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Temporal overlap and aspectual auxiliaries in Japanese internally headed relatives

Raymond Gagné*

Abstract. This paper challenges the claim that internally-headed relative clauses (IHRCs) are judged (un)acceptable based on pragmatic "relevancy," as formulated in Kuroda's (1976) Relevancy Condition. The original formulation of the condition links a simultaneity sub-constraint, but many grammatical IHRCs within the literature directly contradict simultaneity, leading Kuroda to argue that the constraint is often suspended. Counter Kuroda's claims, this paper argues for the relationship of constraints to be reversed, with pragmatic relevancy subordinate to a main temporal condition. Specifically, I reformulate the simultaneity as a Temporal Overlap Constraint and contextualize it through the analysis of previously problematic IHRCs satisfying the constraint by means of target states. I use novel observations relating to aktionsarten and aspectual auxiliaries to support this approach, making IHRC (un)acceptability much more regular. Moreover, this approach accounts for unique properties of IHRCs, such as incompatibility with negation and "change" IHRCs.

Keywords. Japanese; internally-headed relative clauses; IHRC; tense; aspect; aktionsarten; Kuroda's relevancy condition.

1. Introduction. Since Kuroda's (1974, 75-76, etc.) seminal papers first drew attention to internally headed relative clauses (henceforth: IHRCs) in Japanese, a well-accepted property of IHRCs has been their adherence to the Relevancy Condition, as formulated in (1), and the subsequent deviance in acceptability compared to externally headed relative clauses (EHRCs).

(1) The Relevancy Condition: For a headless relative clause to be acceptable, it is necessary that it be interpreted pragmatically in such a way as to be directly relevant to the pragmatic content of its matrix clause. (Kuroda 1976: 270)

As noted in the literature, only IHRCs that conform to (1) are acceptable to speakers, while EHRCs are not restricted by such a constraint and, thus, are robustly acceptable. The condition can be easily demonstrated through the difference in (un)acceptability in (2a-b), whereby (2a) adheres to the conditions and is fully acceptable, whereas the IHRC in (2b) does not, and is thus marginal.

(2) a. Momoka-wa [$_{IHRC}$ Rei-ga ringo[1]-o mui-ta]-no-o tabe-ta.
Momoka-TOP Ray-NOM apple-ACC peel-PST-*no*-ACC eat-PST
'Momoka ate the apple that Ray peeled.'

b.?? Momoka-wa [$_{IHRC}$ Rei-ga ringo-o kat-ta]-no-o tabe-ta.
Momoka-TOP Ray-NOM apple-ACC buy-PST-*no*-ACC eat-PST
'Momoka ate the apple that Ray bought.'

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[1] For ease of identification, the head of IHRCs will be underlined.

The Relevancy Condition in (1) is well received in subsequent works, accepted by many authors and often pointed to as an explanation of grammatical deviance (e.g., Kitagawa 2005, Grosu & Hoshi 2018, among others). However, less acknowledged and generally ignored are the two subconditions posited by Kuroda: simultaneity and co-positionality. The simultaneity constraint stipulates that the IHRC event and matrix event must be "simultaneous," stemming from the observation that overt adverbials, such as in (3), degrade acceptability if they form a temporally disjoint set of events.

(3) *Momoka-wa kesa [$_{IHRC}$ Rei-ga kinoo ringo-o mui-ta]-no-o tabe-ta.
Momoka-TOP this.morning Ray-NOM yesterday apple-ACC peel-PST-*no*-ACC eat-PST
'Momoka ate, this morning, the apple that Ray peeled yesterday.'

Due to the presence of *kesa* 'this morning' and *kinoo* 'yesterday' in (3), the IHRC does not satisfy the simultaneity constraint.

As for the co-positionality constraint, the contrast in (2) above can be argued to show this constraint; in (2a), the event of peeling an apple likely occurs in the place where the apple is going to be eaten, whereas the event of buying an apple in (2b) likewise does not occur at the same place as the apple's consumption, leading to degradation in acceptability. While this argumentation is tenuous – one can easily envision a situation where Ray peeled an apple in a kitchen before bringing it to Momoka in a separate room – Kuroda argues that acceptability of IHRCs, as a pragmatic constraint, depends on the availability of a possible reading. Moreover, he argues that the subconditions are not universal, unlike the main constraint in (1), and that they may be suspended. However, he does not formulate when the subconstraints are necessary or not, further obscuring the exact condition(s) imposed on IHRCs.

