Temporal -*made* in Japanese and its interaction with aspect and polarity

Sam Alxatib
Yasutada Sudo
CUNY Graduate Center and University College London

1 Introduction

The postposition *-made* in Japanese may accompany a caseless noun phrase (NP) or a clause (CP), and in either case *XP-made* functions as a temporal adverb whose meaning is akin to *until* in English.[1] This use of *XP-made,* which we call the *until*-use, exhibits negative polarity sensitivity that is conditioned by the aspectual properties of the predicative phrase it modifies. Specifically, the *until*-use of *XP-made* is compatible with durative predicates with or without negation, as in (1), but when modifying a punctual predicate, it requires negation, as in (2).

(1) Taroo-wa kayoobi-made Tookyoo-ni {a. i-ta / b. i-nakat-ta }.
Taro-TOP Tuesday-MADE Tokyo-LOC {a. be-PAST / b. be-NEG-PAST}
'Taro { was / was not } in Tokyo until Tuesday.'

(2) Taroo-wa kayoobi-made Tookyoo-ni {a.*tsui-ta / b. tsuk-anakat-ta }.
Taro-TOP Tuesday-MADE Tokyo-LOC {a.*arrive-PAST / b. arrive-NEG-PAST}
'Taro { *arrived / did not arrive } in Tokyo until Tuesday.'

The pattern in (1)–(2) is entirely parallel to what has been observed for *until* in English (e.g. Klima 1964, Horn 1972, Karttunen 1974, Iatridou & Zeijlstra 2021, Alxatib 2023), but a unique feature of *-made* in Japanese is that when it is followed by another postposition *-ni,* it comes to mean something akin to *by* in English. We call this use the *by*-use of *-made.* In this use, *XP-made-ni* is no longer sensitive to polarity but continues to be sensitive to aspect. The nature of the restriction, however, is different: *XP-made-ni* is (mildly) unacceptable when it modifies a simple durative predicate, as in (3), but it is fully acceptable when it modifies a simple punctual predicate, as in (4).[2] In both cases the presence/absence of negation does not affect the judgment.

(3) Taroo-wa kayoobi-made-ni Tookyoo-ni {a. ??i-ta / b. ??i-nakat-ta }.
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC {a. ??be-PAST / b. ??be-NEG-PAST}
Taro { was / was not } in Tokyo by Tuesday.'

[1] In this paper we exclusively focus on the temporal reading of *XP-made,* and set aside its spatial reading, although our proposal about the former is expected to extend more or less straightforwardly to the latter. Also, due to space limitations, we cannot discuss the use of *-made* as an NP-modifier in this paper.

[2] Note that the English translation of (3) is acceptable, but arguably that is due to aspectual coercion of the predicate, as evidenced by the fact that with a durative predicate that resists aspectual coercion such as the stative verb *remain*, the acceptability worsens, as in **Patrick remained in the UK by Tuesday.* Crucially for the discussion to follow, such English stative verbs do not exhibit amelioration effects with operators like a necessity modal, as in ***Patrick must remain in the UK by Tuesday.*

(4) Taroo-wa kayoobi-made-ni Tookyoo-ni {a. tsui-ta / b. tsuk-anakat-ta }.
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC {a. arrive-PAST / b. arrive-NEG-PAST}
'Taro { arrived / did not arrive } in Tokyo by Tuesday.'

It should be remarked that although the acceptability contrast between (3) and (4) is clear, the unacceptability of (3) is not entirely sharp. Interestingly, furthermore, we observe that when a deontic necessity modal is added, the acceptability of (3) improves drastically, as in (5), while the acceptability of (4) remains unchanged, as in (6).

(5) Taroo-wa kayoobi-made-ni Tookyoo-ni {a. i-ru / b. i-na-i }
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC {a. be-PRES / b. be-NEG-PRES}
hitsuyoo-ga at-ta.
need-NOM be-PAST
'Taro needed to { be / not be } in Tokyo by Tuesday.'

(6) Taroo-wa kayoobi-made-ni Tookyoo-ni {a. tsuk-u / b. tsuk-ana-i }
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC {a. arrive-PRES / b. arrive-NEG-PRES}
hitsuyoo-ga at-ta.
need-NOM be-PAST
'Taro needed to { arrive / not arrive } in Tokyo by Tuesday.'

We will discuss below other operators that similarly improve judgments of *XP-made-ni* with durative predicates, and claim that there are two types of operators that give rise to such amelioration effects for different reasons.

Our goal in this paper is to propose a uniform analysis of the two uses of *-made* that accounts for the sensitivity to polarity and aspect summarized above. Our proposal for the *until*-use draws heavily on previous research on the semantics of English *until*, specifically Iatridou and Zeijlstra's (2021) and Alxatib's (2023) focus-based account of *until*'s aspect-polarity sensitivity. We build on this further and propose that *-made*'s *by*-use involves an additional operator. We will explain how this analysis accounts for why *-made* ceases to be polarity sensitive in its *by*-use but instead shows the complex aspect sensitivity illustrated in (3)–(6) above, which we claim is a consequence of exhaustivity.

