

Aspect and Thematic Roles

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Abstract

In this work, I propose a new semantic analysis of the Japanese progressive/resultative morpheme *-te iru*, which also leads to an improved account of the English progressive and contributes to cross-linguistic theory of aspect. The proposal is based on the modal analysis of the English progressive proposed by Portner (1998) and Ferreira (2016), but it is modified to accommodate the Japanese data. Crucially, the target state (resultative) reading of *-te iru* is available when the subject entity is a theme/undergoer; this is not controlled by the length of the event being described. To implement this idea, this work develops a formal system in which each thematic role predicate has its own temporal argument, and this time does not necessarily equal the temporal trace of the event in question. Specifically, a theme bears the target state role associated with an event e at a time that immediately follows the temporal trace of e . In addition, to describe and explain the behavior of *-te iru*, the traditional idea of “inertia worlds” according to which the relevant possible worlds are identical up to the utterance time is modified to allow them to differ in the past as well as in the future. It is noted that this modification is justified for the English progressive as well as for the Japanese *-te iru* form. This proposal allows us to predict that the behavior of achievements in English and Japanese is alike in simple past sentences and nominalized cases, but differs from each other in sentences containing the aspectual morphemes in question.

Keywords

aspect, progressive, result state, target state, achievements

1. Introduction

It is well known that Japanese verbs in the *-te iru* form can produce both progressive and result state interpretations (Kindaichi 1955; Ogihara 1998; Shirai 2000; Nishiyama 2006; and many others). Consider the examples (1a-c). (1a, b) receive progressive interpretations, whereas (1c) receives a result state interpretation referring to a concrete state — a “target state” in the sense of Parsons (1990).¹

- (1) a. Hanako-wa ima hasit-te iru.
Hanako-TOP now run-TEIRU.PRES
‘Hanako is running now.’
- b. Hanako-wa ima ie-o tate-te iru.
Hanako-TOP now house-ACC build-TEIRU.PRES
‘Hanako is building a house now.’
- c. Hanako-ga ima asoko-ni taore-te iru!
Hanako-GEN now there-at fall-TEIRU.PRES
‘Hanako is now lying on the ground (presumably because she fell over and has not been able to get up again).’

This article aims to account for the distinction between (1a, b) on the one hand and (1c) on the other in terms of the difference in their subject thematic roles. This observation is well known in the Japanese aspect literature (Okuda 1978; Kudo 1995; Shirai 2000; etc.), but no formal semantic analysis has been proposed in which the thematic roles are used explicitly. The

¹ In this article, the term “result state” has a general and non-technical meaning. It refers to a state that results from a past event. I will later adopt Parsons’ (1990) idea that there are (at least) two types of result states: target states and resultant states. They are defined formally and thus have distinct semantic interpretations.

generalization that needs to be captured is that (1a, b) have agentive subjects and receive progressive interpretations, whereas (1c) features a theme/undergoer subject and yields a target state interpretation. (1a, b) cannot receive any type of result state interpretation when the sentence accompanies adverbials referring to the utterance time such as *ima, genzai* ‘now’. By contrast, (1c) cannot receive a progressive interpretation. In order to make the empirical coverage of my proposal manageable, I here restrict my attention to active sentences in which the subject denotes a singular count entity.²

² A *Journal of Semantics* reviewer suggests that when the subject DP of a *-te iru* sentence denotes a plural entity or a mass entity (such as *hitobito* ‘people’ or *ame* ‘rain’), a progressive interpretation becomes available. This is assumed to be an instance of aspect shift (Moens and Steedman 1988; de Swart 1998, 2000; and Rothstein 2004) in that achievement sentences become activities. This pattern is observed crosslinguistically including English (E.g. *Many people are now dying of an epidemic disease.*) The referee also suggests that passive sentences in the *-te iru* form can yield progressive interpretations in addition to target state interpretations. For example, (i) only receives a target state interpretation, but (ii) arguably receives a progressive interpretation according to this reviewer. I believe that (ii) still prefers a target state reading, but I agree that (ii) could receive a progressive reading as well.

(i) Ki-ga taore-te iru.

tree-NOM fall-TEIRU.PRES

‘A tree is lying on the ground after having fallen over.’

(ii) Ki-ga tao -sare-te iru.

tree-NOM push.down-PASS-TEIRU.PRES

‘A tree is lying on the ground after having fallen over.’ or ‘A tree is being pushed down.’

