Non-veridical Uses of Japanese Expressions of Temporal Precedence

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1.   Introduction[1]

The English temporal sentential connective *'before'* has two Japanese near-equivalents, *'mae'* and *'-nai uti'*. All three of these constructions have *non-veridical* readings (see below). However, they differ subtly in the implicatures associated with those readings. In this paper we discuss these difference in detail and sketch a formal analysis.

2.   Some English Facts

2.1.   Non-veridicality of *'Before'*-clauses

Both *before* and *after* combine with a clausal complement to form a modifier of the matrix clause. We refer to the embedded complement (the bracketed parts in (1)) as the *temporal clause.*

(1)   a. *A* [before *B*]   [before *B*,] *A*
      b. *B* [after *A*]   [after *A*,] *B*

The role of the connectives is to locate the time of the eventuality denoted by the matrix clause relative to that of the temporal clause.

There is a well-known asymmetry between *'before'* and *'after'* regarding the semantic status of the temporal clause: It is entailed by *'after'*-sentences, but not by *'before'*-sentences, as illustrated in (2a,b) (Anscombe 1964, Beaver and Condoravdi 2003, Heinämäki 1972, Heinämäki 1974, Ogihara 1995, Valencia et al. 1992).

(2)   a. I left the party before I got sick. $\not\Rightarrow$ I got sick.

       b. I got sick after I left the party. $\Rightarrow$ I left the party.

Consequently, *'B after A'* entails *'A before B'*, but not *vice versa*:

(3)   a. I left the party before I got sick. $\not\Rightarrow$ I got sick after I left.

       b. I got sick after I left the party. $\Rightarrow$ I left before I got sick.

Thus English *'before'*-sentences can be used in contexts in which the temporal clause is not known to be true, or even known to be false.

2.2.   Flavors of Non-veridicality

Non-veridicality in sentences of the form *'A before B'* comes in two flavors: On the *non-committal* reading, the truth of *B* is not established. On the stronger *counterfactual* reading, the falsehood of *B* is established. Which reading arises in a particular case depends on contextual factors (i.e., what is known or presupposed) as well as the semantic relationship between *A* and *B* (e.g., the sentence must be counterfactual if *A* and *B* cannot both be true). Thus (4a) is most likely either veridical or counterfactual, since the speaker can be assumed to know whether he got sick. The third-person temporal clause in (4b), on the other hand, allows for a non-commital reading.

(4)   a. I left the party before I got sick.   *[verdical or counterfactual]*

       b. I left the party before Sue got sick.   *[may be non-committal]*

In contrast, (5) has a counterfactual reading for semantic reasons, regardless of contextual factors, since the matrix clause and the temporal clause cannot both be true (in the intended temporal relation).

(5)   Mozart died before he finished the Requiem.   *[counterfactual]*

In this paper we are mainly concerned with the counterfatual reading and the implicatures associated with it.

2.3. Likelihood Implicature

'A before B' may be true while *B* is false, but neither the truth of *A* nor the falsehood of *B* are sufficient for the truth of *'A before B'*, even when *A* and *B* stand in the right temporal relation. In (6) (adapted from Beaver and Condoravdi 2003, henceforth B&C), the falsehood of the temporal clause is given, yet the sentence does not follow.

(6)   [David never won a gold metal, but he once at lots of ketchup.]
      $\not\Rightarrow$ David ate lots of ketchup before he made a clean sweep of all the gold medals in the Sydney Olympics.

Similarly, (7) is not necessarily true, even though its matrix clause is.

(7)   Squares had four sides long before David made a clean sweep of all the gold medals in the Sydney Olympics.

Thus counterfactual *'A before B'* does imply something about *B*, though not that *B* is true. Rather, the implicature is *modal*. Some differences aside, B&C, Heinämäki (1972), Ogihara (1995) and others all spell it out as the condition that *B* was *likely* at or just before the time of *A*. However, this characterization runs into problems in cases in which *A* itself is highly likely and implies the falsehood of *B*. An example is (8):

(8)   [As he always does / as people around here always do,]
      Bill returned his books before they were overdue.

Here the given context implies that *B* was highly *unlikely* at the relevant time, yet the *'before'*-sentence is felicitous.