Before moving on to the analysis, it should be noted that in order to save space, we focus on examples where the complement of *-made* is a referring noun phrase. Our observations and analysis, however, are expected to be applicable without significant changes to other types of admissible complements as well.

2 The *until*-use of *-made*

As remarked above, the polarity-aspect sensitivity of the *until*-use of *-made* is analogous to what is known about *until* in English (Karttunen 1974, Iatridou & Zeijlstra 2021, Alxatib 2023). We adopt Alxatib's (2023) analysis of *until* to *XP-made* in this paper.

2.1 Tense and aspect

We will formulate our proposal within a pronominal view of tense semantics. We do this only because it simplifies our discussion of issues that have to do with presupposition projection — the analysis is just as compatible with other views of tense as far as we can see. We assume that a tense head carries an index that denotes an (open) time interval (a convex set of moments) via an assignment function. Different tenses trigger presuppositions about where their referents are temporally located, typically relative to the utterance time. For instance, simple sentences with durative and punctual predicates have the following denotations with respect to an arbitrary assignment function g and utterance time t_u. To save space, compositional details are omitted in this paper.

(7) Taro was$_1$ in Tokyo » [PAST$_1$ [Taro be in Tokyo]]
  a. Presupposition: $g(1)$ precedes t_u.
  b. Assertion: Taro is in Tokyo throughout $g(1)$.

(8) Taro arrived$_1$ in Tokyo » [PAST$_1$ [Taro arrive in Tokyo]]
  a. Presupposition: $g(1)$ precedes t_u.
  b. Assertion: Taro's arrival time in Tokyo is contained in $g(1)$.

2.2 -*Made* with durative predicates

Following Iatridou and Zeijlstra's (2021) and Alxatib's (2023) proposals for *until*, we assume that *-made* has two main functions. Firstly, it triggers a presupposition about the right boundary (RB)—formally, the supremum—of the time interval denoted by the tense. The meaning of (1a), repeated as (9), is shown in (9a-b) (cf. (7)).

(9) Taroo-wa kayoobi-made Tookyoo-niita » [PAST$_1$ [[Tues-*made*] Taro be in Tokyo]]
  Taro-TOP Tuesday-MADE Tokyo-LOC was
  a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
  b. Assertion: Taro is in Tokyo throughout $g(1)$.

Secondly, *-made* introduces *focus alternatives* of its complement (Condoravdi 2008, Iatridou and Zeijlstra 2021). The alternatives to a phrase of the form [*XP-made*] have the same presuppositions as the phrase itself — that the RB of the local evaluation time falls in the denotation of *XP*. However, the alternatives differ in their assertoric content: while a phrase of the form [[*XP-made*] *YP*] asserts that *YP* holds of evaluation time, its alternatives assert that *YP* holds of subintervals of [*XP-made*] that have earlier RBs than evaluation time (Alxatib 2023). In the case of (9), for example, the presupposition of *kayoobi-made* 'Tuesday-*made*' guarantee that the evaluation time, $g(1)$, has Tuesday as its RB and the sentence says in its assertion that Taro's being in Tokyo holds of $g(1)$, right boundary of which is Tuesday. The focus alternatives of (9) make the same assertion, but about intervals that end earlier than Tuesday. That is, while (9) itself attributes Taro's being in Tokyo to the interval ($LB(g(1))$, $RB(g(1))$) — this is $g(1)$ itself — its alternatives attribute

Taro's being in Tokyo to subintervals (*LB*(*g*(1)), *t*), where *t* is an element of—i.e. a time from within—*g*(1). The assertions of (9) and of its focus alternatives may therefore be represented as in (10). Square brackets that include plus signs, –[++]–, delineate Taro's stay in Tokyo.[3]

(10) a. –[++++++++++++++++++(TUESDAY)]–
b. –[++++++++++++++++++]————————
c. –[+++++++++++++++]———————————
d. –[+++++++++++++]—————————————

These alternatives serve as the domain of quantification for a phonologically null exceptive operator, EXC.

(11) EXC φ
a. Presupposition: $\neg\varphi$ and everything that φ and its alternatives presuppose is true.
b. Assertion: Each alternative ψ to φ that is distinct from φ is true.

In words, EXC presupposes its prejacent φ to be false and asserts that its alternatives are all true (while simply projecting the presuppositions of the alternatives). The operator may be thought of as an exceptive, since it says that every relevant alternative is true except for φ. In case of (9), the result of applying EXC is (i) the presupposition that it is *false* that Taro was in Tokyo through Tuesday—that is, that (10a) does not hold—and (ii) the assertion that it is *true* that Taro was in Tokyo through Monday, through Sunday, etc.—(10b), (10c), etc. hold. It follows from this that Taro left Tokyo on Tuesday.

(12) EXC (Tuesday-*made* Taro was$_1$ in Tokyo).
a. Presupposition: ¬(Taro is in Tokyo throughout *g*(1)) and *g*(1) precedes t_u and *RB*(*g*(1)) = Tuesday.
b. Assertion: For each choice function *F* such that *F*(*g*(1)) precedes *RB*(*g*(1)), Taro is in Tokyo throughout (*LB*(*g*(1)), *F*(*g*(1))).