Parsons (1990: 235) makes a distinction between target states and resultant states as quoted in (2).

- (2) If I throw a ball onto the roof, the target state of this event is the ball's being on the roof, a state that may or may not last for a long time. What I am calling the Resultant-state is different; it is the state of my having thrown the ball onto the roof, and it is a state that cannot cease holding at some later time.

The distinction can be formalized straightforwardly in terms of properties. The ball's being on the roof (a target state) is $\{ \langle x, t, w \rangle \mid x \text{ is on the roof at } t \text{ in } w \}$, whereas the state (or property) of my having thrown the ball onto the roof (a resultant state) is $\{ \langle x, t, w \rangle \mid \text{there is a time } t' \text{ such that } t' < t \text{ and } x \text{ throws a ball onto the roof at } t' \text{ in } w \}$. Suppose that Mary has the target state given above now. This does not guarantee that she will have the same property at a future time. By contrast, if Mary now has the resultant state property given above, she is guaranteed to have the same property at any future time. For our purposes, what is important here is the characterization of a target state. It is a temporary state and in this sense, it is similar to a "progressive state" in that it is, in principle, temporary.³ In addition to this similarity between target states and

I assume that the subject of a passive sentence and the subject of an unaccusative verb have different thematic roles, and this might contribute to the empirical differences in question. However, since this topic would take us too far afield, we will not discuss it formally. We will simply restrict the empirical coverage of this article to active sentences with a subject that denotes a singular entity.

³ We can substantiate this intuition by relying on the standard semantics of the English progressive. For example, (i) is true at a time t such that there is a more inclusive time t' that surrounds t and (ii) is true at t' . Since (ii) is an event and the time of this event is finite, the

“progressive states,” there is an additional similarity in that in Japanese both readings can be indicated by the *-te iru* form and the temporal location of the “state” can be indicated by a temporal adverb like *ima* ‘now’. This is shown in (1a-c). The fact that they all contain the adverb *ima* ‘now’ shows that some relevant situation holds at the utterance time in all of them.

Having identified the key data and a formal distinction between target and resultant states, I shall now present the data that is not the target of my formal proposal: resultant state interpretations of sentences in the *-te iru* form. Abstract result states (= resultant states (Parsons 1990) or experience (Fujii 1966)) are possible interpretations with any Japanese verb in the *-te iru* form. This interpretation does not require a co-occurring temporal adverbial. However, only those adverbials indicating past intervals (e.g., ‘last year’) or past events (e.g., ‘several times’) would be acceptable. Resultant state interpretations (= experience) are exemplified by (3a-c).

- (3) a. Hanako-wa kyonen kyougikai-de hasit-te iru.
 Hanako-TOP last.year competition-at run-TEIRU.PRES
 ‘Hanako ran at the track and field competition. (She now has that experience.)’
- b. Hanako-wa kyonen ie-o ikken tate-te iru.
 Hanako-TOP last.year house-ACC one.classifier build-TEIRU.PRES
 ‘Hanako built a house last year. (She now has that experience.)’

maximal interval throughout which (i) is true is also a finite interval.

- (i) Hanako-ga ima hasit-te iru.
 Hanako-nom now run-te iru.PRES
 ‘Hanako is running right now.’
- (ii) Hanako-ga hasiru (tenseless and aspectless)
 Hanako-nom run
 ‘Hanako runs’

c. Kono kuruma-wa mae-ni ikkai koware-te iru.

this car -TOP before-at once break.down-TEIRU.PRES

‘This car broke down once before. (So it is unreliable/I would not use it.)’

Resultant states are permanent by definition once acquired. I follow the formal analysis of this reading presented in Ogihara (1998) in essence and will not discuss it further in this article for reasons of space and scope. According to Ogihara, *-te iru* is analyzed into *-te* and *-iru*, and *-te* bears the feature [+perfect] or [-perfect]. He then explains that *-te iru* sentences yield resultant state readings when *-te* bears the [+perfect] feature. By contrast, progressive and target state readings in (1a-c) are available when *-te* bears the feature [-perfect]. Intuitively, resultant state readings of *-te iru* involve claims about past events and implicate abstract consequences that hold now. By contrast, target state and progressive readings of *-te iru* are generally based on observations about what holds now and suggest that a relevant event takes place at a non-future time. Ogihara’s (1998) proposal makes this fundamental distinction formally explicit. Given this proposal, we can easily set aside resultant state readings as qualitatively different from progressive and target state interpretations. Having thus made clear the empirical coverage of this article, I now turn to a brief discussion of the English data.

