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A compositional account of counterfactual conditional clauses in Old Japanese

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Abstract. The paper is concerned with tenselessness of the past tense morpheme in counterfactuals. The question is twofold. One is why is it the past tense that marks counterfactuality (Iatridou 2000, Ogihara 2000), which indicates anteriority. Another question is why the past tense is tenseless (or "fake tense") in the counterfactuals. The previous theories (past tense as modal and past tense as exclusive operator) have not offered answers to these questions. In this paper, I argue that the conditional clauses originate in temporal adverbial clauses, and therefore it is only natural for the conditionals to be represented by temporal abstracts (Stump 1985). Second, I argue that the temporal abstracts are intensionalized in conditionals and causatives. This assumption not only provides a compositional analysis for the conditional, causal, and temporal adverbial clauses, but also explains the reason why a proposition in the past tense can denote anteriority in the extensional context but counterfactuality (a temporal interval in the possible world) in the intensional context. I support my proposal by presenting data of counterfactuals from Old Japanese. The previous studies show the past tense morpheme is essential to counterfactual interpretation cross-linguistically (Karawani 2014) but I show that it is not a necessity, as counterfactual interpretation originates in the temporal abstract represented by the temporal adverbial clauses. I present four types of temporal clauses from which the counterfactual can be formed: *at the time when*, *whenever (always when), in the circumstance/event that,* and *and then*. All these temporal clauses can be intensionalized to be conditional or causal clauses under a modal operator.

Keywords. counterfactuals; temporal adverbials; modal; Old Japanese

1. Introduction. Let us consider the following Old Japanese example in (1), which conveys a counterfactual-like meaning by the temporal adverbial clause in a focus construction.

(1) Pisakata no ama no misora ni teru tukwi no
distant COP.ADN heaven GEN sky LOC shine.ADN moon GEN

use-na-mu pi **koso,** a ga kwopwi yama-m**e.**
disappear-PERF.-CONJL.ADN day KOSO, I GEN longing stop-CONJL.EXCL
(*MYS* 12: 3004)

'On the very day when (=only if) the moon that shines in the distant heavens ceased to be, my longing would likewise come to an end.' (Adapted from Suga 1991: Part II, 364)

In (1), there is no past tense morpheme. However, this sentence expresses a contrary-to-fact conditional, whereby the speaker intends to convey that "my longing will/would never come to an end." The sentence in (1) consists of the main clause modified with a temporal adverbial

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clause approximately meaning "on the day when." The focus construction consists of a focus particle *koso* and the conjunctive subordinator *-e* meaning 'but' at the end of the main clause.

A similar temporal clause that is often found with the *koso -e* construction is *toki-(ni)* "at the time when" clause:

(2) Au koto no mowara taye-nuru toki ni **koso**,
Meet.ADN NML GEN completely stop-PERF.ADN time DAT KOSO

fito-no kowisiki koto mo siri-ker**e**
person-GEN miss.ADN NML ETOP realize-MPAST.EXCL
(*Kokin* 15: 812)

'At the very moment when I stop seeing (you) completely, I realize how much I miss (you).'
(Translated from Modern Japanese)

The literal meaning of the *toki-ni* clause in (2) is *at the time when*, but the temporal clause is focused, and the temporal clause is interpreted as approximate to English *until*. This is due to the punctual nature of the predicate 'stop' within the temporal clause, and it is interpreted as what is known as "punctual *until*" (Karttunen 1974). The intention of this poem is equivalent to "I didn't realize until I stopped seeing you completely that I would miss you." In other words, literally understood, the poem asserts its temporal meaning of *at the time when*: the speaker has realized how much he/she misses the addressee when he/she stopped seeing the addressee. However, the speaker's intention of the poem seems to turn the temporal meaning into a causal meaning. Namely, it means that it is precisely because the speaker had stopped meeting the addressee completely, the speaker would miss the addressee.

The meaning of [*koso -e*] construction is like that of English *it*-cleft construction, as observed by Whitman (1997) and Frellesvig (2010) among others. If *koso* is a focus particle and follows the standard semantics of focus by Rooth (1985, 1992), [on the day when the moon disappears] is the semantic value assigned to [my feeling will end at t]. While the literal meaning of the poem entails the truth that the speaker's feeling for the addressee will end, it is hard to say that the speaker is asserting the truth of the main clause "my feeling for you will end" since the temporal adverbial clause functions more like a contrary-to-fact conditional. Also, when the temporal clause is taken as *because*-clause, it is hard to say that the speaker is asserting the truth of the main clause proposition.

The purpose of this paper is to account for the elicited meanings of counterfactuality and causality as shown in (1) and (2) above in this construction. In what follows, I will argue that the focused temporal adverbials are intensionalized temporal abstracts.

2. Semantic variability of conditional and *because*-clause. It is interesting that the *koso -e* construction with *koso* attached to the subordinating adjunct clauses are mostly interpreted either conditional or causal.[1] The semantic variability exhibited by the overall meanings of *koso –e* construction can be summarized as follows:

[1] Stump (1985) investigated the semantic variability of the English absolute construction. He argued that the difference between weak adjunct (conditional clauses) and strong adjuncts (*because*-clauses) is that the former can restrict the truth of the main clause event, while the latter cannot. This restrictive property of the weak adjuncts is attributed to telicity of the event ascribed to the predicate in the adjunct. In this analysis, the weak adjuncts are the restrictor of the quantificational operators: modal, frequent adverbs, and generic operator. However, the restrictor analysis applies to indicative conditionals, while the restrictor analysis suffers from the behavior of the subjunctive conditionals and some other clauses that may have counterfactual or non-actual interpretation.

(3) a. Conditional
"If p, would q; (but there is no p, and neither would q.)"
b. Cause/Reason clause
"p, therefore, q; (but non-p necessitates non-q.)"

It is our interest to investigate the semantic composition of the *koso -e* construction to see how the temporal adverbials get to be interpreted as a conditional or a reason. There are two key elements that mark this variability: the morphological distinction of the temporal adverbial clauses, whether it is a realis/irrealis form, and the types of modals in the main clause, whether the main-clause contains conjectural modal or epistemic/evidential modal.