When negation is present, as in (1b), EXC scopally interacts with it. If negation takes scope above EXC, it will affect the assertion of EXC but not its presupposition. We therefore get the same presupposition in (12) but the opposite assertion: (i) it is false that Taro was in Tokyo through Tuesday (presupposition), and (ii) for some earlier time than Tuesday *t*, it is *false* that Taro was in Tokyo through *t* (assertion). This means that Taro left Tokyo earlier than Tuesday.

[3] The focus alternatives to *XP-made* may be defined using choice functions (CFs). CFs, by definition, have elements of their input sets as outputs, so in the case of (9) the focus alternatives attribute Taro's being in Tokyo to the interval [*LB*(*g*(1)), *F*(*g*(1))], where *F* is a CF.

(13) not (EXC (Tuesday-*made* Taro was$_1$ in Tokyo)).

a. Presupposition: ¬(Taro is in Tokyo throughout $g(1)$) and $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.

b. Assertion: For some choice function F such that $F(g(1))$ precedes $RB(g(1))$, Taro is not in Tokyo throughout $[LB(g(1)), F(g(1))]$.

On the other scopal configuration, where negation takes scope below EXC, both EXC's prejacent and its focus alternatives are negated; they say, respectively, that Taro was not in Tokyo during the interval that ends on Tuesday, and not in Tokyo during the interval that ends on Monday, Sunday, etc. We indicate this with the blank spacing in (14):

(14)

a. –[(TUESDAY)]–

b. –[ ]————————

c. –[ ]————————

d. –[ ]————————

We therefore predict, according to this parse, that the presupposition of (15) say that (14a) is false—this is (15a), which is negation of (12a)—and that the assertion (15b) conjoin the assertions of the focus alternatives in (14b,c,…):

(15) EXC (not (Tuesday-*made* Taro was$_1$ in Tokyo)).

a. Presupposition: ¬(Taro is not in Tokyo throughout $g(1)$) and $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.

b. Assertion: For each choice function F such that $F(g(1))$ precedes $RB(g(1))$, Taro is not in Tokyo throughout $[LB(g(1)), F(g(1))]$.

This roughly means that Taro arrived in Tokyo on Tuesday. Note that we assume, crucially, that durative predicates are homogeneous with respect to linguistic negation, which is independently motivated, but not with respect to ¬, which is introduced by EXC, so the presupposition in (12a) does not entail that Taro is in Tokyo throughout $g(1)$.

As we have just seen, according to the present analysis, the sentence with negation in (1b) is ambiguous. As far as we can see, this prediction is on the right track, but for reasons of space we will not present evidence for the ambiguity here.[4]

[4] We also set aside the 'throughout' reading. Alxatib (2023) claims that *until* in English with a non-negated durative predicate is ambiguous and *Taro was in Tokyo until Tuesday* can mean either (i) that Taro left Tokyo on Tuesday or (ii) that he left Tokyo on Wednesday. We observe that the Japanese sentence in (1a)/(9) is similarly ambiguous. Thus, the reading we derived in (12) is only one of the possible readings, namely, (i). To account for the other reading, (ii), Alxatib postulates another alternative sensitive operator, THROUGHOUT. To save space, we will not go into the details here and simply refer the interested reader to Alxatib 2023.

2.3 -*Made* with punctual predicates

Turning now to punctual predicates, recall that the *until*-use of -*made* requires negation in this case. We claim that this polarity sensitivity follows from the fact that without negation, EXC gives rise to a contradiction. Consider (2a) once again, repeated here as (16):

(16) Taroo-wa kayoobi-made Tookyoo-ni { a. *tui-ta / b. tuk-anakat-ta }.
Taro-TOP Tuesday-MADE Tokyo-LOC { a.*arrive-PAST/ b. arrive-NEG-PAST}
'Taro { *arrived / didn't arrive } in Tokyo until Tuesday.'

Consider specifically the (ungrammatical) unnegated version of (16). Some aspects of the predicted semantics here are the same as in the previous examples: the presupposition of the sentence comes from the semantics of the past-tense morpheme and from the presupposition of the -*made* phrase, which together say that evaluation time (here $g(1)$) precedes utterance time, and that Tuesday marks the RB of $g(1)$. The assertion of the sentence says that there is an event of arrival (of Taro in Tokyo) that falls temporally *within* the interval denoted by the -*made* phrase:[5]

(17) Taroo-wa kayoobi-made Tookyoo-ni tuita » [PAST$_1$ [[Tue-*made*] Taro arrived in T.]]
Taro-TOP Tuesday-MADE Tokyo-LOC arrived
a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
b. Assertion: Taro's arrival time in Tokyo is contained in $g(1)$.