According to the truth conditions of the English progressive proposed by Dowty (1979), a progressive sentence in the present tense is true at the utterance time if and only if this time is enclosed within a more extended interval at which the same sentence with the tense and aspect markers stripped off is true in a set of relevant possible worlds called “inertia worlds.” Subsequent proposals such as Landman (1992) and Portner (1998) hold a similar view in that the time in question is in the middle of a complete event that is realized in some “accessible worlds”, though the details of the truth conditions differ from Dowty’s. If we try to extend the same type of semantic account to the Japanese *-te iru* case, the requirement is satisfied in (1a, b) because in each example, Hanako’s action started before the utterance time and is being extended into the future. By contrast, the target state reading of (1c) cannot be accounted for in the same way,

because Hanako's falling belongs wholly to the past and clearly does not contain any utterance situation; what belongs to the utterance time is its target state. Thus, the Japanese morpheme *-te iru* has a property that cannot be explained by previous analyses of the English progressive.

Obviously, one could say simply that *-te iru* is ambiguous between its progressive interpretation and its target state interpretation, and deal with the target state interpretation separately. However, that seems unsatisfactory given that they both seem to talk about "current state of affairs" and can go with time adverbials indicating the utterance time, as shown in (1a–c). Even if they were distinct readings, it would be unclear how the target state interpretation of (1c) can receive a compositional semantic account.

We should note here that the English progressive form (*be V-ing*) also has a wide range of possible meanings, even though it cannot be used as a result state marker. Let us first look at the examples (4a, b).

- (4) a. Hanako is running now.
b. Hanako is falling over now.

(4a) clearly receives a progressive interpretation: Hanako's running is ongoing. (4b) can mean either that Hanako's falling over is ongoing (as if it is happening in slow motion), or that Hanako's falling over is just about to occur. The latter is a futurate progressive reading discussed by Dowty (1979), Copley (2002, 2008), etc. A futurate reading of a progressive sentence can be overtly marked as in (5).

- (5) We are buying a house next year.

A major point here is that regardless of how the semantic variability of the *be V-ing* form is captured, it is clear that the range of its interpretations does not include the reading that the Japanese example (1c) receives.

What is striking about the above data is that the “progressive forms” in Japanese and English appear to be mirror images of each other. The Japanese *-te iru* form has the ability to “push” a relevant event to the past, whereas the English *be V-ing* form is capable of placing a relevant event entirely in the future of the utterance time. This is definitely a theoretically interesting difference between the two languages, and an account that does justice to both the Japanese and English data is called for. This article proposes an account based on the fact that the interpretation of *-te iru* sentences depends on the thematic role of the subject. No formal accounts in the past, including Ogihara (1998), Igarashi and Gunji (1998), and Nishiyama (2006), refer to this characteristic of *-te iru* sentences, and thus this article is a step in the right direction.

The proposal is generally based on Portner’s (1998) proposal for the English progressive, and it has been extended to cover the Japanese *-te iru* examples. The innovation of my proposal is that the selection of the relevant accessible worlds is made in such a way that they could differ from the actual world both in the past and in the future. I argue that this approach is needed not just for the *-te iru* form in Japanese but *also* for the English progressive. This proposal counters the standard semantic analyses of the English progressive which are based on a set of worlds that are identical to the actual world regarding the past but can differ from the actual one regarding the future (Dowty 1979; Landman 1992; etc.)⁴

This article is organized as follows: Section 2 discusses the semantic interpretation and formal analyses of English progressive achievements.⁵ Section 3 summarizes Ogihara’s (1998) account of the Japanese and English achievements in their “progressive” forms, and Section 4

⁴ Portner’s (1998) account arguably allows a relevant set of “accessible worlds” to differ from each other not just in the future but also in the past. This point will be discussed in more detail in Sections 5 and 6.

⁵ Throughout the rest of the article, I assume the standard Aktionsarten types (state, activity, achievement, and accomplishment) originally proposed by Vendler (1967).

presents some crucial problems with this proposal. Section 5 discusses my proposal in an informal fashion, and Section 6 shows how it is formalized. Section 7 concludes this article.