2.1. REALIS/IRREALIS ON THE TEMPORAL CLAUSES. Among all the temporal adverbial clauses that *koso* takes, there is one that makes a morphological distinction between realis and irrealis. This is *ba*("whenever")-clauses. The following examples in (4)-(6) show the semantic variability of *ba*-clauses. The irrealis form *-aba* in (4) is realized as a conditional clause as follows:

(4) Komo makura api-maki-si kwo mo ar**aba koso**,
woven.straw pillow recip.-share-SPAST.ADN. love ETOP. exist.COND. KOSO,

yo no pukuraku mo a ga wosimi se-m**e.**
night GEN advance.NMNL ETOP. I GEN feel.sad.INF do-CONJL.EXCL
(*MYS* 7: 1414)
'Only if my love who used to lie beside me were still alive, would I feel sad as the night advances.' (Adapted from Suga 1991 and Honda 1967)

In (4), *-aba* clause itself makes up a conditional clause. But interestingly, with the *-aba* clause focused by *koso*, the causal relation is elicited between the adjunct clause and the main clause[2]. In (5), the realis form *-eba* is used. This form is called a "provisional" clause, and functions as a temporal adverbial clause, but when focused by *koso*, it elicits a causal relation to the main clause.

(5) Tatuta fime tamukuru kami-no ar**eba koso**,
Tatsuta princess offer.ADN gods-GEN exist.PROV KOSO,

aki-no konofa-no nusa-to tiru-ram**e**
autumn-GEN leaves-GEN blessing-as fall-PCONJL.EXCL
(*Kokin* 5: 298)
'The crimson leaves must fall as offering (to Gods), as/because there is the God of Travel to whom Princess Tatsuta wishes to make offering (when she leaves).'

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[2] The conditional clause without *koso* expresses a looser relation between the conditional clause and the main clause. One good example of this is given as follows:

1) Kono yo ni si, tanosiku araba, ko-mu yo ni pa
this world LOC even be.fun.INF be.COND, come-CONJL.ADN world LOC TOP
musi ni tori ni mo ware pa nari na mu
bug COP.INF bird COP.INF ETOP I TOP become PERF CONJL.CONCL (MYS 3: 348)
'If I could but be happy in this life, what should I care if in the next I became a bird or a worm!'
(Nippon Gagujutsu Shinkokai translation 1965)

In this example, there is no causal relation expressed. We cannot say that because he is happy in this life, he would not care if he be a bird or a worm. This poem is conveying the wish that he would be happy in this life. It is not explaining why he would not care being a bird or a worm in the next life.

(Adapted from Honda1970)

(6) Tir**eba koso**, itodo sakura-wa medeta-ker**e**
fall-PROV KOSO even.more cherry.blossom-TOP. be.nice-ACOP.EXCL
(*Ise monogatari* 82)
'It is because they fall, cherry blossoms seem to us especially precious.'
(Mostow and Tyler 2010: 176)

In (5), the poem conveys the author's imaginary reasoning of why crimson leaves fall in the autumn. With the provisional clause focused by *koso*, the causal relation is again elicited. The author is describing the situation where he observes the crimson leaves falling. The provisional clause is adding the author's conjectural reasoning that falling leaves is caused by the Deity Tatsuta worshipping God with money (=metaphor for falling leaves). In (6), the author is explaining why the cherry blossoms are precious. The author's emphasis is on the fact that the cherry blossoms blooms for only a short time. The author reasons that cherry blossom's ending its short life by falling makes the cherry blossoms so precious. Such causal relations make stronger ties between the temporal adverbial clauses and the main clause.

2.2. FACTUAL/NON-FACTUAL ON MAIN CLAUSE PREDICATES. There is another crucial difference between the conditional and causal *koso -e*. That is the type of modals in the main clause. Conditional construal is usually accompanied by a conjectural modal in the main clause. For example, *-mu* the conjectural modal in Old Japanese, co-occurs with conditional clauses. Other modals such as *-ram*/*-kyem* the present/past epistemic modals, or *kyer* the modal of realization co-occur with causal clauses. This semantic pattern becomes evident when there is no morphological distinction between the temporal adverbial clauses focused by *koso*. The gerundive adjunct clauses *-te*, attaches to an infinitive VP and forms an adjunct clause. When this temporal adverbial is focused by *koso*, it again shows the semantic variability over causal and conditional interpretations. The gerundive clause in (7) has conditional-like meaning, while that in (8) is interpreted as causal.

(7) …Hito no kokoro wo mi-te **koso** yama-m**e**
…person GEN mind ACC see-GER KOSO stop-CONJL.EXCL
(Kokin 15: 817)
Lit: 'I will give up on my love (only) after I understand her mind.'
(Based on Modern Japanese translation)
'(Again, and yet again, the farmer till the land reclaimed), so will I struggle hard to see my love before we part.' (Honda 1970: 210)

The gerundive clause is a conjunctive subordinating clause, forming an adverbial clause with VP that modifies the main clause. In (7), the conjectural modal *-mu* is used in the main clause, and the adjunct with *koso* is interpreted as a condition ("I see her mind") to the main clause ("I will give up on her"). On the other hand, if the main clause predicate contains other types of modals such as epistemic or evidential, the adjunct clause is interpreted as a cause or a reason. For instance, the modal of realization *-kyeri* cooccurs with the causal adjunct clauses as in (8):

(8) …mi ni nari-te **koso** kwopi masari-kyer**e**
…seed DAT become.INF-GER KOSO longing increase-MPST.ECXL
(MYS 7: 1365)
Lit: 'I admire (Hagi plant) even more after it formed seeds.'
(Based on Modern Japanese translation)
'Now it has gone to seed, which I cherish all the more indeed.' (Honda 1967: 111)

In (8), the modal contains what is called 'modal past' *kyeri*, which is the modal of realization, roughly translated as "I've realized that". This predicate is one of implicative verbs (Karttunen 1971), entailing the factuality of the embedded proposition. With this predicate in the main clause, all the temporal adjunct clauses focused by *koso* are interpreted as a reason or cause.