(18a) shows the requirements of the sentence, and (18b,c,…) shows the requirements of its focus alternatives (E is Taro's arrival event):

(18) a. –[(E) (TUESDAY)]–
b. –[(E)]————
c. –[(E)]————
d. –[(E)]————

When applied to this sentence, EXC will presuppose that (18a) is false, and assert that (18b,c,…) are true. (18a) is false just in case there are *no* arrival events (of Taro in Tokyo) in $g(1)$; (18b,c,…) are true just in case there is such an event in the subintervals of $g(1)$. The requirements are contradictory, and the sentence is therefore unacceptable. The details are shown in (19):

(19) EXC (Tuesday-*made* Taro arrived$_1$ in Tokyo).
a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
b. Assertion: ¬(Taro's arrival time in Tokyo is contained in $g(1)$), but for each choice

[5] The requirement that the event be included in $g(1)$ comes either from the semantics of eventive/episodic VPs like *arrive*, or from a higher, unpronounced perfective head (see e.g. Klein 1994, Kratzer 1998).

function F such that $F(g(1)) \neq RB(g(1))$, Taro's arrival time in Tokyo is contained in $(LB(g(1)), F(g(1)))$.

Now consider the (grammatical) negated version of (16). Arguably there is a parse of this sentence in which negation outscopes EXC, and another where EXC outscopes negation. The first parse is problematic for reasons that need not concern us.[6] The second parse, however, produces a sensible reading that matches intuition: The prejacent in it, which is negated, says that there are no arrival event anywhere in $g(1)$, (20a), and the prejacent's alternatives say the same thing about $g(1)$'s subintervals in (20b,c,…):

(20) a. –[(TUESDAY)]——
b. –[ ]————————
c. –[ ]————————
d. –[ ]————————

EXC now says that (20a) is false and that (20b,c,…) are true, that is, there must be an event of arrival in $g(1)$, which has Tuesday as its RB, but not in any of the intervals in (20b,c,…). This essentially means that Taro arrived in Tokyo on Tuesday but not earlier, which is what the sentence intuitively means. (21) shows the details:

(21) EXC (not (Tuesday-*made* Taro arrived$_1$ in Tokyo)).
a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
b. Assertion: Taro's arrival time in Tokyo is containe
d in $g(1)$, and for each choice function F such that $F(g(1)) \neq RB(g(1))$,
Taro's arrival time in Tokyo is not con tained in $(LB(g(1)), F(g(1)))$.

3 The *by*-use

Let us now turn to the *by*-use of *-made,* which is not polarity-sensitive, but gives rise to (mild) incompatibility with durative predicates, as mentioned in Section 1. Recall also that the *by*-use of *-made* involves an additional postposition, *-ni,* which is a multi-purpose postposition that is used to express locative, directional, and temporal meaning, among others. What is most relevant for our present discussion is obviously its temporal use, which is illustrated in (22).

(22) Taroo-wa kayoobi-ni Tookyoo-ni {ita / tuita}.
Taro-top Tuesday-loc Tokyo-loc {was / arrived}
'Taro was/arrived in Tokyo on Tuesday.'

[6] Here are the reasons. It may appear that this parse is just as trivial as the unnegated example: the latter is contradictory, as was explained above, so the former must be tautological and therefore unacceptable. This is not the case, however, because the presupposition of EXC is predicted to project through negation, while its assertion isn't. The predicted inferences produce non-trivial truth conditions: from the (projected) presupposition of EXC we get the inference that $g(1)$ is clear of arrival events, and from the negation of EXC's assertion we get the inference that at least one interval from (17b,c,…) is also clear of arrival events. The assertion, therefore, follows from the presupposition, something that generates unacceptability with other focus particles (like *only*). We may therefore rule this parse out on that basis.

We claim that when used in the *by*-use of *-made, -ni* contributes existential quantification over the right-boundaries of the domain alternatives that *-made* introduces (although we remain implicit about the compositional details). This is illustrated in (23)–(24) with a durative and punctual predicate, respectively. For technical reasons, we make use of a choice function variable that selects the right boundary of one of the alternatives to its argument. Since each domain alternative to $g(1)$ has a right-boundary that is within $g(1)$, what is picked out by the choice function will be a moment in $g(1)$.

(23) $\exists F$ (F(Tuesday-*made*)-*ni* Taro was$_1$ in Tokyo).
  a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
  b. Assertion: There is a moment in g(1) where Taro is in Tokyo.

(24) $\exists F$ (F(Tuesday-*made*)-*ni* Taro arrived$_1$ in Tokyo).
  a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
  b. Assertion: There is a moment in $g(1)$ where Taro arrives in Tokyo.

In addition, we assume that these sentences have alternatives that are existential statements whose domain of quantification is a non-empty subset of the set of all the right boundaries. These alternatives are by default exhaustified by EXH. We follow the literature in adopting the following semantics for EXH (see Spector & Sudo 2017 among others for an in-depth discussion that the presuppositions of φ project through EXH as stated in (25a)).

(25) EXH φ
  a. Presupposition: The presuppositions of φ and those of all the non-weaker alternatives to φ are true.
  b. Assertion: φ is true and each non-weaker alternative to φ is false.

Let us first see what is predicted for the non-negated punctual statement in (4a). We assume that existential closure takes place above EXH (but this stipulation is dispensable if we assume a certain dynamic version of EXH as in Sudo 2016).