2. The English Progressive and Achievements

I shall briefly summarize the data and arguments that led to Bennett and Partee's (1972) classical proposal for the progressive: a progressive sentence in English is true at the utterance time if and only if there is an interval I that surrounds the utterance time such that a sentence without the progressive is true at I . As we will see later, Dowty's (1979) analysis of futurate progressives is important for our purposes. Not many semanticists have taken up the topic of futurate progressives since then, but one important exception is Copley's work (2002, 2008).

We will start our discussion with a progressive sentence containing an activity predicate such as *swim* as in (6).

(6) Hanako is swimming now.

It seems adequate to assume that sentences like (6) are true iff there is an interval t that surrounds the utterance time such that Hanako's swimming obtains throughout t . In other words, when one utters a sentence like (6), one asserts that she is "in the middle" of a swimming activity.

However, going beyond activity sentences, we find cases in which this type of semantic analysis is inadequate. They include examples that involve the imperfective paradox discussed by Dowty (1979). (7) exemplifies a case in which a progressive sentence can be true at a time not included within a time interval at which a relevant tenseless, aspectless sentence is true in the actual world. In other words, (7) does not entail *Austin crossed the street*.

(7) Austin was crossing the street when he was hit by a car.

How do we know that Austin was actually crossing the street when there was no

complete crossing to support this assertion? Dowty's (1979) proposal asks us to examine a set of possible worlds (called inertia worlds) which are exactly like the actual one until the utterance time and in which the future course of events after this time develops in ways most compatible with the past course of events. According to Dowty, there is an interval I that encompasses the utterance time such that in each inertia world, we can find a complete event of Austin's crossing the street at I . (8) paraphrases Dowty's formal account (1979: 149) in a slightly simplified form.

- (8) **Prog ϕ** (where ϕ is a tenseless aspectless sentence) is true iff there is an interval I such that in all worlds w (called "inertia worlds") that are exactly the same as the actual world up to the time in question and the future course of events develops in ways that are most compatible with the past course of events, ϕ is true at I in w .

Put informally, this solution to the "imperfective paradox" says that the truth of a progressive sentence indicates that the event in question would have been completed had there been no interruption (or any other unexpected event that interfered with the ongoing event). Thus, the idea that a progressive sentence indicates an "internal view" (i.e., being surrounded by a time at which the same sentence without the progressive form is true) is preserved thanks to the notion of inertia worlds. Dowty's modal semantic analysis of the progressive is supported indirectly by the fact that when (7) is true, the counterfactual sentence (9), which is based on (7), is also true (assuming that there would have been no additional interruptions).

- (9) Austin would have crossed the street had he not been hit by the car.

A counterfactual like (9) clearly requires a modal analysis, and the semantic relations between (7) and (9) suggest strongly that (7) should also receive a modal semantic analysis.

Dowty's (1979) account based on inertia worlds takes care of cases involving incomplete accomplishment events.⁶ However, there is a separate set of examples that cannot be accounted for by Dowty's proposal or any subsequent proposals based on Dowty's original idea. The problem concerns progressive achievements such as (10a, b) and is discussed extensively by Rothstein (2004).⁷ Consider situations in which (10a) or (10b) is intuitively true.

- (10) a. The train is arriving at the station.
b. The tree is falling over.

(10a) means that the arrival of the train is imminent; it will happen in the near future. Given our discussion up to now, it is natural to hope that there is an interval *I* containing the utterance time such that *the train arrive at the station* (tenseless sentence skeleton) is true at *I* (either in the actual world or in the inertia worlds in the sense of Dowty). However, when (10a) is intuitively true, there seems to be no such interval either in the actual world or in any inertia world.

At-adverbials can be a diagnostic here. In general, *at*-adverbials are understood to indicate instants or short intervals at which the (tenseless) sentence in question is true. Consider (11a, b) in conjunction with (10a, b).

⁶ Many authors (Vlach 1981; Landman 1992; Parsons 1990; to name a few) provide improvements over Dowty's original proposal. For example, when there was another car ready to hit Austin when the first car missed him, (9) does not seem to be true, and we need a more complex semantic account that accommodates scenarios like this. However, the point made by Dowty's proposal, which is that the progressive requires a modal semantics, is valid to this day, and that is all that matters for the purposes of this article.

⁷ Rothstein's proposal is discussed separately below.

- (11) a. The train arrived at the station at 2 p.m. yesterday.
b. The tree fell over at 11 p.m. last night.