    This problem is avoided by stating the implicature as a *conditional*, making the likelihood of *B* contingent upon the falsehood of *A*. There are two candidate forms for such an implicature: the past (predictive) indicative, and the present counterfactual. Based on (8), both seem viable: (9a) *was* true at the relevant past time and (9b) *is* true now.

(9)   a. If Bill does not return his books, they will be overdue.
      b. If Bill had not returned his books, they would have been overdue.

Similarly, both conditionals corresponding to (5) are true at the respective times. In the next section, we take a closer look at the relationship between *'before'*-clauses and conditionals.

2.4. *'Before'*-sentences and Conditionals

The label "counterfactual" for the use of *'A before B'* presently under discussion suggests a close affinity between *'before'* and the counterfactual. However, the two are not equivalent: *'Before'*-sentences generally

imply the corresponding counterfactuals, but not *vice versa* (the symbol '⤳' reads "implicates"):

(10) a. '*A before B*' ⤳ '*If had been ¬A, would have been B*'

  b. '*If had been ¬A, would have been B*' ⇸ '*A before B*'

The following scenario is a case in point.

(11) The speaker is on the bus from Kyoto to Tokyo. She gets off at Nagoya; the bus travels on. The next day the speaker hears that the bus had an accident and everyone on board was injured or killed.

  a. If I hadn't gotten off the bus, I would have been injured.

  [true now]

  b. If I don't get off the bus, I will get injured. *[was false then]*

  c. #I got off the bus before I got injured.

(11a) is true and felicitous in the given context, even though the accident was highly unlikely at the time of the antecedent. On the other hand, the unlikelihood of the accident means that (11b) was false. In cases which exhibit this mismatch between the present counterfactual and the past indicative, the corresponding '*before*'-clause patterns with the past indicative, not the present counterfactual.[2] Thus we conclude that '*A before B*' implicates that at (or just before) the time of *A*, the indicative conditional '*If A is false, B will be true*' is/was true.

3. Some Japanese Facts

3.1. Non-veridicality and Likelihood Implicature

The two Japanese formal nouns (*keisiki meisi*) '*mae*' and '*uti*' (with a negated complement clause) both correspond to English '*before*':

(12) a. ***B*** mae ni ***A***   *[lit. 'before B, A']*
       B before LOC

  b. ***B*** nai uti   ni ***A***   *[lit. 'while still not-B, A']*
       B NEG within LOC

'*Mae*' takes non-stative clauses as its complement. Its temporal meaning corresponds to English '*before*'. '*Uti*' combines with stative, progressive and negated clauses, generally meaning '*while still*'. Both require Nonpast tense in the complement clause. The locative postposition '*ni*' can be dropped in colloquial speech.

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[2] Although it is sometimes assumed that present counterfactuals are equivalent to the corresponding past indicatives, this is not always the case (see Kaufmann 2005a and references therein).

Both of (12a,b) are like English *'before'*-sentences in having veridical and non-veridical uses, as well as non-commital and counterfactual uses in the non-veridical case. However, they differ in the implicatures of the counterfactual reading. Consider again the scenario in (11). The veridical use is illustrated in (13) (recall that the accident occurred):

(13) [Boku-wa] ziko-ga   {okoru mae-ni   / okora-nai
     I-TOP   accident-SUBJ occur before-LOC   occur-NEG
     uti-ni   } basu-o   orita
     within-LOC   bus-ACC exit-PAST
     I got off the bus before there was an accident.

The non-veridical use in this example must be counterfactual. By assumption, the accident is not foreseeable at the time the speaker leaves the bus. This does not affect (14a), but it makes (14b) infelicitous:

(14) a.   Kega suru mae-ni   basu-o   orita
          get injured before-LOC bus-ACC exit-PAST

     b.   #Kega si-nai   uti-ni   basu-o   orita
          get injured-NEG within-LOC   bus-ACC exit-PAST

In this, (14a) patterns with the counterfactuals (11a) and (15):

(15) Basu-o   ori-tei-nakat-tara   kega si-tei-ta   *[true now]*
     bus-ACC get off-PRF-NEG-COND get injured-PRF-PAST
     If I hadn't gotten off the bus, I would have been injured.

In contrast, (14b), like (11c) above, patterns with the past indicative conditionals (11b) and (16):

(16) Basu-o   ori-nakat-tara   kega suru   *[was false then]*
     bus-ACC get off-NEG-COND get injured
     If I don't get off the bus, I will get injured.