3. Composition. In this section, I will provide a compositional analysis to the conditional interpretation given to the temporal adverbial clauses. First, I examine the type of clauses that are interpreted as conditional, as opposed to those that are interpreted as causal. Second, I argue that the temporal clause receives conditional interpretation when it is intensionalized by the focus on the temporal abstract.

3.1. TEMPORAL ADVERBIAL CLAUSES THAT TAKE *KOSO*. According to Dowty (1982) and Stump (1985), a sentence refers to time in two ways. One way is to mark the temporal location of the VP event by tense/finiteness marking on the VP. However, this may not be all to be told about how languages mark a temporal location. Dowty points out that temporal location of VP event needs to cover not only the point of temporal reference in relation to the speech time, but also the interval where the temporal property is attributed to. This function is covered by temporal adverbs, making a reference to a type of temporal interval that the tense is associated with. Past tense, for example, can be recognized by the tense marking of the VP. Stump demonstrates that English absolutes and adjuncts, types of temporal adverbial clauses, do have semantic variability over temporal, causal, conditional, etc., and the semantic role of English absolutes depend on the internal aspectual property of the temporal adverb.

It is our interest to examine how these frameworks of temporal adverbial clauses and tense might be adopted to derive a counterfactual conditional meaning observed in the Old Japanese data. In the previous section, I have shown that counterfactual-like meaning is expressed through focused temporal adverbial clauses. Also, I pointed out that the semantic role of the temporal adverbial clause can vary between causal and conditional depending on what type of modal or predicate is used in the main clause. In this section, I argue that conditional/causal construal originates temporal abstracts (i.e. the temporal adverbial clauses) that provide temporal interpretations to a proposition. This is shown by looking at the adjunct clauses that take a focus particle *koso* in the examples we have seen above. They are [p-*toki*/*pi*-*ni* q] "q at the time/on the day when p", [p-*ba* q] "q when(ever) p", [p-*te* q] "p and then q". They are temporal abstracts, which restrict the temporal interval of the main clause. I provide English translations of these temporal adverbial clauses as follows:

(9) a. [p-*pi*-*ni* q] "q when p on the day"
b. [p-*toki* q] "q when p at that time"
c. [p-*eba* q] "q whenever p" ("q always when p")
d. [p-*aba* q] "q at any circumstance in which p"
e. [p-*te* q] "p and then q"

All these temporal clauses can be selected by *koso* and be interpreted as a conditional/causal clause. The property that is common to the temporal clauses listed above is that the *p*-event precedes or overlaps with the *q*-event. The temporal adverbials showing conditional/causal variability under the *koso -e* construction are characterized by the requirement on the temporal sequencing between *p* and *q*.

3.2. DERIVING TEMPORAL CLAUSES BY TEMPORAL ABSTRACTION. Let us take a closer look at the temporal clauses and their compositional meanings. *Pi-ni* and *toki-ni* are subordinators that take a proposition (or a partitive phrase) to form a temporal adverbial phrases equivalent to the English temporal adverbials p that modifies q, as shown in (10).

(10) a. [p *pi-ni* q] = "q when p on the day"
p: then moon disappears
q: my feeling for you stops
b. [p *toki-ni* q] = "q when p at the time"
p: it snows as the year-end comes close
q: we can see that the pine never change color

Since *pi* "day" and *toki* "time" are nominals and the proposition p corresponds to the relative clause of these nouns, I analyze *pi-ni* "on the day" and *toki-ni* "at the time" as temporal postpositional phrases. In addition, I will analyze *when* as the (temporal) relative pronoun that binds the temporal abstracts of the temporal interval indicated by "on the day." By Predicate Abstraction, these temporal adverbial clauses can be translated as follows:

(11) a. λt [t ⊆ a-day-within-t'& AT (t', p)]
b. λt [t ⊆ an-interval-of-t'& AT (t', p)]

First, let us derive the sentence with a temporal adverbial [p *pi-ni*]. Adopting Stump's (1985) work on the temporal semantics, we can first introduce a temporal variable t to *p* by temporal abstraction. The temporal adverbial, however, denotes a temporal interval that mediates the temporal abstracts of two propositions. In this case, the main clause proposition is not introduced yet, so this translation simply denotes the set of intervals at which p is realized. The temporal postpositional phrase [on that day] is coindexed with the variable *when*, forming a temporal adverbial clause. Let us see how the temporal adverbial clause of the sentence (1) is derived by steps:

(12) $when_i$ i [t_i is within a day from t'] the moon disappears at t'
[1]λt' [AT (t', the moon-disappears)] (Temporal Abstract)
[2]λt' [t' ⊆ day & AT (t', the moon-disappears)] ([1] with "on the day")
[3]λt ∃t' [t ⊆a-day-within-t' & AT (t', the moon-disappears)] (Abstraction of "on the day")
[4] λP [λt ∃t' [t ⊆a-day-within-t' & AT (t', the moon disappears)] & P(t)]
(Main Tense Adverbial)

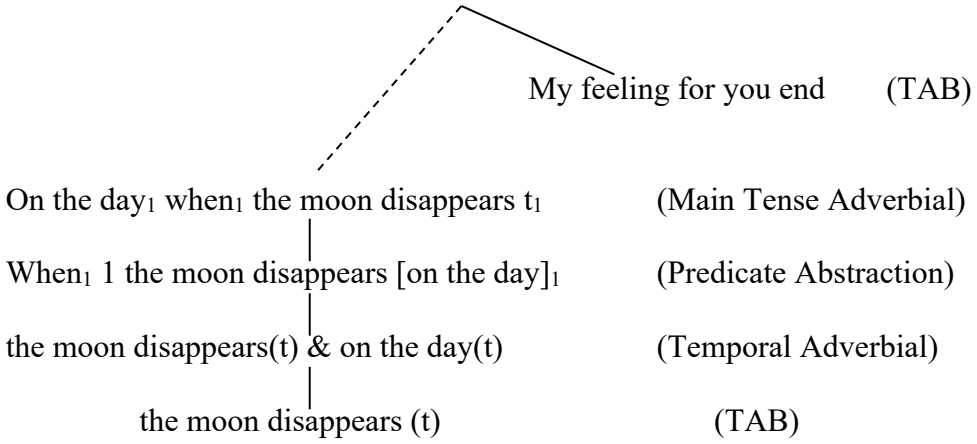
The temporal abstraction is first applied to the proposition "the moon disappears" in line [1]. The temporal denotation of the proposition in [1] is further specified by the temporal adverb "on the day," which is a set of days on which the proposition "the moon disappears" holds. This adverbial is further abstracted in [3]. The temporal adverbial denotes a set of temporal intervals that fall within a day from the time when the proposition "the moon disappears" is true. Following Stump's semantics of Main Tense Adverbial rule, the main tense adverbial is derived by introducing the sentential variable for the main clause. In another words, the denotation of adverbial clause coincides with the temporal denotation of the main clause. The (tenseless) sentence with the temporal adverbial clause in (13) is now translated into (14):