Suppose that (10a) was uttered at 1:57 p.m. yesterday, and the train actually entered the station and stopped there three minutes later, namely at 2 p.m. This event can be truthfully described by (11a) uttered now. This is taken to indicate that the sentence skeleton *The train arrive at the station* is true at 2 p.m. and the event in question does not extend into the past of 2 p.m. This contradicts the intuition that (10a) uttered at 1:57 p.m. yesterday is true in this scenario. If so, the truth of (10a) cannot be explained in terms of inclusion within a time at which *the train arrive at the station* (a tenseless aspectless sentence) is true either in the actual world or some possible worlds that are reasonably similar to the actual one (such as inertia worlds in the sense of Dowty). A similar reasoning applies to the pair of sentences (10b) and (11b).

Dowty's (1979) original proposal is meant to cover cases in which the progressive describes an event that is ongoing at the utterance time but may not culminate in the actual world. Since progressives like (10a, b) describe events that have not yet started, Dowty's original account does not take care of such cases. One could perhaps argue that what intuitively constitutes "one achievement event" is described by a sentence that is true at multiple times. For example, given the scenario about a train arriving at the station described above, *The train arrive at the station* (a sentence skeleton) would be true at 2 p.m. yesterday, and also at an interval starting earlier than the utterance time of (10a) and ending at 2 p.m. (e.g., $\{t \mid 1:50 \text{ p.m.} \leq t \leq 2 \text{ p.m.}\}$). This proposal allows us to say that the truth of (10a) is verified by a more inclusive interval at which the corresponding tenseless sentence is true. Ogihara (1998) adopts this idea to describe the behavior of achievements in English. This line of thought unfortunately leads to a major lexical semantic difference between English and Japanese achievements, as we shall see below. In the next section, we will examine in detail the behavior of Japanese achievements in the *-te iru* form.

An alternative account that is suggested in the literature (de Swart 1998, 2000; Rothstein

2004) calls for an aspect shift rule that converts achievements into accomplishments under coercion. If an achievement like *arrive* is turned into an accomplishment that takes time, then it is technically possible for Dowty's (1979) analysis of the progressive (or any of the more elaborate extensions) to cover examples like (9a, b). However, this comes with a cost. We have to posit aspect shift rules that are language specific: deriving an accomplishment from an achievement is possible in English but not in Japanese. We shall also see that adverb facts are not necessarily in agreement with this analysis. This point will be discussed in more detail in Section 4.

3. Japanese Achievements in the *-te iru* Form

We now turn to the Japanese case. It is clear that the problem that we are now facing stems from the fact that *-te iru* is capable of conveying two “distinct” interpretations: progressive and target state (Parsons 1990) interpretations. Consider the examples (12) and (13).

(12) **Process/Accomplishment + *teiru*: progressive**

Mary-ga ima asokode arui-te iru.

Mary-NOM now over there walk-TE IRU.PRES

‘She is walking.’

(13) **Achievement + *-te iru*: target state (Parsons 1990)**

Mary-ga ima asoko-ni taore-te iru.

Mary-NOM now over.there-at fall-TE IRU.PRES

‘Mary is lying over there (after having fallen over).’

(12) shows that an activity sentence in the *-te iru* form yields a progressive interpretation (just like its English counterpart). (13) is an achievement sentence and can only receive a target state interpretation. As mentioned in Section 1, the crucial difference between them is the thematic role of each subject. (12) contains an unergative verb *aruku* ‘walk’ and has an agentive subject,

while (13) contains an unaccusative verb *taore* ‘fall (over)’ and has a theme subject. Note that (12) and (13) are accompanied by the deictic temporal adverbial *ima* ‘now’, which is taken to indicate that the asserted proposition is true at the utterance time.⁸ The English progressive sentence that parallels (13) can only produce ongoing process or futurate interpretations.

Ogihara (1998) proposes that the temporal extension of an achievement verb like the Japanese verb *taoreru* ‘fall over’ consists of the entire duration of its target state, which will be rejected in the proposal defended in this article. Ogihara’s account defines the lexical meaning of *aruku* ‘walk’ and *taoreru* ‘fall over’ as in (14).