The core thesis of this paper, thus, pushes against this pragmatic approach to IHRCs and the supremacy of (1) over the subconstraints. Rather, I recontextualize the Relevancy Condition through the lens of the simultaneity constraint as the main driver of IHRC (un)acceptability. As Kuroda is rather obscure on what satisfies "simultaneity," I re-articulate this constraint as a temporal overlap condition, noting how to satisfy it. Beyond that, I will argue that pragmatic constraints like (1) are still applicable to IHRCs but are rather a subcondition applied only when the temporal overlap condition cannot be clearly satisfied. To do so, I will draw from both examples in the literature as well as novel data to demonstrate the robust temporal constraints on IHRCs.

The structure of this paper is as follows. In Section 2, I look at widely used examples in the literature that are problematic for Kuroda's simultaneity constraint. I also discuss the auxiliary (*te)oku* 'do something in preparation,' as has been previously discussed in Kuroda and subsequent works. In Section 3, I reformulate the Relevancy Condition as the Temporal Overlap Constraint. In Section 4, I turn to aktionsarten, noting patterns within the literature as well as other novel IHRCs. Next, I discuss contributions of Japanese aspectual auxiliaries to IHRC acceptability in Section 5. In Section 6, I discuss implications of this reformulation and how it can better account for IHRC acceptability. Finally, I conclude in Section 7.

2. Problems for simultaneity. Before turning to novel data, let us first turn our attention to examples in the literature that pose a problem for a strict simultaneity constraint. Kuroda never explicitly states how the simultaneity constraint must be satisfied, whether it is truly simultaneity in which the IHRC and matrix events occur at the exact same time, or some more loose simultaneity. For now, let us assume that "simultaneity" simply means that the two events' runtimes must coincide at some point, no matter how brief. Even with this loose interpretation, many of

Kuroda's examples seem to fail to satisfy this constraint. Example (4) is an acceptable sentence from Kuroda's work (his example 3).

(4) Taroo-wa [IHRC ringo-ga sara-no ue-ni at-ta]-no-o tot-te, poketto-ni ire-ta.
Taro-TOP apple-NOM plate-GEN top-on be-PST-*no*-ACC take-SER pocket-in put-PST
'Taro picked up an apple which was on a plate and put it in a pocket.'

Despite being acceptable, it is dubious if (4) satisfies even loose simultaneity. The only moment where both "the apple is on the plate" and "Taro is picking up the apple" occur is the exact moment he touches the apple to pick it up. Once he has lifted the apple off the plate, it is no longer "on the plate," and thus simultaneity ends. Thus, (4) raises the question of whether a single moment of overlap is sufficient or not.

While (4) can possibly satisfy simultaneity, (2a), reproduced as (5) below, cannot possibly satisfy simultaneity. Nevertheless, numerous examples of apple-peeling IHRCs are found in the literature (Hoshi 1995, Erlewine & Gould 2016, Grosu & Hoshi 2019, Kitagawa 2019, etc.).

(5) Momoka-wa [IHRC Rei-ga ringo-o mui-ta]-no-o tabe-ta.
Momoka-TOP Ray-NOM apple-ACC peel-PST-*no*-ACC eat-PST
'Momoka ate the apple that Ray peeled.'

The intended meaning of (5) is such that there is an event of Ray's peeling an apple which completes before Momoka can eat the apple. Crucially, (5) does not have a reading where Momoka is eating the apple while Ray is peeling it. (5) clearly does not satisfy the simultaneity constraint, even in the loosest definition. For Kuroda, this meant stipulating that the simultaneity constraint can be suspended in such cases of strong pragmatic relevance.

Beyond the clear exceptions to simultaneity, another well-accepted, yet puzzling, property of IHRCs is their improvement with the auxiliary (*te)oku*[2] 'to do something in advance' (Kuroda 1976, Itō 1986). It is well observed that otherwise unacceptable IHRCs can often be improved with the addition of (*te*)*oku*, as demonstrated in the contrast of (6a-b)[3].

(6) a. * Kesa Taroo-wa [IHRC Hanako-ga kinoo ringo-o
this.morning Taro-TOP Hanako-NOM yesterday apple-ACC
kat-ta]-no-o tabe-ta.
buy-PST-*no*-ACC eat-PST
'This morning, Taro ate the apple that Hanako had bought yesterday.'

b. Kesa Taroo-wa [IHRC Hanako-ga kinoo ringo-o
this.morning Taro-TOP Hanako-NOM yesterday apple-ACC
kat**te**-**oi**-ta]-no-o tabe-ta.
buy-**AUX**-PST-*no*-ACC eat-PST
'This morning, Taro ate the apple that Hanako had bought yesterday **(in advance)**.'

Based upon the simultaneity constraint, both (6a) and (6b) are expected to be unacceptable due to the presence of temporal adverbials. However, this prediction is not borne out, with (6b) being acceptable. Notably, the temporal ordering of events in both sentences is the same: there is first

[2] Japanese auxiliaries often require the preceding verb to take the "te-form", and so I will include (te) when mentioning these auxiliaries in prose. Additionally, the past tense root of *oku* is *oi-*, for clarity in example (6b) and subsequent examples.