(13) My feeling for you ends [on the day when the moon disappears] $_{TAC}$
(14) λP [λt ∃t' [t ⊆a-day-within-t' & AT (t', the moon disappears)] & P(t)](λt" [AT(t", my-feeling-for-you-end)])

=λt [t ⊆ a-day-within-t' & AT (t', the-moon-disappears')]] & AT (t, my-feeling-for-you-end')]

The bottom-up derivation of the whole sentence (14) can be seen in (15), which corresponds to the semantic derivation above:

(15) On the day when the moon disappears, my feeling for you ends. (TAB)



The semantics in (14) does not represent the meaning of (1), as the semantics of (14) predicts that the sentence is true if and only if there is a time when the speaker's feeling ends within a day from the time at which the moon disappears. However, the sentence in (1) would be true even if there is no such time where the moon disappears or the speaker's feeling for the addressee will end. The intention of the poem (1) instead, is to assert that there will be no such day. Therefore, the semantics of (1) is not "extensional"; I argue that the temporal adverbial clause such as those in (1) should be interpreted as "intensional."

3.3. EXTENSIONAL VS. INTENSIONAL TEMPORAL ADVERBIAL CLAUSES. Let us proceed to the semantics of *ba*"whenever"-clauses, where there is a morphological distinction between "Provisional" subordinator *eba* as in (6), as opposed to "Conditional" subordinator *aba* as in (4). Their English equivalences of *eba* and *aba* and their propositional contents of *p* and *q* in the example sentences are given as follows.

(16) a. [p-*eba* q] "q whenever p" ("q always when p")
p: cherry blossoms fall
q: cherry blossoms are precious
b. [p-*aba* q] "q at any circumstance in which p"
p: my love is still alive
q: I feel sad

I follow Stump's suggestion that *always* is a relative frequent adverbial that takes two temporal abstracts as arguments. The sentence should mean that at all the times when *p* occurs, *q* will be the case. In such a case, *when*-clause can be the restricting clause of *q*. I provide the following translation for the provisional subordinator *eba*:

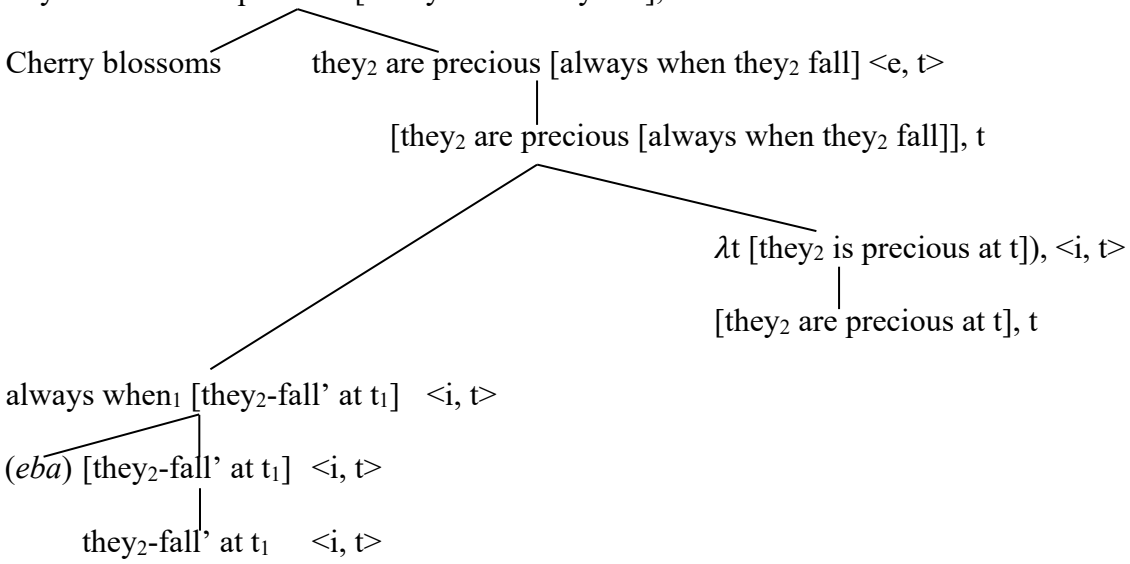
(17) $\lambda p\, \lambda q\, [\forall t'[t=t' \,\&\, AT\,(t', p)]\, AT\,(q, t)]$

Using the semantics of subordinator *eba*, let us compute the semantics for the sentence (6). First, we derive the subordinating adverbial clause by steps:

(18) The compositional derivation for the sentence (6)
[1] λt' [AT (t', x-fall)] (TAB)
[2] λt $\forall$t' [t=t' & AT (t', x-fall)] ([1] with temporal adverbial)
[3] λP [$\forall$t'[t=t' & AT (t', x-fall)] & AT (P, t)] (semantics of *-eba* from (17))
[4] λP [$\forall$t'[t=t' & AT (t', x-fall)] & AT (P, t)] (λt" λx [x is precious at t"])
(MTA, Functional Application)
[5] $\forall$t'[cherry-blossoms(x) & t=t' & AT (t', x-fall')] & AT (t, x-be-precious)]
(TAB)

In the meantime, I disregard tense, as there is no explicit tense marking. Since the provisional clause (6) is close to English *whenever*, I analyze this sentence as equivalent to "always when." I simply assume that the temporal relation between *t* and *t'* is "simultaneous," as English *when*. The top-down calculation of this sentence should look like the following:

(19) Cherry blossoms are precious [always when they fall], t



Note that this semantics does not include focus imposed by *koso*. It gives rise to the interpretation that every time the cherry blossoms fall, they are precious. The derived meaning is quite different from the actual interpretation of the sentence (6). The revision is in order.