- (14) $\llbracket \text{aruku ‘walk’} \rrbracket = \lambda x . \lambda t . x \text{ engages in the act of walking at } t$
 $\llbracket \text{taoreru ‘fall over’} \rrbracket = \lambda x . \lambda t . t \text{ is a maximal interval throughout which } x \text{ is lying flat at } t$
 $\text{on the ground, floor, and there is an interval } t' \text{ that immediately precedes } t \text{ and } x \text{ falls at } t'.^9$

The key to understanding (14) is that the lexical semantics of *aruku* ‘walk’ is the standard semantics of an activity verb (like that of *walk* in English), but the semantics of *taoreru* ‘fall over’ defined here refers to the temporal trace of the target state, not that of the falling over event unlike its English counterpart *fall over*. This means that we find a major difference in lexical

⁸ If the tense morpheme in (12) and (13) is changed from present to past, the “reference time/topic time” in the sense of Reichenbach (1947) or Klein (1994) is also changed to a past time. The parallel between (12) and (13) presents itself in the same manner in that case as well. The only difference is that the time under discussion is a past “reference time” rather than the utterance time.

⁹ In order for any interval t to be a maximal time with some property P , there cannot be an interval t_1 such that t_1 has the same property P and t is a proper subset of t_1 .

semantics between English and Japanese achievements.¹⁰ Taken literally, this means that *fall over* and *taoreru* ‘fall over’ are not synonymous with each other. This proposal will be presented here briefly along with its analysis of the *-te iru* form and temporal adverbials. The time of the context (i.e., the utterance time) is indicated by the symbol c_T .

(15) **Lexicon**

$$\llbracket \text{-te iru} \rrbracket^c = \lambda f_{\langle i, t \rangle} . \lambda t . \exists t_1. f(t_1) = 1 \wedge t \subseteq t_1$$

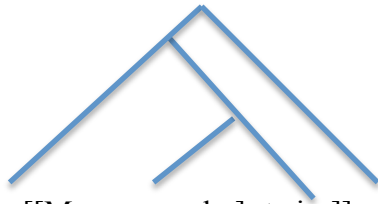
$$\llbracket \text{ima ‘now’} \rrbracket^c = \lambda f_{\langle i, t \rangle} . \lambda t . t \subseteq \text{now} \wedge f(t) = 1$$

$$\llbracket \text{PRES} \rrbracket^c = \lambda f_{\langle i, t \rangle} . f$$

Truth definition: A sentence S is true at c_T iff $\llbracket S \rrbracket^c (c_T) = 1$

Compositional Semantics

(16) **Progressive**



$\llbracket \text{ima} \llbracket \text{Mary-ga aruku} \rrbracket \text{-te iru} \rrbracket \text{PRES}$

1. $\llbracket \text{Mary-ga aruku ‘Mary walk’} \rrbracket^c = \lambda t . \text{Mary walks at } t$

2. $\llbracket \text{Mary-ga arui-te iru ‘Mary is walking’} \rrbracket^c =$

$$\lambda f_{\langle i, t \rangle} . \lambda t . \exists t_1. f(t_1) = 1 \wedge t \subseteq t_1 (\lambda t . \text{Mary walks at } t)$$

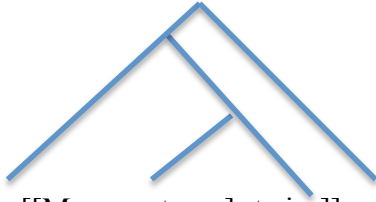
$$\lambda t . \exists t_1. \text{Mary walks at } t_1 \wedge t \subseteq t_1$$

3. $\llbracket \text{ima Mary-ga arui-te iru PRES ‘Mary is walking now’} \rrbracket^c = 1$ iff

¹⁰ $\llbracket \text{fall over} \rrbracket = \lambda x . \lambda t . x$ falls over at t , where t is immediately preceded by an interval of x ’s being upright and t is immediately followed by x ’s being on the ground.

$\exists t_1 . c_T \subseteq \text{now} \ \& \ \text{Mary walks at } t_1 \ \& \ c_T \subseteq t_1 \text{ (via the truth definition)}$

(17) **Target State**



[[ima [[Mary-ga taore] -te iru]] PRES]

1. $\llbracket \text{Mary-ga taore 'Mary falls over'} \rrbracket^c = \lambda t . \text{Mary is lying flat at } t \text{ on the ground}$
2. $\llbracket \text{Mary-ga taore -te iru 'Mary is lying on the ground'} \rrbracket^c = \lambda t . \exists t_1 . t_1 \text{ is a maximal interval throughout which Mary is lying flat on the ground and Mary falls over right before } t_1 \wedge t \subseteq t_1$
3. $\llbracket \text{ima Mary-ga taore -te iru 'Mary is lying on the ground'} \rrbracket^c = 1 \text{ iff } \exists t_1 . t_1 \text{ is a maximal interval throughout which Mary is lying flat on the ground and Mary falls over right before } t_1 \wedge c_T \subseteq t_1 \text{ (via the truth definition)}$