[3] Examples (6a-b) come from Itō (1986), ex. 9b and 10b respectively. Emphasis is my own.

an event of an apple's being purchased, followed by a later event of the apple being eaten. To explain the above contrast, Kuroda argues that the simultaneity constraint does not apply in a case like (6b), and that the contrast in grammaticality is due to the auxiliary *(te)oku* forming the pragmatic cohesion necessary to satisfy the Relevancy Condition in (6b).

3. Reformulating the simultaneity constraint. Based upon the previous section, one might argue that the simultaneity constraint is untenable, given the ubiquity of apple-peeling examples and the contrast in grammaticality in (6), which all go against any sort of temporal simultaneity. I will, however, argue that such argumentation is unnecessary, and that a clearer articulation of the simultaneity constraint can not only save its applicability, but also reduce the need for the pragmatic Relevancy Condition. To do so, let us first reconsider the contrast in (6).

Core to my reformulation of the simultaneity constraint – and the Relevancy Condition at large – is the contribution of *(te)oku* in (6). Kuroda notes that it means 'to do something in advance,' and thus argues that it helps establish the relevancy of an embedded IHRC to its matrix clause. However, I argue that the contrast in (6) arises from *(te)oku* creating a target state, in the sense of Parsons (1990). A target state is a state created at the culmination of some event. For example, the event of throwing a ball on a roof yields the target state of the ball being on the roof (Parsons 1990: 235). As such, in (6b), the auxiliary allows the IHRC to extend temporally beyond the end of Hanako's buying event and up to the point of Taro's eating. This contrast is diagrammed below in Figures 1 & 2 below, representing the temporal structure of (6a) and (6b) respectively.

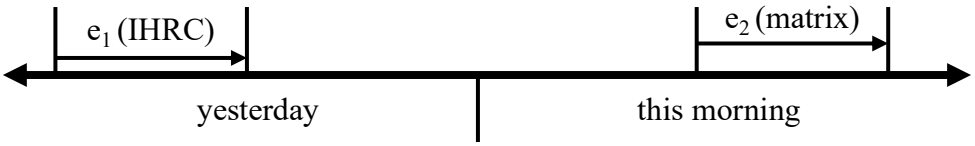

Figure 1. Temporal structure of (6a)

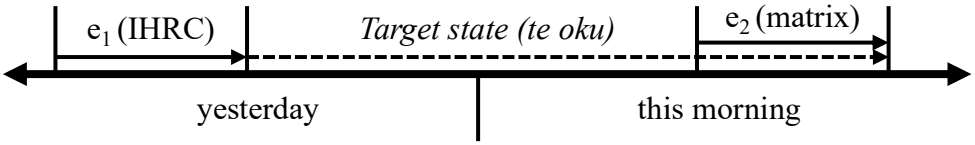

Figure 2. Temporal structure of (6b)

In (6a), schematized in Figure 1, there is no temporal overlap between e_1 and e_2, the IHRC and matrix events respectively, and thus no simultaneity. Conversely, the contribution of *(te)oku* is seen concretely in Figure 2, with a dotted line, which extends the IHRC event to the end of the matrix event[4]. Per my analysis, this extension of e_1 up to the end of e_2 satisfies the simultaneity constraint and explains the contribution of *(te)oku* and contrast in (6).

At this point, let us turn our attention back to the simultaneity constraint. Given the above contrast and acceptability of (5), (6b), a "simultaneity" constraint appears to be a misnomer that leads to incorrect predictions. Rather, I will refer to the constraint as a "temporal overlap constraint." The IHRC and matrix events are rarely simultaneous, but often a salient target state can

[4] Whether the target state extends beyond the matrix event depends on both the RC and matrix predicates. Given that *eat* destroys the apple, I assume that the state of "being bought" ends as well. Nevertheless, it is not crucial to my analysis; the target state extending beyond the eating event is unproblematic.

overlap with the matrix event, leading to the change in terminology. More concretely, I propose the constraint be formulated as (7).

(7) *The Temporal Overlap Constraint*: For an IHRC to be acceptable, the IHRC must either 1) denote a state that overlaps with the matrix event or 2) denote an event with a salient target state that overlaps with the matrix event.

Before continuing, I must mention one slight particularity of (7), which is that when I refer to a "state" (but not target state), I am referring to a slightly larger set of predicates than just stative ones. More precisely, I seek to target any predicate that exhibits the sub-interval property (Bennett & Partee 1972), including stative predicates, progressives, and habituals (Deo 2020). The stipulation that IHRCs may either denote a state or target state is necessary to account for examples like (4) and will become more evident in the following sections.