In sum, *'B mae ni A'* implies the counterfactual, whereas *'B-nai uti ni A'* implies the past indicative.

More observations have been reported in the literature which we cannot address here for lack of space (see Kuno 1973, McGloin 1989, Ogihara 1995, and Terakura 1985 for more details). We mention only one additional fact which bears on the analysis.

3.2. Past and Future

We concluded from (14a) that *'B mae ni A'* does not implicate the (past) indicative. Things are different with future reference, however. Both forms in (17), like their English gloss, implicate the (present) indicative:

(17) Bakkin-wo {torareru   mae-ni   / torarenai uti-ni   }
     fine-ACC   take-PASS before-LOC   take-NEG within-LOC
     kuruma-wo ugokasoo
     car-ACC   let's move-CAUS
     Let's move the car before we are fined.
     ↝ If we don't move the car, we will be fined.   *[now]*

With past reference, the difference becomes apparent again. (18) is felicitous even if the car was parked in a spot that had never been visited by the parking enforcer, and only after moving it did the speaker learn that other cars parked next to it were ticketed. (18) does implicate the counterfactual, however, as expected.

(18) Bakkin-wo torareru   mae-ni   kuruma-wo ugokasita
     fine-ACC   take-PASS before-LOC car-ACC   move-PAST
     We moved the the car before we were fined.
     ↝̸ If we don't move the car, we will be fined.   *[then]*
     ↝ If we hadn't moved the car, we would have been fined.   *[now]*

For *'nai uti'* in (19), unlike *'mae'*, the indicative implicature does carry over to the past.[3]

(19) Bakkin-wo torarenai uti-ni   kuruma-wo ugokasita
     fine-ACC   take-NEG within-LOC car-ACC   move-PAST
     We moved the car before we were fined.
     ↝ If we don't move the car, we will be fined.   *[then]*

Under our account, the presence of the indicative implicature with futurate *'mae'* in (17) is not due to *'mae'* per se. Rather, it arises for pragmatic reasons, having to do with the inability to "look ahead" in history, as opposed to the benefit of "hindsight" with regard to the past.

4.   Analysis
4.1.   Temporality
Due to space constraints, we ignore for the most part the role of aspectual classes, tenses, and the details of the semantic composition. The main ingredients of the formal framework are from B&C, Condoravdi (2002), Condoravdi (In press), and Kaufmann (2005b). We will write 'α' and 'β' for the *sentence radicals* obtained by stripping the atomic sentences *A* and *B* of their tenses.

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[3] Incidentally, the counterfactual is *not* implied by (19): The sentence is still felicitous if the speaker has since learned that he was wrong and the car would not have been fined even if it had been left in place.

Let T be a set of atomic temporal instants, ordered by an "earlier then"-relation $<$ that is transitive, asymmetric and linear.[4] The denotation $[\![\alpha]\!]$ of sentence radical α is a function which, given a subset of T, returns "true" if α is true at some member of that set, and "false" otherwise. Tenses denote intervals $x \subseteq T$, determined relative to speech time S: the set of times preceding S for the Past, and its complement for the Nonpast. A simple tensed sentence is evaluated by applying the denotation of its radical to the tense interval x. Thus for instance, '$PAST(\alpha)$' is true iff α is true at some time preceding speech time.

Other elements besides tense, such as context, temporal frame adverbials and temporal clauses, impose further restrictions on the subset of T of which the radical is predicated. 'B mae' and 'B-nai uti' denote subsets $y \subseteq T$; their contribution as modifiers of the matrix clause consists in intersecting the interval x provided by tense with y, thus strengthening the resulting existential statement about α.

Regarding the denotation of 'B-mae', we adopt the definition B&C give for English 'before B'. There, the tense of B is inherited from A, and 'before B' is the set y of times preceding the *earliest* time in $[\![\beta]\!]$.[5] The assumption that B lacks its own tense is sensible for English in view of the obligatory Sequence of Tense in 'before'-clauses. For Japanese, in contrast, recall that B has obligatory Nonpast tense, and assume for simplicity that this Nonpast is semantically vacuous. Thus we are dealing with an expression 'B mae ni α', where B is the (vacuously) tensed temporal clause and α is the untensed matrix clause; the tense of the matrix clause makes an obvious further contribution, which we ignore here. Then the analogous truth conditions to those of B&C are as follows:

(20) 'B mae ni α' is true at time t if and only if there is some $t' \in [\![\alpha]\!]$ which precedes the earliest $t'' \in [\![\beta]\!]$.