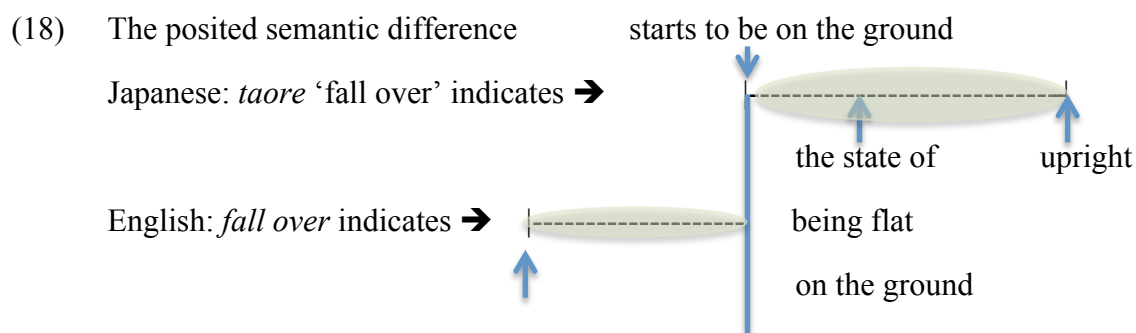
(16) says that Mary’s walking is ongoing, while (17) says that Mary’s being on the ground is “ongoing” (is taking place now), which follows an event of Mary’s falling over. The former corresponds to the progressive reading of (12); the latter to the target state reading of (13). The account features “one constant interpretation” of the *-te iru* form, which is desirable given that these two readings are indicated by one and the same morphological form. The price we pay is the lexical semantic difference between English and Japanese achievement verbs. This issue will be discussed in detail in Section 4.

As shown in Section 2, an alternative way of accounting for the semantics of Japanese achievements in the *-te iru* form is to appeal to an aspect shift rule as proposed by de Swart (1998, 2000) and Rothstein (2004). However, this possibility leads to some unwanted complications as does the above proposal made by Ogihara (1998). These points will be elaborated on in Section 4.

4. Problems

Let us now return to our main concern in this article. If the lexical semantics of a Japanese achievement refers to an instantaneous event and its target state (in the sense of Parsons (1990)) as proposed in Ogihara (1998), this entails an important semantic difference between English and Japanese regarding achievements. This proposal allows the *-te iru* form to have a constant meaning, which is a clear advantage.¹¹ However, it has a potential problem in that it posits a cross-linguistic difference where no such difference is clearly felt or expected. The diagnostics to be discussed in this section reveal that achievements in Japanese and English are alike when they are not in the *te iru* or *be V-ing* form, making reference to events. This is a problem for the view that there is a lexical semantic difference between English and Japanese achievements.

According to Ogihara (1998), both English and Japanese achievements describe “changes of states” but differ with respect to additional meanings that they accompany. Japanese achievements combine a change of state with a target state segment that comes right after the change, whereas English achievements combine the change of the state with its preparatory stage that immediately precedes it. This is indicated informally as in (18).



¹¹ Strictly speaking, Ogihara’s (1998) proposal only posits a constant meaning of the auxiliary *-iru*. The connective *-te* is ambiguous and yields two types of interpretation (current-time-oriented vs. perfect).

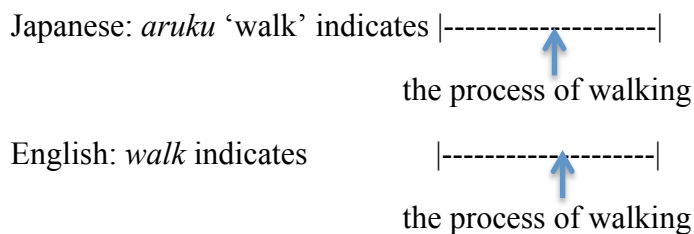
upright

The idea given in (18) is formalized as in (19). This clearly shows that the two verbs in question have different interpretations. The lexical semantics of *taoreru* ‘fall over’ given here repeats what was presented in (14).

- (19) $\llbracket \text{fall over} \rrbracket = \lambda x . \lambda t . x$ undergoes a change from being upright to being flat on the ground throughout t in w , and the final moment of t is the first moment when x is flat on the ground.
- $\llbracket \text{taoreru ‘fall over’} \rrbracket = \lambda x . \lambda t . t$ is a maximal interval throughout which x is lying flat at t on the ground and there is an interval t' that immediately precedes t and x falls at t' .