4. IHRCs and lexical aspect (aktionsarten). Having now formalized the temporal restrictions on IHRCs, let us see how IHRC acceptability falls out from the predictions of (7). To do so, let us first consider the interplay of tense and lexical aspect in IHRCs. I will discuss the four types of lexical aspect, or aktionsarten (Vendler 1957), in the following order: states, accomplishments, achievements, and activities.

States, as their name implies, denote states. Given that (7) allows for an IHRC to denote a state, we thus expect a stative predicate to be valid for forming an IHRC. This is indeed the case, as we have already seen in (4). Beyond existential stative predicates like *aru/iru* 'to exist,' other stative predicates, such as potential verbs, are also acceptable in IHRCs like (8)[5].

(8) Sensei-wa [IHRC kodomo-ga Mozart-no kyoku-ga hik-eru]-no-o home-ta.
Teacher-TOP child-NOM Mozart-GEN music-NOM play-POT.PRS[6]-*no*-ACC praise-PST
'The teacher praised the student who could play Mozart's compositions.'

The acceptability of stative predicates is expected, given that they are the sole predicates in Japanese that can yield an ongoing present tense reading on their own (all other predicates require an auxiliary, akin to English's progressive). In (8), the IHRC state extends throughout the matrix event, as children do not spontaneously forget Mozart upon being praised, typically. Moreover, both past and present tense stative IHRCs are possible, as (4) and (8) have shown respectively. A past-tensed state in an IHRC may appear unexpected, as it would seem to form a state disjoint with the matrix clause, but Japanese RCs allow for absolute tense (Ogihara 1996), meaning that the syntactically past tensed verb may still be semantically simultaneous with the matrix tense. Thus, neither combination of tense with a stative predicate is unexpected.

Let us now turn to achievements and accomplishments, which I will discuss together as they are both telic predicates. For both classes – which form the majority of attested IHRCs in the literature – they are acceptable in IHRCs if they are past tense and have a salient target state. To demonstrate this point, let us re-examine (2), reproduced below as (9).

[5] Judgments for IHRCs not attributed to a source are from Toshiyuki Ogihara (p.c.).

[6] More accurately, Japanese possesses a past and non-past tense, with the latter yielding either present or future readings depending on the predicate (although, see Ogihara 1996 for a divergent analysis that Japanese possesses three tenses). For simplicity, I will refer to the latter simply as the "present" tense and gloss it as such.

(9) a. Momoka-wa [IHRC Rei-ga ringo-o mui-ta]-no-o tabe-ta.
Momoka-TOP Ray-NOM apple-ACC peel-PST-*no*-ACC eat-PST
'Momoka ate the apple that Ray peeled.'

b.?? Momoka-wa [IHRC Rei-ga ringo-o kat-ta]-no-o tabe-ta.
Momoka-TOP Ray-NOM apple-ACC buy-PST-*no*-ACC eat-PST
'Momoka ate the apple that Ray bought.'

This minimal pair shows the importance of a salient target state. With a verb like *muku* 'peel,' there is a clear target state. Once an apple is peeled, you have a peeled apple, and this target state does not randomly cease. Thus, (9a) is widely acceptable due to the target state being concrete and holding over long durations. However, *kau* 'buy' in (9b) does not have these properties; while the predicate can have a target state (in essence, ownership), it is rather abstract and not well-defined temporally (spontaneously losing ownership of something is much more reasonable than apples regrowing their peels). As such, the degradation of (9b) can be accounted for by the lack of a salient, durable target state.

It should be noted that contrasts like (9) are what originally led Kuroda to posit the Relevancy Condition. Even under the reinterpreted temporal overlap constraint of this paper, some level of pragmatic variation appears necessary to account for IHRCs. This pragmatic variation is less about the cohesion of the IHRC and matrix event in "relevancy," but rather based upon the accessibility of a lasting state induced by the IHRC to satisfy the temporal restriction. For a predicate like *peel*, the state is clear and thus speakers readily will accept the clause. For *buy*, on the other hand, the induced target state is more abstract, leading to variations in salience and inter-speaker variation regarding the acceptability of the IHRC. Therefore, both achievements and accomplishments are possible predicates within IHRCs, but their overall acceptability will depend mainly on pragmatic factors of whether a target state can realistically be construed, barring the presence of aspectual auxiliaries. Neither class of predicate, however, can be present tensed in IHRCs and be acceptable, due to the lack of a relevant target state.

Finally, let us turn our attention to activities. Notably, these predicates are atelic, lacking a concrete end point, and this means they generally lack a salient target state. As such, regardless of tense, activities are not well-formed in IHRCs without the help of some aspectual auxiliary. Regardless of tense, (10) is not a well-formed IHRC.