B&C's definition of "earliest" ensures that (20) entails that B is true at *some* time. The combination with tense then adds the condition that t' must stand in the appropriate relation to t.

'B-nai uti' is slightly more complex, but semantically transparent. 'B-nai' is the negation of B, true of a set of times just in case it does

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[4] Transitive: for all $t,t',t'' \in T$, if $t < t'$ and $t' < t''$, then $t < t''$. Asymmetric: for all $t,t' \in T$, if $t < t'$ then not $t' < t$. Linear: For all $t,t' \in T$, either $t < t'$ or $t' < t$ or $t = t'$. Transitivity and asymmetry jointly imply irreflixivity: For all $t \in T$, not $t < t$.

[5] B&C stipulate that all English sentence radicals denote sets of times which have an earliest time. They also rightfully point out that the definition must be refined for the case that B is an accomplishment: There, 'before B' may be the set of times preceding the earliest *culmination time* in $[\![B]\!]$.

not contain any instances of $[\![\beta]\!]$.[6] '*Uti*' maps such intervals to themselves and adds the presupposition that they are right-bounded.[7] The resulting meaning is literally '*when still*'; the combination with '*B-nai*' yields '*when B is/was still false*', equivalent to '*when B is/was not yet true*'. Thus as far as its temporal meaning is concerned, '*B-nai uti ni* α' is equivalent to '*B-mae ni* α' in (20).

This subsection offered only rough outline of the temporal treatment. Further facts, such as restrictions on aspectual classes, cannot be accounted for without further complexity. We leave these elaborations for the full version of the paper and move on to the modal dimension.

4.2. Modality

Basics. As used above, the set T traces the history of one world (the actual one). The likelihood of a sentence is independent of its truth value at the actual world. We extend the above linearly ordered model of time to a *possible-worlds* model of *branching time* (see Kaufmann 2005b and references therein). Given a set W of possible worlds, each corresponds to an alternative history traced by T. A world-time pair or *index* $i = \langle w, t \rangle$ is a "snapshot" of world w at time t. Sentence radicals denote sets of indices. The truth of a simple tensed sentence is fully determined by the world of evaluation, but the interpretation of '*before*'-sentences makes reference to alternative worlds if the temporal clause is not instantiated at the world of evaluation.

Branching time. The passage of time involves the elimination of possibilities. At each $\langle w, t \rangle$, the past up to t is fixed, but there are multiple possible continuations. Furthermore, for subsequent times t', fewer continuations are possible at $\langle w, t' \rangle$ than at $\langle w, t \rangle$. Intuitively, uncertainty about the future at $\langle w, t \rangle$ is partly resolved at $\langle w, t' \rangle$ by the events that came to pass during the time that elapsed between t and t'.

Modal bases. In Kratzer's (1981) terms, the set of alternatives at $\langle w, t \rangle$ is a *modal base* (*MB*). Formally, an *MB* is a function from indices $\langle w, t \rangle$ to sets of co-temporal indices $\langle w', t \rangle$.[8] This set may comprise *historical* or *epistemic* alternatives, corresponding to objective or subjective uncertainty, hence to different readings of the modal implicature. We write 'MB_i^{+p}' (where p is a sentence) for that subset of MB_i at which p is true.

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[6] In fact, B in B-nai uti is untensed; the Nonpast is expressed on the negative suffix '*nai*'. We continue to write '*B-nai*' for simplicity and uniformity.

[7] It is fairly common to attribute such a presupposition of a "phase transition" to temporal particles (Condoravdi In press, Löbner 1989, and others).

[8] Kratzer's definition of *MB* as well as *OS* (below) is more elaborate than this. Our simplification is purely for the sake of brevity.

Ordering sources. The *MB* determines which continuations of history are *possible*. To encode what is *likely*, we adopt from Kratzer (1981) the notion of an *ordering source* (*OS*). Formally, an *OS* is a function from indices $\langle w,t \rangle$ to *pre-orders* $\preceq_{\langle w,t \rangle}$ on the set of co-temporal indices $\langle w',t \rangle$.[9] For our purposes, we use two ordering sources: *Relative likelihood* is a "stereotypical" *OS*, one which ranks worlds by the degree to which they conform to the "normal" course of events: '$j \preceq_i j'$' means that j is more normal, or less far-fetched, than j'. *Overall similarity* is given by a "totally realistic" *OS*, one which ranks worlds by their similarity to the world coordinate of j.[10] Whereas likelihood is a time-dependent notion, overall similarity is assumed to be constant throughout a world's history.