(26) $\exists F$ (EXH (F(Tuesday-*made*)-*ni* Taro arrived$_1$ in Tokyo)).
  a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
  b. Assertion: There is a unique moment in $g(1)$ where Taro arrives in Tokyo.

Assuming that Taro arrived in Tokyo only once during $g(1)$, the additional inference that EXH introduces is practically (though certainly not logically) trivial.

With a non-negative durative predicate, as in (3a), this will yield infelicity.

(27) $\exists F$ (EXH (F(Tuesday-*made*)-*ni* Taro was$_1$ in Tokyo)).
  a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
  b. Assertion: There is a unique moment in $g(1)$ where Taro is in Tokyo.

We claim that this assertoric content is perceived as a (non-logical) contradiction, because by assumption, a state cannot hold at a single moment (see Altshuler & Schwarzschild 2013 for a stronger assumption that a state always holds of an open interval), and for this reason, the sentence is judged as unacceptable. This ontological assumption about the temporal extensions of states, which we henceforth call *the non-punctuality assumption,* plays a crucial role throughout our account of the *by*-use.

Let us now turn to the negative versions of these sentences. Firstly, adding negation below EXH to the sentence containing a punctual predicate will yield an implausible meaning, (28), which entails that Taro kept arriving in Tokyo, so we can safely assume that this reading is practically unavailable.

(28) $\exists F$ (EXH (not (F(Tuesday-*made*)-*ni* Taro arrived$_1$ in Tokyo))).
  a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
  b. Assertion: There is a unique moment in $g(1)$ where Taro did not arrive in Tokyo.

With wide scope negation, on the other hand, we derive the following reading.

(29) not ($\exists F$ (EXH (F(Tuesday-*made*)-*ni* Taro arrived$_1$ in Tokyo))).
  a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
  b. Assertion: There is not a unique moment in $g(1)$ where Taro arrives in Tokyo.

This can be true when Taro arrived in Tokyo multiple times during $g(1)$. However, the perceived reading of the sentence is essentially that Taro never arrived in Tokyo before Tuesday. We claim that this is because the exhaustivity inference is about a particular event (just like it is about a particular choice function F) and it amounts to that there is no moment in $g(1)$ where an event e takes place such that e is an event of Taro arriving in Tokyo, and its run-time is unique within $g(1)$.

Note that we would like to keep EXH in the negative sentence here, because we wish to account for the fact that negated durative predicates give rise to infelicity with the *by*-use of -*made*. With narrow scope negation, infelicity is derived in the same way as before in terms of the non-punctuality assumption: Taro cannot be not in (i.e., away from) Tokyo for just one moment.

(30) $\exists F$ (EXH (not (F(Tuesday-*made*)-*ni* Taro was$_1$ in Tokyo))).
  a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
  b. Assertion: There is a unique moment in $g(1)$ where Taro is not in Tokyo.

Crucially, this time, wide scope negation will not help, because the predicted assertion is practically tautologous, given the non-punctuality assumption.

(31) not ($\exists F$ (EXH (F(Tuesday-*made*)-*ni* Taro was$_1$ in Tokyo))).
  a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
  b. Assertion: There is not a unique moment in $g(1)$ where Taro is in Tokyo.

Having explained the *by*-use of *-made* in simple positive and negative sentences, we will now turn to cases involving linguistic operators. We observe that when added to the infelicitous examples with durative predicates above, certain operators trigger 'obviation effects' (in the sense of Fox & Hackl 2006) and make the sentences acceptable. We argue that our account explains the obviation effects without further ado. In particular, we claim that obviation effects come about in one of two ways: Either the inference triggered by EXH is made consistent with the non-punctuality assumption, or another operator that operates on focus alternatives is used in place of EXH.

3.1 Obviation effects with modals and quantifiers

As mentioned in Section 1, the acceptability of the *by*-use of *-made* in a sentence with a durative predicate improves when a necessity modal is present. The relevant example is repeated in (32).

(32) Taroo-wa kayoobi-made-ni Tookyoo-ni { a. i-ru / b. i-na-i }
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC { a. be-PRES / b.be-NEG-PRES}
hitsuyoo-ga at-ta.
need-NOM be-PAST
'Taro needed to { be / not be } in Tokyo by Tuesday.'

Our account explains this obviation effect straightforwardly: Although states by assumption always span across multiple moments, there can be a particular moment at which it is required that Taro be in Tokyo (see Fox & Hackl 2006 for a similar logic applied to numerals with comparative modifiers).[7] Therefore the assertion in (33b) is consistent with the non-punctuality assumption.

(33) $\exists F$ (EXH (must (F(Tuesday-*made*)-*ni* Taro was$_1$ in Tokyo))).
a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
b. Assertion: There is a unique moment in $g(1)$ where Taro must be in Tokyo.