(10) *Taroo-wa [IHRC kodomo-ga kooen-de hitoride {aruku / arui-ta}]-no-o
Taro-TOP child-NOM park-at alone {walk.PRES / walk-PST}-*no*-ACC
hogosi-ta.
take.custody.of-PST
'Taro took custody of the child that [walked/walks/will walk] alone in the park'

Regardless of tense, (10) cannot yield a target state to satisfy temporal overlap. Thus, simply activity predicates are incompatible with IHRC formation.

To briefly conclude this section, Table 1 summarizes the findings of this section.

	States	Accomplishments	Achievements	Activities
Past	Yes	Yes/No	Yes/No	No
Present	Yes	No	No	No

Table 1. Acceptability of different predicates in IHRCs

States, which can produce a true simultaneous reading, are valid in both tenses, since the past tense can receive an absolute tense reading and still coincide with the matrix event. Telic predicates are acceptable in the past, but not the present, if they have a salient target state, thus being subject to pragmatic variation. Activities, lacking salient end points and target states, are unacceptable.

5. Aspectual auxiliaries in IHRCs. Having looked at basic predicates, let us now turn to a few aspectual auxiliaries and their contributions to IHRCs. In this section, I will first review the contribution of *(te)oku* before turning to *(te)aru*, *(te)iru*, and *(te)simau* in sequence. Aside from *(te)oku*, the contribution of these auxiliaries towards improving IHRC acceptable has, to the best of my knowledge, not been discussed in prior literature.

Given that *(te)oku* yields a target state, it can be readily added to an IHRC and generally improve grammaticality. As far as I am aware, the addition of *(te)oku* cannot render an IHRC less acceptable, leading most authors to use the auxiliary when constructing examples. Moreover, in the previous section, I argued that the variability in acceptability of achievements and accomplishments in IHRCs stems from the pragmatic viability of a target state. Thus, a predicate like *buy* is subject to more variation than one like *peel*. When *(te)oku* is added to an IHRC, however, this contrast disappears, as seen in (11), which reproduces the minimal pair in (9) but with the auxiliary added.

(11) a. Momoka-wa [IHRC Rei-ga ringo-o muite-**oi**-ta]-no-o tabe-ta.
Momoka-TOP Ray-NOM apple-ACC peel-**AUX**-PST-*no*-ACC eat-PST
'Momoka ate the apple that Ray peeled (in preparation for later).'

b. Momoka-wa [IHRC Rei-ga ringo-o katte-**oi**-ta]-no-o tabe-ta.
Momoka-TOP Ray-NOM apple-ACC buy-**AUX**-PST-*no*-ACC eat-PST
'Momoka ate the apple that Ray bought (in preparation for later)).'

The inclusion of the auxiliary forces a target state. This effect is not appreciated in (11a), given that the base predicate readily allowed a target state, but the effect is more pronounced in (11b), where we now have an acceptable IHRC when the base predicate, without the auxiliary, was marginal at best. Under my analysis, this is because the auxiliary forces a target state, regardless of baseline saliency, and satisfies temporal overlap. Thus, pragmatic effects that lead to inter-speaker variation are obviated when *(te)oku* is included, allowing for much more stable judgments.

Beyond *(te)oku*, Japanese has other auxiliaries that yield target states, such as *(te)aru*. Under my account, we would expect that this auxiliary also would be acceptable in IHRCs for the same reason as *(te)oku*, by satisfying temporal overlap. Indeed, this prediction is borne out, as seen in (12-13).

(12) Momoka-wa [IHRC ringo-ga muite-**aru**]-no-o tabe-ta.
Momoka-TOP apple-NOM peel-**AUX.**PRS-*no*-ACC eat-PST
'Momoka ate the apple that has been peeled (by someone).'

(13) Hanako-wa [IHRC ringo-ga katte-**at**-ta]-no-o tabe-ta.
Hanako-TOP apple-NOM peel-**AUX**-PST-*no*-ACC eat-PST
'Hanako ate the apple that had been bought[7].'

Additionally, since *(te)aru* yields a target state, it behaves like stative predicates and is acceptable in both the present and past tense, since the former receives an ongoing interpretation (true simultaneity) and the latter can be interpreted as an absolute tense relative which still coincides with the matrix event.

Next, let us turn to *(te)iru*, which has two different functions, depending on the verb with which it combines. When combined with intransitive achievements, *(te)iru* yields a target state reading, akin to *(te)aru*. Unsurprisingly, IHRCs containing such a combination are readily acceptable, as easily seen in (13), which contains the intransitive verb *wareru* 'to break.'

(13) Ziroo-wa [IHRC mado-ga warete-**iru**]-no-o soozisi-ta.
Jiro-TOP window-NOM break-**AUX.**PRS-*no*-ACC clean.up-PST
'Jiro cleaned up the window that broke.'