Let us now proceed to *aba*, a conditional subordinator, as in the example in (4). In this form, *p* usually refers to a non-actualized event, and receives a hypothetical interpretation. Thus, this subordinator could be thought of as equivalent to English subordinator "in any circumstance in which" or "in such an occasion when." Since this morphology is used for conditionals, a world variable can be in place of the temporal variable. The following translation can be given to the conditional subordinator *aba*:

(20) $\lambda p_{<s,t>} \lambda q_{<s,t>}$ [for all w: [w is a circumstance & AT (w, p)] & AT(w, q)]

Here I will adopt the same idea that the adverbial clause ([p *aba*]-clause) is formed by raising the prepositional phrase "at a circumstance" to the specifier of the subordinating adverbial clause.

In this analysis, *in which* corresponds to a relative adverb, coindexed with the world variable of the form *at a circumstance/world*. This makes an intensional adverbial clause, in which the proposition *p* has the extensional denotation of a world. In the standard English, possible worlds may not correspond to any specific lexical item. Interestingly, such notions are expressed by the

past tense morpheme or subjunctive mood, such as [my wife were still alive (in the possible world)]. An indexical is given to the past tense morpheme rather than the event time, which denotes a set of possible worlds in which the proposition is realized.

However, there is an issue here about how to apply the same analysis to the *when*-type clauses we have seen earlier. In those cases, intensional construal is not directly attributed to the temporal denotations of the subordinate clause. If we adopt Stump's analysis of temporal adverbial clauses, they are temporal abstracts. Similar problem is addressed in Stump's treatment of weak adjuncts. Stump took the weak adjuncts as a special category of temporal abstracts, as weak adjuncts are intensional when it is the argument of the modal *would*. There are difficulties in treating weak adjuncts as a Main Tense Adverb, as the time of the subordinate clause event (i.e., my love being alive) is not computed as an adverbial that modifies the main clause tense. Thus, Stump adopts Kratzer (1977, 1979)'s analysis of modals, as a quantifier of possible worlds. In his analysis, he claims that the weak adjuncts restrict the modals, while the strong adjuncts, which denote sets of temporal intervals, do not. Stump's analysis drew a clear distinction between weak adjuncts and strong adjuncts, one is intensional and the other extensional. In the present paper, I argue that this is not really a correct analysis. As our data suggest, reason clauses restrict different types of modals. The correct analysis, I propose, would be that the temporal adverbial clauses are either extensional or intensional.

To make this proposal more explicit, it seems to me a right strategy to take the *aba* adverbial clause to be an "intensionalized" temporal abstracts (ITAB) of the type <s, <i, t>>, as translated in (21).[3] The past tense morpheme involved in the intensional adverbial clauses denote a possible world distinct from the actual world in which the proposition is realized. The past tense morpheme can be taken as a tenseless temporal abstract. The *aba*-clause in (4), "were my wife still alive" would have the following translation:

(21) λw $\exists$t [AT (w, my-love-be-alive(t))] (ITAB)

The ITAB in (21) is equivalent to a set of possible worlds w in which there is a time at which the proposition is true. Using the semantics of subordinator *aba* in (21), let us compute the semantics for the sentence (4). The temporal subordinating clause of (4) can be derived as follows:

(22) Semantic compositional of the sentence (4)
[1] λt'[AT (t', my-love-be-alive)] (TAB)
[2] λw $\exists$t'[AT (w, my-love-be-alive(t'))] (ITAB)
[3] $\lambda P_{<s,t>}$[for all w: [w is a circumstance] & AT (w, my-love-be-alive(t'))] & AT(w, P)]
(Semantics of -*aba*)
[4] $\lambda P_{<s,t>}$[for all w: [w is a circumstance & AT (w, my-love-be-alive(t'))] & AT(w, P)]
(λw' $\exists$t [AT (w', I-feel-sad(t))]) (Functional Application)

[3] Note that Ogihara (2000) had given the temporal interval of the type <i, <s, t>> for the English future time-mismatched counterfactual conditional. He argued that the past tense in the counterfactuals does not have extensional tense, as the intonational focus on future temporal adverbial "tomorrow" in the past tense counterfactual would be ungrammatical if it does. It is not surprising that this time-mismatched conditional clause is ungrammartical as a temporal adverbial clause: "*When John had given flower to Mary tomorrow, she would be happy." This suggests that the past tense in the conditional clause is intensional, and the proposition has a temporal extension of "John gives flower to Mary tomorrow instead of yesterday" in the possible world.

From TAB we can derive intensionalized TAB. The subordinator *aba* takes ITAB, the temporal adverbial clause. This is equivalent to MTA which takes another ITAB. The main clause can be applied to this function. It gives rise to (23).

(23) For all w [w is a circumstance & AT (w, my-love-be-alive(t'))], AT (w, I-feel-sad(t))]

The semantics given in (23), however, seems counterintuitive. The reason is that this semantics allows two independent temporal variables quantified over by a possible world. If (23) is the case, then it follows that lifetime of the speaker's love is necessarily shorter than the speaker's; the sentence would be false if there is a world where the speaker is no longer alive (and therefore not feeling sad) when the speaker's love is alive; or the sentence would be true even if there is no world in which my love was ever alive. Further revision is called for; we will come back for the semantics of this sentence in section 4.