The necessity modal used in (32) is syntactically a nominal, but the category of the modal does not matter, as expected under our analysis. Concretely, (34), which involves a non-nominal necessity modal that is morpho-syntactically complex, is as acceptable as (32). For completeness's sake, we present in (35) a version of (34) with a punctual predicate, although its acceptability is unsurprising.[8]

[7] An anonymous reviewer remarks that *Taro must be happy by 30 June* in English seems to imply that Taro must be happy throughout 30 June. An analogous observation holds for (5): One may infer that Taro must be in Tokyo on Tuesday. Our analysis does not capture these intuitions, but one analytical possibility that is consistent with our account is that they arise as a consequence of pragmatic inferences. In particular, these inferences (may) disappear when the sentences are embedded in certain grammatical constructions like polar questions and conditional antecedents, although examples are omitted here for reasons of space.

[8] We omit the versions of these examples with negative predicates under the modal, as the complex modal construction used in these examples itself contains double-negation (literally meaning something akin to 'It will not do, if not φ'), and adding another negation inside the complement clause is generally perceived to be degraded independently of the phenomenon under discussion.

(34) Taroo-wa kayoobi-made-ni Tookyoo-ni i-nakerebanaranai.
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC be-must
'Taro must be in Tokyo by Tuesday.'

(35) Taroo-wa kayoobi-made-ni Tookyoo-ni tsuk-anakerebanaranai.
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC arrive-must
'Taro must arrive in Tokyo by Tuesday.'

Furthermore, necessity modals are not the only operators that give rise to amelioration effects. Plain universal quantifiers also lead to obviation, as shown in (36). In order to facilitate (if not force) the intended scopal relation, we place the universal quantifier *zen'in* 'everyone' to the right of the *made-ni* phrase here.

(36) kayoobi-made-ni zen'in-ga Tookyoo-ni {a. i-ta / b.i-nakat-ta }.
Tuesday-MADE-LOC everyone-NOM Tokyo-LOC {a. be-PAST/ b. be-NEG-PAST }
'Everyone {was / wasn't} in Tokyo by Tuesday.'

This observation is accounted for in the same way as the case of universal modals explained above. That is, that there is a unique moment in some interval at which everyone is in Tokyo is consistent with the non-punctuality assumption that each person's state of being in Tokyo spans across multiple moments.

(37) $\exists F$ (EXH (everyone λx (F(Tuesday-*made*)-*ni* x was$_1$ in Tokyo))).
a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
b. Assertion: There is a unique moment in $g(1)$ where everyone was in Tokyo.

It is important that not all logical operators give rise to obviation effects. For instance, existential quantifiers, unlike universal quantifiers, do make the example acceptable.

(38) kayoobi-made-ni dareka-ga Tookyoo-ni {a. ??i-ta / b. ??i-nakat-ta }.
Tuesday-MADE-LOC someone-NOM Tokyo-LOC {a. be-PAST / b. be-NEG-PAST}
'Someone {was / wasn't} in Tokyo by Tuesday.'

(39) kayoobi-made-ni dareka-ga Tookyoo-ni {a. tsui-ta / b. tsuk-anakat-ta }.
Tuesday-MADE-LOC somone-NOM Tokyo-LOC {a. arrive-PAST / b. arrive-NEG-PAST}
'Someone { arrived / didn't arrive } in Tokyo by Tuesday.'

This is as expected under our account because the predicted meanings contradict the assumption that states cannot hold only at a single moment.

(40) $\exists F$ (EXH (someone λx (F(Tuesday-*made*)-*ni* x was$_1$ in Tokyo))).
a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
b. Assertion: There is a unique moment in $g(1)$ where someone was in Tokyo.

Similarly, possibility modals do not give rise to obviation effects.

(41) Taroo-wa kayoobi-made-ni Tookyoo-ni {a. ??i-te / b. ??i-naku-te }
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC {a. be-GER / b. be-NEG-GER}
yokat-ta.
good-PAST
'Taro was allowed to { be / not be } in Tokyo by Tuesday.'

(42) Taroo-wa kayoobi-made-ni Tookyoo-ni { a. tsui-te / b. tsuk-anaku-te }
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC { a. arrive-GER / b. arrive-NEG-GER}
yokat-ta.
good-PAST
'Taro was allowed to { arrive / not arrive } in Tokyo by Tuesday.'

The predicted meaning is as in (43).

(43) $\exists F$ (EXH (allowed (F(Tuesday-*made*)-*ni* Taro was$_1$ in Tokyo))).
a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
b. Assertion: There is a unique moment in $g(1)$ where Taro is allowed to be in Tokyo.

The assertive meaning in (43b) entails that there is a deontically accessible possible world where Taro is in Tokyo at a single moment. Assuming that the non-punctuality assumption holds not only in epistemically plausible worlds but also in deontically accessible worlds, we can explain the lack of obviation effects here.

The data so far demonstrates that consistency with the non-punctuality assumption tracks the observed pattern of judgements, which is a good result. However, there are two further observations that indicate that our account needs further refinements.