When *(te)iru* combines with other predicates, including transitive accomplishments and activities, it instead yields a progressive reading. As demonstrated by (14), these progressive readings are acceptable in IHRCs when the IHRC event overlaps with the matrix event.

(14) Nanami-wa [IHRC syefu-ga suupu-o tukutte-**iru**]-no-o azimis-ta.
Nanami-TOP chef-NOM soup-ACC make-**AUX**.PRS-*no*-ACC taste-PST
'Nanami tasted the soup that the chef is making.'

In (14), the matrix event is completely surrounded by the IHRC event, as can be schematized in Figure 3. This satisfies the temporal overlap constraint, as the IHRC overlaps fully with the matrix event (regardless of whether 'tasting' is an instantaneous achievement or short-duration accomplishment).

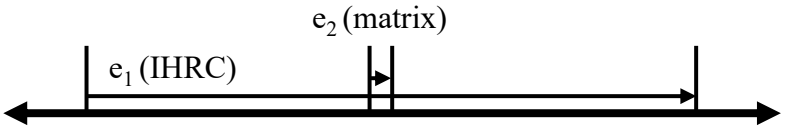

Figure 3. Schematization of the temporal structure of (14)

Thus, examples like (14) appear to adhere to Kuroda's original simultaneity constraint. Nevertheless, they are equally unproblematic for the account I pursue here.

[7] Toshiyuki Ogihara (p.c.) notes that (13) sounds better to him in the past tense. He also notes that a slightly more complex examples sound better to him, providing (i), as a perfectly natural IHRC.

(i) Hanako-wa [IHRC takusan sooziyoo-no senzai-ga katte-**at-ta**]-no-o
Hanako-TOP lots.of cleaning.purpose-GEN detergent-NOM buy-**AUX**-PST-*no*-ACC
tukat-te, utizyuu-o soozisi-ta.
use-SER whole.house-ACC clean-PST
'Hanako cleaned the whole house, using the cleaning detergent which a lot of was bought.'

It is not immediately clear to me why more complex IHRCs might sound better and remains to be explained in future works.

More surprising, perhaps, is the fact that *(te)iru* can also create acceptable IHRCs with activities. As noted in the previous section, these predicates are unacceptable regardless of tense in IHRCs due to the lack of a coherent target state. However, as ongoing events, they can form acceptable IHRCs akin to (14), as seen in (16). Crucially, this example is equivalent to the unacceptable (10) but with the inclusion of the auxiliary.

(16) Taroo-wa [$_{IHRC}$ kodomo-ga kooen-de hitoride aruite-**iru**]-no-o
Taro-TOP child-NOM park-at alone walk-**AUX**.PRS-*no*-ACC
hogosi-ta.
take.custody.of-PST
'Taro took custody of the child that was walking alone in the park'

Thus, this shows that while a certain predicate, e.g., *aruku* 'walk,' may normally be incompatible with an IHRC due to a lack of a target state (and, thus, also odd with *(te)aru/(te)oku*), they can still form coherent IHRCs as progressives.

As a final piece of evidence in favor of the temporal overlap constraint, let us consider a different type of aspectual auxiliary, *(te)simau*. Unlike the other auxiliaries, *(te)simau* does not yield a target state. Rather, it signals the "completive" aspect (Iwasaki 2013), which indicates that an event has reach a point in culmination that its completion is inevitable, and cannot be reversed. This is often done to add a nuance of regret, or unintentionality. Regardless of pragmatic purpose, *(te)simau* can be freely used in cases where a target state was already pragmatically supplied. In (17), the addition of *(te)simau* adds nuance without changing acceptability.

(17) Taroo-wa [$_{IHRC}$ musuko-ga inu-ni sin-are(te-simat)-ta]-no-o nagusame-ta.
Taro-TOP son-NOM dog-DAT die-PASS(-AUX)-PST-*no*-ACC comfort-PST
'Taro comforted his son who had his dog (regrettably) die.'

While the addition of the auxiliary makes no notable difference in (17), the auxiliary is, conversely, incompatible in cases where the irreversibility of the IHRC event creates a contradiction with the matrix clause, as demonstrated in (18). In this sentence, the addition of *(te)simau* means that the fire cannot be put out, directly contradicting the matrix clause and causing unacceptability.

(18) ?Syooboosi-wa [$_{IHRC}$ hannin-ga ie-ni hi-o tukut(*te-simat)-ta]-no-o
Firefighter-TOP criminal-NOM house-DAT fire-ACC set(-AUX)-PST-*no*-ACC
kesitome-ta.
put.out-PST
'The firefighter put out the house that the criminal had (*irreversibly) set on fire.'[8]

Whether the degradation of *(te)simau* in (18) derives from the temporal overlap constraint or simply due to being a contradiction is not clear to me; regardless, the fact that the auxiliary *(te)simau*, unlike any of the target state auxiliaries, can cause a decrease in IHRC acceptability is notable.