3.4. GERUNDIVE ADVERBIAL CLAUSES. For the gerundive subordinator represented by ***te***-clauses, the closest translation that I can provide is "and then." The propositional content of the poems (7) and (8) are given as follows:

(24) [p **te** q] "p and then q"
<the propositional content of poem (7), conditional construal>
p: I understand my love
q: I leave my love
< the propositional content of poem (8), causal construal>
p: Hagi-plants form seeds
q: I like hagi-plants even more

Japanese gerundive clause *-te* can be seen as a subordinator of a VP in a gerundive form, just like English absolutes. As a head final language, *-te* phrase can modify any phrase equivalent to *q* or small than *q*. In our example in (7) and (8), *-te* phrase makes a VP, and coordinates with q as in [p and q]. Heim and Kratzer (1998) provides the semantics of "subsentential" coordination as in (24), which allows translating VP coordination as in (25):

(25) $[\![and]\!] = \lambda f_{<e,t>} \lambda g_{<e,t>}$ [λx_e. $f(x)=g(x)=1$]]
(26) $[\![sing\ and\ dance]\!]$
= λx_e. [sing(x)=dance(x)=1]

Using this semantics, we can provide semantics for *te*-phrases in Japanese. In the Japanese gerundive *-te* clauses, it is only the preceding event that can be subordinated.[4] The subordinator *-te* takes a temporal abstract as an argument and forms a gerundive clause. This gerundive clause can be identified with a function that takes another temporal abstract which indicates the temporal order of the two events, as follows:

(27) $[\![p\ te\ q]\!] = \lambda t\ \exists t'$ [$t' < t$ & $p(t') = q(t) = 1$]

This temporal adverbial denotes an extentional temporal abstract, in which q is realized after p is realized. The subordinate clause can form an intensional temporal abstract.

(28) $[\![p\ te\ q]\!] = \lambda w\ \exists t\ \exists t'$ [$t' < t$ & $p^{t'}(w)=q^{t}(w)=1$]

[4] As far as I see, it is the same with English absolutes, the free adjuncts with participles.
2) Starting the trip early, we have arrived the city by the end of the day.
3) #We started the trip early, arriving the city by the end of the day.

Let us analyze then derivation of *te*-clauses in (7) and (8) as (29) and (30) respectively. The VP attached by *te* can be first abstracted by the temporal variable and form a temporal adverbial.

(29) The semantic derivation of [p *te* q] in (7)
[1] λt' [x-understand-x's-love'(x)(t')] (TAB)
[2] And then$_1$ 1 [understand-x's-love'(x)(t$_1$)] (TA abstraction)
[3] λP [λt $\exists$t' [t'$<$ t & understand-x's-love'(x)(t')=P(t)=1]] (semantics of subordinator *te*)
[4] λt $\exists$t' [t'$<$ t & understand-x's-love'(x)(t') = leave-x's-love'(x)(t) =1] (TAB)

(30) The semantic derivation of [p *te* q] in (8)
[1] λt [form-seeds'(x)(t)] (TAB)
[2] And then$_1$ 1 λt [form-seeds' (x)(t$_1$)] (TA abstraction)
[3] λP^t [λt $\exists$t' [t'$<$ t & form-seeds'(x)(t') and P^t(t)]] (semantics of subordinator *te*)
[4] λt $\exists$t' [t'$<$ t & form-seeds'(x)(t') = fond-of-the-plant'(x)(t) =1] (TAB)

At this point, there is no outstanding difference between the semantics in (29) and (30). Then semantics of *te*-clause do not distinguish the semantic role: the one in (29) is perceived as conditional, and then other in (30) as causal. The discussion of the semantic variability of TAB between (29) and (30) will be discussed by then selection of TAB by modals, in section 5 below.

4. Zero tense. In this section, I discuss tense/tenseless distinction of temporal adverbial clauses in order to pro-vide an account for tenselessness of counterfactual-like conditional clauses. So far, we have seen that the conditional/causal interpretations are possible only with the temporal adverbial clauses in which the temporal postpositional phrase is focused and relativized. But it is the conditional clauses that receive no temporal construal, while reason clauses do have temporal denotation. I argue that the tense can have no semantic contribution, i.e. "zero" in the conditional clauses, while there is intrinsic temporal feature in the causal clauses.

Kratzer (1998) argued that the interpretation of past tense in the relative clauses is ambiguous, exemplified in the example in (31):

(31) John bought a fish that was still alive.
a. [past$_1$ John buy a fish that [Ø$_1$ [t be still alive]]
b. [past$_1$ John buy a fish that [past$_{1/3}$ [t be still alive]]

When tense moves to then matrix clause, the embedded clause has zero tense as in (31a). It is also possible for the tense to remain in the embedded clause and receive real tense interpretation as in (31b). Adopting this analysis, the possible analysis of focused temporal adverbials in our data of then form (32) may have the deictic tense or zero tense as in (33):

(32) [p *pi-ni koso* q]
p: the moon disappear
q: my feeling for you end

(33) My feeling would end on the day when the moon disappeared.
a. [tense$_1$ My feeling ends on the day when [Ø$_1$ [the moon disappears at t]
b. [tense$_1$ My feeling ends on the day when [(past)$_{1/3}$ when1 [the moon disappears at t]

When focused by *koso*, the temporal postpositional phrases (*on the day, at a circumstance, at that moment*, etc.) are relativized. As the embedded PP is relativized and raised to the temporal

adverbial of the main clause, the tense of the embedded adverbial clause is moved as well. This causes the temporal adverbial clause to be intensionalized, and the proposition to be tenseless.

Here we can make revision to the semantics of ITAB given in (22) above, repeated here as (34a). When the adverbial with -aba is focused by *koso*, the semantics of ITAB is elaborated by tense movement and zero tense as in (34b). The temporal denotation of the adverbial is not just a set of worlds in which a point of time exists, but it denotes a set of worlds in which time interval exists, as in (34b):

(34) a. [p-*aba* q]
λw λt [AT (w, my-love-be-alive'(t))] (ITAB)
b. [p-*aba koso* q]
λw∃t ∃t' [Ø(t) & t ⊆ lifetime of my love (t') & AT (w, my-love-be-alive'(t'))] (ITAB)

I claim that the relativization of the temporal adverbial creates an intensional context in which temporal abstract becomes tenseless and receives the counterfactual interpretation. In (34b), the temporal abstract denotes the possible worlds where there is a (tenseless) temporal interval during which the speaker's love is alive, and the main clause temporal abstract is a part of. The tense of the adverbial clause is simply anaphoric to the matrix tense, not introducing any extensional temporal value. Implementing this semantics, we can also revise the composition of the form "on then day when" in (12) above as follows:

(35) [on the day]$_i$ when$_i$ i [t$_i$ is within a day from t'] the moon disappears at t'
[1]λt ∃t' [on-the-day(t, t') & AT (t', the-moon-disappears)] (Temporal Abstract)
[2]λt ∃t'[t ⊆ within-a-day-from-t'& AT (t', the-moon-disappears)] (Temporal Interval)
[3]λw ∃t'∃t [Ø(t) & t ⊆ within-a-day-from-t'& AT (w, the-moon-disappears(t'))] (ITAB)
[4]λP[λw∃t'∃t[Ø(t)&t⊆within-a-day-from-t'&AT (w, the-moon-disappears(t'))] & P(w)] (Main Tense Adverbial)

The postpositional temporal adverbial introduces the event time of the proposition and forms a temporal abstract in line 1. The temporal adverbial is a function that denotes an interval of time during which the proposition is true, as indicated in line 2. Applying zero tense to the focused postpositional temporal adverbial, we derive intensional TAB (ITAB) in line 3. This proposition denotes a set of possible worlds in which there is a temporal interval at which the proposition holds. Having this proposition as a main tense adverbial, the semantics of the whole propositions from (14) and (23) can be revised accordingly:

(36) a. ⟦My love would end when the moon disappears⟧
=λw ∃t' ∃t [Ø(t) & ∃t' [t⊆within-a-day-from-t'& AT (w, the-moon-disappears'(t'))]] & AT (w, my-feeling-for-you-end'(t))]

b. ⟦I would feel sad were my love still alive⟧
=λw ∃t' ∃t [Ø(t) & ∃t' [t⊆lifetime of my love (t') & AT (w, my-love-be-alive'(t'))]] & AT (w, I-feel-sad'(t))]

This semantics accounts for the counterfactual interpretation: the counterfactuals denote the possible worlds in which we find a subset of time intervals at which the consequent is realized among those in which the antecedent is true.

5. Counterfactual vs. epistemic modality. In this section, I examine the role of modality in the semantic composition of conditional and causal sentences. As we have seen in 2.2., the temporal adverbial clauses are interpreted as conditional or causal depending on the type of modal auxiliaries used in the main clause. Our data show that the conditional meaning is derived from the conjectural modal, while the causative meaning is derived from the epistemic modal.

The (counterfactual) conditional interpretation of the *koso –e* construction appears exclusively with conjectural/subjunctive modals such as *–m(u)* 'would/will' in the main clause.[5] On the other hand, the *because*-like interpretation always involves evidential/epistemic modals –*ram* "must/may" or *–k(y)em* "must have/may have", *-k(y)eri* "realized that" and all other non-modal verbs.

Let us examine the compositional meaning of modals. According to von Fintel and Heim (2011), the semantics of modal, say, "may" is formulated as follows:

(37) $[\![\text{may}]\!]^{g,w} = \lambda p_{<s,t>}\ \exists w$ compatible with the evidence in w*: p(w)=1

The modal takes a proposition and returns a truth value. I propose that modal operators take intensionalized temporal abstracts. The modal *–m(u)* 'would/will' for example, takes an intensional temporal abstract and returns truth values if there is a temporal extension where the proposition holds.[6]

(38) $[\![mu]\!]^{g,w,t} = \lambda p_{<s,<i,t>>}\ \forall w$ compatible with the normal course of events that the speaker supposes or conjectures in w*, p(t) is true in w.

Kratzer argued that modal takes just one argument (i.e., the consequent), and it is the conditional clause that restricts the truth of the consequent. Likewise, in Stump (1985), the weak adjuncts are an argument of the modal *would.*[7] This leads us to assume that the modal *would* is a modal quantifier/operator and selects both a weak adjunct and the main clause as its arguments. The challenge to this analysis, however, is that the temporal adverbials are extensional temporal abstract and is not directly connected to the semantics of modal operator, whose function is to bind the world variables. It is much more natural to assume that the temporal adverbials are modifying the tense of the main clause.

As I have mentioned in Section 4, there is a tensed/tenseless distinction between conditional clauses and *because*-like clauses. I argue that the conjectural modal selects an "intensional temporal abstract" as its argument. Our data suggest that conjectural modal (*-mu*) is higher than temporal clause (TP), and therefore can take either a tensed or a tenseless clause.[8] The temporal adverbials that *mu* cooccurs with are the subjunctive clauses, *aba* "whenever"-clause, *pi-ni* clause, and *te*-clause.

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[5] Another interesting fact is that the counterfactual modal *-masi* does not occur in the *koso -e* construction. The modal *masi* often appear in both the temporal clause and the main clause as in "p-*maseba* q-*masi*," marking counterfactuality of the antecedent and the consequent. Many of them involve event of *p* as hindsight (Edgington 2003). That is, there is the following lexical constraint in premodern Japanese:

*P *maseba koso* q-*masi*

I will not discuss the possible cause of this constraint here.

[6] There is an extensional meaning (i.e. future reference) to *mu*. The divergence of this modal in conjectural and future uses in Old Japanese can be conceived as equivalent to the English *would* and *will*.

[7] If Stump's main argument is that weak adjuncts (conditional clauses) are restrictor of the modals, while the strong adjuncts (reason clauses) are not.

[8] The evidence comes from the morphological makeup of the present/past epistemic modals in Old Japanese. *-Ram* consists of the temporal present form *-ru* and modal *mu*, and *k(y)er* consists of *-ki* and *-mu*.

(39) a. p *aba koso* q $mu_{\text{conjectual}}$
b. p *pi-ni koso* q $mu_{\text{conjectual}}$
c. p-*te koso* q $mu_{\text{conjectual}}$

Let us look at the example of the form (39a). The consequent clause *q* does not form a constituent with the modal *mu*, as the truth of the whole sentence does not entail the truth of the consequent with *mu*. Instead, the main clause forms a constituent with the temporal adverbial clause first, as the truth of the consequent is restricted by this temporal interval.