Human necessity. Relative to a modal base *MB* and an ordering source *OS*, we say that a sentence *A* is a *human necessity* at *i* if and only if it is true at the most likely continuations under $\preceq_i$.[11]

4.3. Truth and Implicature

Using the notions just introduced, we account for non-veridicality and the implicature separately. First, definition (20) is modified to allow for non-veridical uses.

(21)   '*B mae ni* α' is true at $i = \langle w,t \rangle$ with respect to modal base *MB* if and only if there is some t' such that $\langle w,t' \rangle \in [\![\alpha]\!]$ and t' precedes the earliest time t'' such that for some $\langle w',t \rangle$ in MB_i, $\langle w',t'' \rangle \in [\![\beta]\!]$.

The only substantive change from (20) is the existential quantification over alternative worlds in evaluating β. Clearly (21) is weaker than (20): The sentence entails that β is/was *possible* at the relevant time, not that it is true—nor, for that matter, that it is/was likely. The meaning of '*B-nai uti ni* α' is similar to (21).

    The likelihood implicature is added separately as the condition that β (or, in the case of '*-nai uti*', the end of not-β) be a "human necessity" relative to $MB^{+\neg\alpha}_{\langle w,t' \rangle}$—in other words, that the conditional '*If* $\neg\alpha$, *will* β' is true at t'. This is in line with the widely shared assumption

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[9] A pre-order is transitive and reflexive (see Fn. 4 above).

[10] The notion of overall similarity is familiar from the literature on conditionals (Lewis 1973, Stalnaker 1968), but not very well defined. See (Kaufmann 2004, Kaufmann 2005a) for an analysis in terms of causal independence.

[11] This is a simplified statement. In general, there may not be a set of most likely continuations. For the general case it should be: "...if and only if for all $j \in MB$, there is a $j' \in MB$ such that $j' \preceq_i j$ and for all $j'' \in MB$ such that $j'' \preceq_i j'$, *A* is true at j''." The term "human necessity" is due to Kratzer (1981).
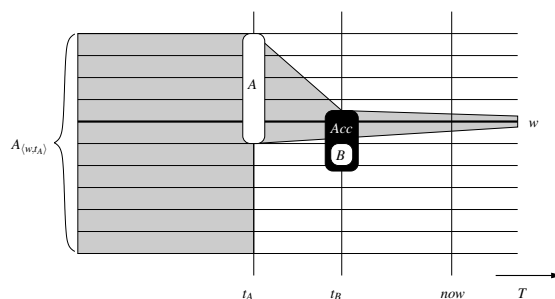
Figure 1.
(The grey area shows the alternatives of *w* at each time.)

that conditionals are interpreted in terms of modal operators, with *'if'*-clauses imposing restrictions on the modal base.

The difference between *'mae'* and *'-nai uti'* formally comes down to the choice of the ordering source with respect to which the implicature is calculated: In the case of *'mae'*, it is totally realistic, thus the implicature is true iff *B* is true at the *most similar* α-worlds. In the case of *'-nai uti'*, it is stereotypical, true iff *B* is true at the *most normal* α-worlds (from the perspective of t').

Returning now to the "bus" scenario (11), recall the judgments about English (11c) and Japanese (14a,b), repeated here:

(11c) #I got off the bus before I got injured.

(14) a.   Kega suru mae-ni   basu-o   orita
            get injured before-LOC bus-ACC exit-PAST

      b. #Kega si-nai   uti-ni   basu-o   orita
            get injured-NEG within-LOC bus-ACC exit-PAST

Figure 1 is an informal depiction of the scenario. Times flows from left to right; alternative worlds run parallel to the world *w* of evaluation. The grey area covers, for any index $\langle w,t\rangle$, the set of alternatives open at that time. The time t' at which the speaker got off the bus is labeled 't_A'. The accident ('*Acc*') is unlikely at t_A, but occurs at t_B in *w*. The closest non-*A* worlds to *w* (i.e., worlds at which the speaker did not get off the bus) are ones in which the accident happened, and in the closest ones among those, the speaker was injured ('***B***').