We have now seen that the temporal overlap constraint is further supported by the introduction of various aspectual auxiliaries into IHRCs. For all three target state auxiliaries, we see that they can improve otherwise marginal or variably acceptable IHRCs by extending the IHRC event

[8] Qi Cheng (p.c.) has questioned whether the internal head of (18) is *ie* 'house' or *hi* 'fire.' There is no reason I can think of that would restrict one interpretation over the other. However, regardless of the true head in (18), neither head should challenge the observation that *(te)simau* causes ungrammaticality.

to overlap with the matrix event by leveraging target states. Moreover, *(te)iru* can create progressive readings of some verbs, allowing for IHRC events runtimes to truly overlap, or sometimes surround, the matrix event runtime. Finally, the completive aspect auxiliary *(te)simau* can be innocuously added to acceptable IHRCs that already require a completed event to form target states. However, the auxiliary behaves differently when the irreversibility of the IHRC event would actively contradict, or prohibit overlapping with, the matrix event. The behaviors of each of these auxiliaries in part strengthen the idea that temporal overlap, as opposed to true simultaneity, accounts best for IHRC (un)acceptability.

6. Implications. Having now shown how the reformulation of the Relevancy Condition, in the form of the temporal overlap constraint, best captures patterns in acceptability of IHRCs as related to both aktionsarten and aspectual auxiliaries, let us now turn our attention to a few implications. I will start by discussing two noted properties of IHRC which could be explained with this formulation before turning to a yet undiscussed prediction of my account.

Grosu (2010) notes that IHRCs are incompatible with negation. With regards to the classic Relevancy Condition, this property is unexplainable, with the deviance of (19) completely unexpected.

(19) * Momoka-wa [IHRC Rei-ga ringo-o muk-ana-katta]-no-o tabe-ta.
Momoka-TOP Ray-NOM apple-ACC peel-NEG-PST-*no*-ACC eat-PST
'Momoka ate the apple that Ray did not peel.'

However, the unacceptability of (19) can be explained clearly with the temporal overlap constraint. Since Ray did not perform the action of peeling an apple, there is thus no accessible target state that can extend to the matrix time. Put another way, any state that is induced in (19) is not created by the IHRC predicate. One could argue that there is a state of an unpeeled apple, but that was not caused by the event of Ray's not peeling an apple; the state exists regardless of Ray's actions. Thus, the incompatibility of negation in IHRCs is explained by the lack of a temporally overlapping target state.

A second phenomenon that can be explained under this account is the matter of "squeeze-juice" or "change" IHRCs. These are named as such because of early examples often involving the squeezing of juice. An example is demonstrated in (20) below, from Hoshi (1995: 121, ex. 10).

(20) Zyon-wa [IHRC Mary-ga ringo-o sibottekure-ta]-no-o hitoikide nomihosi-ta.
John-TOP Mary-NOM apple-ACC squeeze-PST-*no*-ACC in.a.gulp drink.up-PST
'John drank up [the juice] in a gulp which Mary made for him by squeezing apples.'

The case of change IHRCs have been problematic, in part, since they seem to drastically convert the IHRC head into a matrix entity which has no syntactic correlate; there is no word in (20) corresponding to *zyuusu* 'juice,' despite that being the normal denotation of the IHRC. However, appealing to target states makes (20) appear less remarkable. Unlike some previous examples where the target state is rather minute, such as ownership or the peeling of an apple, (20) involves a much more drastic target state that converts the IHRC apples into the state of being

juice. Thus, (20) is easily correlated to more "standard" IHRCs without any additional mechanisms.[9]

Finally, let us turn to one last prediction of my account and whether it is borne out. The general argumentation pursued throughout this paper is that IHRCs are most often accepted due to a target state, induced by the IHRC, extending to the matrix event time. Many of the target states discussed are not easily or naturally reversible, such as peeling an apple, juicing an apple, or dying. However, if a target state is reversible and, perhaps, naturally does reverse itself, then we might expect an IHRC to be unacceptable.[10] Such a context is construed in (21) which, surprisingly, is acceptable.

(21) Hanako-wa [$_{IHRC}$ Taroo-ga piza-o asa atatamete-oi-ta]-no-o
Hanako-TOP Taro-NOM pizza-ACC morning heat-AUX-PST-*no*-ACC
sigoto-no atode tabe-ta.
work-GEN after eat-PST
'Hanako ate, after work, the pizza that Taro had heated up in the morning.'

