are marginal. A possible hypothesis is that in Japanese there is a rough shift from strong evidentials to weak evidentials within a modally dependent reading, unless there is a discourse break between the constituents marked by a particle. This

rough shift may cause difficulties in inferring discourse relations, though this is speculative. Another possibility is that use of the \Box modals in the first sentence is already infelicitous in this context because of unsatisfied presuppositions. We leave this issue open for the present.

6 Summary and Prospects

In this paper we have given the facts about Japanese modal subordination and analyzed them in terms of interaction between evidential presuppositions associated with modals and the mechanisms of modal subordination. The conclusion is that modal subordination itself in Japanese works just as in English; the differences are the result of differences between Japanese and English modals.

This project is only a start in the examination of the interaction of evidentiality and the various modal (or intensional) constructions. Many issues remain open. First, more work needs to be done on the $\Box\Diamond$ cases, to clarify whether either of our hypotheses is right. One also wonders whether our presuppositional story can be extended fully to other languages with evidentials, such as Quechua or Tibetan, and whether modal subordination works similarly in languages like these.

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