Firstly, the exhaustivity inferences we predict for sentences with *XP-made-ni* under necessity modals and universal quantifiers are arguably incorrect. For the examples with necessity modals in (32a) and (34), for instance, the assertoric content says that there is a unique moment during the reference time interval $g(1)$ at which Taro is required to be in Tokyo. However, intuitively, the sentence can be truthfully uttered in a context where the requirement is that he stay for some time, and there are multiple moments at which he is required to be in Tokyo. Similarly for the example in (36) with a universal quantifier, the assertoric content is that there is only one moment during the reference time interval $g(1)$ at which everyone is in Tokyo. In order for this to be true, it must be the case that at the very moment at which the last person arrives, one of the other ones leaves, so that there is only one moment at which everyone is in Tokyo together. However, intuitively, this is not an entailment of the sentence, and the sentence is compatible with everyone staying in Tokyo together for some time. We will leave these issues open for now.

Secondly, as Junri Shimada (p.c.) pointed out to us, examples with an epistemic possibility modal like (44) sound much more acceptable than those with a deontic possibility modal like (38) above.

(44) Taroo-wa kayoobi-made-ni Tookyoo-ni {a. i-ru / b. i-na-i }
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC {a. be-PRES / b. be-NEG-PRES}
kanoosee-ga at-ta.
possibility-NOM be-PAST
'There is a possibility that Taro { is / is not } in Tokyo by Tuesday.'

According to the account so far, this is unexpected, as EXH should likewise yield an assertoric meaning that entails that there is an epistemically accessible possible world in which Taro is in Tokyo at a single moment. However, we believe the acceptability of (44) has to do with the second type of obviation which we claim does not involve EXH. We will come back to this example after discussing the second type of obviation effects more generally.

3.2 Obviation effects with contrastive topic and 'at least'

We observe that adding a topic marker *-wa* to the *XP-made-ni* phrase together with a contrastive intonation (which can fall on the topic marker, the whole *XP-made-ni* phrase, or both) similarly improves the acceptability, as shown in (45) and (46). We mark the contrastive use of *-wa* by capitalization here (cf. the thematic use of *-wa*, as in *Taroo-wa* in all the examples so far, which is not accompanied by a contrastive intonation).[9]

(45) Taroo-wa kayoobi-made-ni-WA Tookyoo-ni {a. i-ta / b. i-nakat-ta }.
Taro-TOP Tuesday-MADE-LOC-CT Tokyo-LOC {a. be-PAST / b. be-NEG-PAST}
'Taro { was / was not } in Tokyo at least by Tuesday.'

(46) Taroo-wa kayoobi-made-ni-WA Tookyoo-ni {a.tsui-ta / b. tsuk-anakat-ta }.
Taro-TOP Tuesday-MADE-LOC Tokyo-LOC {a. arrive-PAST / b. arrive-NEG-PAST}
'Taro { arrived / did not arrive } in Tokyo at least by Tuesday.'

As indicated in the translations, the contrastive topic is associated with an 'at-least' interpretation. In fact, an overt 'at least' phrase, *sukunakutomo*, can be added to these examples without change the overall meaning, as demonstrated below.

(47) Taroo-wa sukunakutomo kayoobi-made-ni-WA Tookyoo-ni {a. i-ta / b. i-nakat-ta }.
Taro-TOP at.least Tuesday-MADE-LOC-CT Tokyo-LOC {a. be-PAST / b. be-NEG-PAST}
'Taro { was / was not } in Tokyo at least by Tuesday.'

(48) Taroo-wa sukunakutomo kayoobi-made-ni-WA Tookyoo-ni{a.tsui-ta / b.tsuka-nakat-ta }.
Taro-TOP at.least Tuesday-MADE-LOC Tokyo-LOC {a. arrive-PAST / b. arrive-NEG-PAST}
'Taro { arrived / did not arrive } in Tokyo at least by Tuesday.'

[9] A contrastively topicalized phrase shows scopal interaction with negation in Japanese (see Hara 2006 for relevant discussion). Here we are interested in the wide scope interpretation of the contrastive topic, which is associated with an ignorance inference, similarly to the one *at least* triggers in the English translations. This is relevant, because the narrow scope reading of the contrastive topic in (45b) is degraded. This ambiguity is a potential confound in assessing judgments here, but the intended wide scope reading is the only prominent one in (47) and (48), which contain an overt 'at least' phrase, presumably due to its positive polarity.

Furthermore, the contrastive topic marker -*wa* is in fact unnecessary, as in (49)–(50), so it is sufficient to have one of these two markers to trigger obviation.

(49) Taroo-wa sukunakutomo kayoobi-made-ni Tookyoo-ni {a. i-ta / b. i-nakat-ta }.
Taro-TOP at.least Tuesday-MADE-LOC Tokyo-LOC {a. be-PAST / b. be-NEG-PAST}
'Taro { was / was not } in Tokyo at least by Tuesday.'

(50) Taroo-wa sukunakutomo kayoobi-made-ni Tookyoo-ni {a. tsui-ta / b. tsuka-nakat-ta }.
Taro-TOP at.least Tuesday-MADE Tokyo-LOC {a. arrive-PAST / b. arrive-NEG-PAST}
'Taro { arrived / did not arrive } in Tokyo at least by Tuesday.'

Moreover, similar contrastive topic interpretations are not completely unavailable without overt marking by -*wa* or *sukunakutomo* 'at least', as in the original examples (3), especially when the *XP-made-ni* is read with contrastive intonation. We believe this is the reason why the judgments of (3) are somewhat unstable and the example is not perceived to be outright unacceptable.