Absent context, (21) seems to violate the temporal overlap constraint, since we have no context to assume that Hanako gets off work in the morning. Thus, the acceptability of (21) seems inherently problematic for this paper's thesis, but there are at least two possible explanations of (21) that can obviate this problem.

One possibility is to leverage resultant states (Parsons 1990). Such states differ from target states in that they generally are irreversible. For example, while a ball thrown on a roof may eventually fall off the roof, ending the target state, the ball would still have the resultant state of being thrown on the roof (as supposed to balls never thrown up on a roof). Thus, (21) may leverage that the pizza has a resultant state of being heated up, and that is sufficient to satisfy temporal overlap. However, this raises the question of why (21) can leverage a resultant state whereas other IHRCs cannot. This approach seems to overpredict IHRC acceptability and would provide a rather ad hoc adjustment to account for (21).

Given the problem of suddenly leveraging resultant states, a better approach would utilize target states to explain (21). However, it should be noted that there has been no formal restriction on what target state can satisfy temporal overlap, so long as it is induced by the IHRC event. Put another way, at first sight, (21) seems to use a target state of a warm pizza to attempt to satisfy temporal overlap. In such a case, the pizza likely would have cooled by the matrix event time and, thus, violate the condition. However, speakers may instead leverage a different, more abstract target state, such as the pizza being prepared. In such a case, the state of the pizza's readiness/preparedness (for eating) is triggered by the matrix clause and, regardless of temperature, can persist until Hanako's eating. This possibility is illustrated in Figure 4.

[9] Claims have been made that change IHRCs are syntactically distinct from regular IHRCs (see, for example, Tonosaki 1996). While I do not discount such a possibility, I will not currently consider the implications for the semantic interpretation of change IHRCs.

[10] Thanks to David Beaver (p.c.) for pointing out this prediction during the LSA presentation of this work.

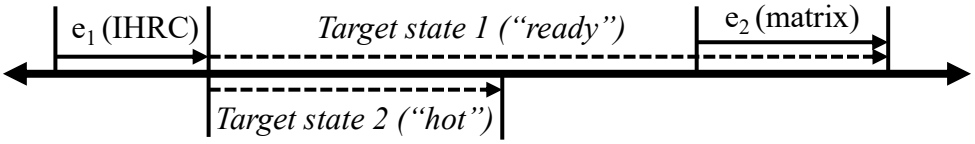

Figure 4. Temporal structure of (21)

As shown in Figure 4, the apparent violation of the constraint in (21) may be due to the lower "target state 2," despite speakers actually employing "target state 1" to satisfy the constraint. This analysis can fit nicely into this paper's main argumentation, given that the Relevancy Condition was not fully discarded, as discussed in Sections 4 & 5. Thus, (21) may demonstrate that even cases with *(te)oku* may lead to (less) variation based on pragmatics.

In this section, I have shown how the temporal overlap constraint can not only account for IHRC behaviors relating to aspect, but also that other properties of IHRCs can be explained under this constraint. Negation, which is incompatible with IHRCs, can be explained by the lack of target states induced by an event. Moreover, change IHRCs can be subsumed as a standard type of IHRC, just with a much more drastic target state that changes the form of the head. The prediction that target states that are cancelable should be incompatible with IHRCs, however, remains an open question for future research, given the acceptability of (21), albeit this could simply be due to confounds with the exact sentence. As such, this question will need to be addressed in future work.

7. Conclusion. This work has pursued a recontextualization of the Relevancy Condition and simultaneity sub-constraint (Kuroda 1976) that applies to IHRCs in Japanese. Contra Kuroda's formulation, I argue that the Relevancy Condition and pragmatic factors are not the prime constraint on IHRCs, and that a temporal constraint – specifically, as I call it, a "temporal overlap constraint" – can better account for IHRC acceptability. I accept that pragmatic information that led to Kuroda's original condition must still be considered in IHRCs, but that the pragmatic relevancy is the subcondition, and only necessary when strict temporal overlap cannot be satisfied.

The theoretical claims of this paper have been backed by novel observations relating to both lexical aspect and auxiliaries in IHRCs. I have noted that states and past-tensed telic predicates readily form IHRCs whereas present-tensed telic predicates and activities are not; this contrast arises from predicates that denote either states or allow for a salient target state. With regards to auxiliaries, I have shown that beyond the well-noted case of *(te)oku*, other target state auxiliaries, *(te)aru* and *(te)iru*, also readily form acceptable IHRCs. I also show that progressive IHRCs are acceptable when overlapping with a matrix clause. Conversely, the completive auxiliary *(te)simau* can degrade IHRC acceptability when it causes an IHRC event to be irreversible, and thus unable to extend into the matrix event time. Finally, I showed that this temporal constraint can explain otherwise puzzling behaviors of IHRCs, such as incompatibility with negation and change IHRCs.

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