Now the implicature of (14a) is *true* because the most *similar* non-*A* worlds to *w* are ones at which the accident occurs. In contrast, the implicature of (14b) is *false* because the most *likely* non-*A* worlds from the perspective of t_A are ones in which the accident does not occur.

Notice that both sentences are semantically *true*; the infelicity of (14b) is explained by the falsehood of the implicature. This is a subtle but non-trivial difference between our account and that of B&C. Here, the truth value of the sentence and that of the implicature are determined by different sets of worlds (the whole modal base *vs.* the most likely/similar worlds); the sentence is true but its implicature is false. In contrast, B&C calculate both with respect to the subset of "reasonably probable" worlds in the modal base, attributing the infelicity of (11c) to semantic undefinedness, due to the fact that the temporal clause is not true in any of those "reasonably likely" alternatives. The ramifications of this difference remain to be explored.

5. Conclusions

Non-veridical expressions of temporal precedence constitute an intriguing set of data at the interface of modality and temporality. We have shown that in Japanese a distinction is lexicalized that has no analog in English, and we have demonstrated the utility of standard formal tools in the analysis of the observations. In future work, we plan to complete the picture by drawing into consideration other temporal connectives, such as Japanese '*toki*', '*aida*' and '*mama*', as well as English '*while*' and '*as long as*', and others.

References

Anscombe, E. 1964. Before and After. *The Philosophical Review* 73:3–24.

Beaver, D. and C. Condoravdi. 2003. A Uniform Analysis of *Before* and *After*. *Proceedings of SALT XIII*:37–54.

Condoravdi, C. 2002. Temporal Interpretation of Modals: Modals for the Present and for the Past. *The Construction of Meaning*, eds. D. I. Beaver, L. Casillas, B. Clark, and S. Kaufmann, 59–88. Stanford, CA: CSLI Publications.

Condoravdi, C. In press. Punctual *Until* as a Scalar NPI. *The Nature of the Word*, eds. S. Inkelas, S. and K. Hanson. Cambridge, MA: MIT Press.

Heinämäki, O. 1972. Before. *Papers from the Eighth Regional Meeting, Chicago Linguistic Society*, eds. P. M. Peranteau, J. N. Levi, and G. C. Phares, 139–151. Chicago, IL: The Chicago Linguistic Society.

Heinämäki, O. 1974. *Semantics of English Temporal Connectives*. Doctoral Dissertation, University of Texas at Austin.

Kaufmann, S. 2004. Conditioning Against the Grain: Abduction and Indicative Conditionals. *Journal of Philosophical Logic* 33(6):583–606.

Kaufmann, S. 2005a. Conditional Predictions: A Probabilistic Account. *Linguistics and Philosophy* 28(2):181–231.

Kaufmann, S. 2005b. Conditional Truth and Future Reference. *Journal of Semantics* 22:231–280.

Kratzer, A. 1981. The Notional Category of Modality. *Words, Worlds, and Contexts*, eds. J. Eikmeyer and H. Riesner, 38–74. Berlin: Walter de Gruyter.

Kuno, S. 1973. *The Structure of Japanese*. Cambridge, MA: MIT Press.

Lewis, D. 1973. *Counterfactuals*. Cambridge, MA: Harvard University Press.

Löbner, S. 1989. German *Schon–Erst–Noch*: An Integrated Analysis. *Linguistics and Philosophy*, 12:167–212.

McGloin, N. H. 1989. *A Students' Guide to Japanese Grammar*. Tokyo: Taishuukan.

Ogihara, T. 1995. Non-factual *Before* and Adverbs of Quantification. *Proceedings of SALT V*:273–291.

Stalnaker, R. 1968. A Theory of Conditionals. *Studies in Logical Theory, American Philosophical Quarterly, Monograph: 2*:98–112. Oxford: Blackwell.

Terakura. 1985. English *Before*-clauses and Japanese Temporal Clauses. *Journal of Asian Culture* 9:199–215.

Valencia, V. S., T. von der Wouden, and F. Zwarts. 1992. Polarity and the Flow of Time. *Language and Cognition*, volume 3, eds. A. de Boer, J. de Jong, and R. Landeweerd, 209–218. Groningen: Uitgeverij Passage.