We analyze this type of obviation effects with an operator that makes use of the focus alternatives, namely, LEAST (cf. Gajewski 2008, 2013), which we assume can be covert or overtly realized and appears in place of EXH. It introduces an epistemic scalar inference that the prejacent is the strongest proposition that the speaker has (strong) evidence for among the focus alternatives (see Biezma 2013, Grosz 2011). We will remain silent here with respect to the nature of this scalar inference and the compositional details of LEAST, but it is easy to see that this operator is compatible with any predicate regardless of its aspectual property. For instance, with a durative predicate, the predicted scalar inference is as in (51):

(51) $\exists F$ (LEAST (F(Tuesday-*made*)-*ni* Taro was$_1$ in Tokyo)).
a. Presupposition: $g(1)$ precedes t_u and $RB(g(1))$ = Tuesday.
b. Assertion: There is a moment in $g(1)$ where Taro was in Tokyo.
c. Scalar inference: The speaker does not have evidence that there is a moment in [LB($g(1)$), r] where Taro was in Tokyo, for any r in $g(1)$ earlier than RB($g(1)$).

Importantly, if LEAST is used, instead of EXH, the sentence is predicted to be acceptable, because there is nothing in the meaning that is in conflict with the non-punctuality inference. Importantly, to explain the (mild) infelicity of sentences without any overt marking, as in (3), we assume that the default parse involves EXH and that LEAST either needs to be spelled out by a lexical item like *sukunakutomo* or its presence needs to be signaled in some overt means, such as topic intonation and a contrastive topic marker -*wa,* or both.

Finally, coming back to the observation above that epistemic possibility modals seem to give rise to obviation effects, unlike deontic possibility modals, we hypothesize that an epistemic possibility modal facilitates the parse with LEAST, due to the uncertainty it conveys.

Conclusions

The main puzzle that Japanese *-made* gives rise to is that it has two uses, the *until*-use and the *by*-use. In this paper we attempted to analyze the two uses uniformly. The core idea is that in both uses *-made* introduces domain alternatives, and a phonologically null alternative-sensitive operator introduces additional inferences based on them. We employed two such operators, EXC and EXH. The former accounts for the *until*-use, as in Alxatib's 2023 account of English *until.* The latter plays a crucial role in our account of the infelicity of the combination of the *by*-use of *-made* and a durative predicate as well as of the obviation effects.

References

Alxatib, Sam. 2023. Two *until*s in English. To appear in *Proceedings of Sinn und Bedeutung 28*.

Altshuler, Daniel and Roger Schwarzschild. 2013. Moment of change, cessation implicatures and simultaneous readings. In *Proceedings of Sinn und Bedeutung 17,* pp. 45–62.

Biezma, María. 2013. Only one *at least:* refining the role of discourse in building alternatives. In *Proceedings of PLC 36,* pp. 11–19.

Condoravdi 2008. Punctual *until* as a scalar NPI. In Kristin Hanson and Sharon Inkelas (eds.), *The Nature of the Word,* pp. 630–653. Cambridge, MA: MIT Press. doi: 10.7551/mitpress/9780262083799.003.0027.

Fox, Danny and Martin Hackl. 2006. The universal density of measurement. *Linguistics and Philosophy,* 29(5): 537–586. doi: 10.1007/s10988-006-9004-4

Grosz, Patrick Georg. 2011. A uniform analysis for concessive *at least* and optative *at least.* In Neil Ashton, Anca Chereches and David Lutz (eds.), *Proceedings of SALT 21,* pp. 572–591. doi: 10.3765/salt.v21i0.2627

Grosz, Patrick Georg. 2012. *On the Grammar of Optative Constructions.* Amsterdam: John Benjamins.

Horn, Laurence. 1972. On the semantic properties of logical operators in English. Doctoral dissertation. University of California, Los Angeles.

Iatridou, Sabine and Hedde Zeijlstra. 2021. The complex beauty of boundary adverbials: *in years* and *until. Linguistic Inquiry,* 52(1): 89–142. doi: 10.1162/ling_a_00368

Karttunen, Lauri. 1974. *Until*. In Michael La Galy, Robert Fox, and Anthony Bruck (eds.), *Papers from the Tenth Regional Meeting of the Chicago Linguistic Society,* pp. 283–297. Chicago, IL: Chicago Linguistic Society.

Klima, Edward. 1964. Negation in English. In *The Structure of Language: Readings in the Philosophy of Language*, ed. Jerry A. Fodor and Jerrold J. Katz, 246-323. Englewood Cliffs, NJ: Prentice Hall.

Spector, Benjamin and Yasutada Sudo. 2016. Presupposed ignorance and exhaustification: How scalar implicature and presupposition interact. *Linguistics and Philosophy*, 40(5): 473–517. doi: 10.1007/s10988-017-9208-9

Sudo, Yasutada. 2016. The existential problem of scalar implicatures and cross-alternative anaphora. In Christopher Piñón (ed.), Empirical Issues in Syntax and Semantics 11 (EISS 11), pp. 225–244. Paris: CSSP.