To account for our data, I need to distinguish the two types of modality, epistemic (and evidential) modal and conjectural (i.e. counterfactual) modal. As we have seen in section 2.2, the focused temporal adverbial receives counterfactual interpretation with conjectural modals, while causal interpretation with epistemic modals. I postulate a semantics for the conjectural modal as in (40), according to which a conjectural modal takes an intensional temporal abstract as its argument. This contrasts with the semantics of epistemic modal in (41), which selects an extensional temporal abstract and denotes the speaker's certainty of the truth of the proposition.

(40) Conjectural (Counterfactual) modality
⟦Modal p⟧ denotes a set of worlds in which there is a temporal interval at which p holds.
(41) Epistemic modality
⟦Modal p⟧ denotes a degree of certainty of p, represented by the set of worlds among those which are compatible with the speaker's knowledge or belief, p is true.

Adopting this semantic distinction, let us postulate the semantic composition of conjectural modals and the counterfactual interpretation of a proposition with conjectural modals as follows:

(42) Conjectural Modal (*mu* in Old Japanese)
$[\![mu]\!]^{g, w, t} = \lambda p_{<s,<i, t>>} \lambda w$ [w is compatible with the normal course of events that the speaker supposes or conjectures in w*, p(t) is true in w]

(43) $[\![mu]\!]^{g, w, t}$ (⟦my love stops on the day when the moon disappears⟧)
={w: w is compatible with the normal course of events that the speaker supposes or conjectures in w*, in which ∃t' ∃t [Ø(t) & ∃t' [t ⊆ within-a-day-from-t' & AT (w, the-moon-disappears(t'))]] & AT (w, my-feeling-for-you- end(t))]}

The semantics of (43) states that the sentence would be true at the possible world among all worlds accessible to the actual world, in which the speaker's feeling for the addressee stops within a day from the time at which the moon disappears. However, in the normal course of events, there is no such time, which implicates that there are no such worlds.

Let us move on to the semantics of epistemic modals, *kyeri* 'I realized that.' The semantics of epistemic modal can be postulated as in (44) and gives rise to the causal interpretations of the focused temporal clause as in (45):

(44) Epistemic Modal (*kyeri* 'must/might have', modal past in Old Japanese)
$[\![kyeri]\!]^{g, w, t} = \lambda p_{<i, t>}$ ∃w compatible with what the speaker has realized in c, there is t such that t<t*, p(t) is true in w.

(45) $[\![kyeri]\!]$(⟦the cherry blossoms are precious at the time when they fall⟧)
$= \lambda p_{<i, t>}$ [∃w compatible with what the speaker has realized in c & t<t*, p(t) is true in w](λt [for all t such that Pres(t) & cherry-blossoms(x) & t⊆ season of blossom (t') & AT (t', x-fall)] AT (w, x-be-precious(t))]

= ∃w compatible with what the speaker has realized in c & t<t*, [for all t such that Pres(t) & cherry-blossoms(x) & t⊆season of blossom (t') & AT (t', x-fall)] AT (t, x-be-precious)] in w.

According to the semantic interpretation given in (45), in the world of the speaker's perceived reality, cherry blossoms are precious in any moment during the (short) blossom season which ends at the time of flower's falling.

The same analysis can be applied to then semantics of *te*-clauses in (29) and (30) above. Due to shortage of space, I leave the readers to make sense of the semantic variability of *te*-clause.

6. Conclusion. In this paper, I argued that counterfactual-like conditional clauses and causal/reason clauses are to be analyzed as a restrictor of a modal proposition: the former is conjectural and the latter epistemic. I presented data from Old Japanese, in which the conditional/causal interpretations are elicited when the embedded temporal adverbial is focused and relativized. I extended Dowty and Stump's analysis of temporal interval semantics and temporal abstracts and proposed that temporal abstracts optionally get intensionalized. I provided an account for tenselessness of the counterfactual clauses, applying Kratzer's analysis of tense movement in the relative clause. I have shown that the distinction between conditional and causal interpretation comes from whether the temporal adverbial clause is restricting conjectural modality or epistemic modality. As expected, the conditional/causal sentences denote a set of worlds which have the temporal extensions of the state of affairs.

References

Dowty, David R. 1982. Tenses, time adverbs, and compositional semantic theory. *Linguistics and Philosophy* 5(1). 23–55. https://doi.org/10.1007/BF00390692.

von Fintel, Kai & Irene Heim. 2011. *Intensional semantics*. Unpublished lecture notes.

Frellesvig, Bjarke. 2010. *A history of the Japanese language*. Cambridre: Cambridge University Press.

Kratzer, Angelika & Irene Heim. 1998. *Semantics in generative grammar*. Oxford: Blackwell.

Iatridou, Sabine. 2000. The grammatical ingredients of counterfactuality. *Linguistic Inquiry* 31(2). 231–270. https://doi.org/10.1162/002438900554352.

Karawani, Hadil. 2014. *The real, the fake, and the fake fake: In counterfactual conditionals, crosslinguistically*. Amsterdam: Utrecht University dissertation.

Kratzer, Angelika. 1998. More structural analogies between pronouns and tenses. *Semantics and Linguistic Theory (SALT)* 8. 92–110. https://doi.org/10.3765/salt.v8i0.2808.

Ogihara, Toshiyuki. 2000. Counterfactuals, temporal adverbs, and association with focus. *Semantics and Linguistic Theory (SALT)* 10. 98–114. https://doi.org/10.3765/salt.v10i0.3106.

Stump, Gregory T. 1985. *The semantic variability of absolute constructions*. Dordrecht: Springer.

Whitman, John. 1997. Kakarimusubi from a comparative perspective. In Ho-Min Sohn & John Haig (eds.)*Japanese/Korean Linguistics* (Volume 6), 161–178. Stanford, CA: CSLI.

Honda, Heihachiro. 1967. *The Manyoshu: A new and complete translation*. Tokyo: Hokuseido Press.

Mostow, S. Joshua & Royall Tyler (translators). 2010. *The Ise stories: Ise monogatari.* Honolulu: University of Hawaii Press.

Suga, Teruo 1991. *The man'yo-shu: A complete English translation in 5-7 rhythm*. Tokyo: Kanda Institute of Foreign Languages.

<Old Japanese texts>

Shinpen nihon koten bungaku zenshu. Tokyo: Shōgakkan, 1994–2002.