Regarding activity and accomplishment verbs, this proposal does not need to posit a lexical semantic difference between Japanese and English. For example, *aruku* ‘walk’ and *walk* have the same lexical semantic information. This is indicated graphically in (20). The formal version was presented above in (14).

- (20) Activities/Accomplishments [No difference between English and Japanese]



Given this lexical semantics, we can assume that both *V-te iru* and *be V-ing* indicate being in the middle of an interval at which the sentence skeleton with no tense or aspect morpheme is true.

Since this account posits unexpected cross-linguistic lexical semantic differences in English and Japanese achievements, we should check it against some diagnostic tests. First, we

compare the semantic interpretations of the simple past tense of the relevant verbs to see if they exhibit any semantic differences. The answer is negative, as shown in (21a, b).

- (21) a. Hanako-ga taore-ta.
Hanako-NOM fall.over-PAST
'Hanako fell over.'
b. Hanako fell over.

(21a, b) both indicate the existence of a past event that involves a change of state: Hanako was standing and then her state changed to that of lying flat on the ground (and this change was caused by some accident or illness, and not intentional). Nominalized verbs as used in (22a, b) do not reveal any semantic difference either.

- (22) a. Hanako-wa taoreru koto-o osore-te i-ta.
Hanako-TOP fall.over NOMINALIZER-ACC be.afraid-TEIRU.PAST
'Hanako was afraid of falling over.'
b. Hanako was afraid of falling over.

The nominalized expression *taoreru koto* 'falling over' in Japanese and the gerundive expression *falling over* in English seem to make reference to the change of state and nothing else. We do not perceive any semantic difference between them.

If Japanese achievements are indeed designed to talk about target states, they should be similar to stative verbs, except that the former contain information about the inception of a relevant state. One could then hypothesize that a lexical stative sentence with an adverbial that completely specifies the duration of the entire state is equivalent to what an achievement in Japanese is purported to indicate. Given this hypothesis, consider (23a, b). Crucially, the time interval indicated by the adverbial corresponds to the exact duration of the state in question.

- (23) a. Hanako-wa iti-zi kara ni-zi made dake heya-ni i-ta.
 Hanako-TOP one-o'clock from two-o'clock until only room-at be-PAST
 'Hanako was in the room only from 1 p.m. till 2 p.m.'
- b. Hanako was in her room from exactly 1 p.m. till 2 p.m.

Since the adverbial *from exactly 1 p.m. till 2 p.m.* is an expression that indicates the beginning and the end of a state, this type of expression is expected to be able to indicate the entire duration of the target state associated with the Japanese verb *taoreru* 'fall over'. However, this is not possible, as shown in (24).

- (24) #Hanako-wa iti-zi kara iti-zi zyup-pun-made dake yuka-ni taore-ta.
 Hanako-TOP one-o'clock from one ten until only floor-on fall.over-PAST
 [Intended] 'Hanako was lying on the floor (after falling over) only from 1 to 1:10.'

The fact that the temporal adverbial *iti-zi kara iti-zi zyup-pun-made dake* 'only from 1 to 1:10' cannot be used to indicate the entire duration of the target state in (24) is puzzling if the Japanese verb *taoreru* 'fall over' makes reference to the maximal duration of the target state (including the change of state at the beginning of this period) and makes no reference to the preparatory stage. The native speaker's intuition is that (24) is anomalous in exactly the same way that the English sentence (25) is.

- (25) #Hanako fell over only from 1 till 1:10.
 [Intended] 'Hanako fell over and was lying exactly from 1 till 1:10.'

Thus, the adverb facts do not support the hypothesis that Japanese and English achievements are semantically different.

In fact, Japanese lexical statives can even occur in the simple present tense with a durative adverbial that indicates a definite interval such as *iti-zi kara iti-zi zyup-pun-made* ‘from 1 till 1:10’ such that the utterance time is in the middle of this interval. This is shown in (26a). The corresponding English sentence (26b), which is a literal translation of (26a), is anomalous and is marginally acceptable at best.

- (26) a. Hanako-wa iti-zi kara iti-zi zyup-pun-made heya-ni iru.
 Hanako-TOP one-o'clock from one-o'clock ten-minute-until room-at be.PRES
 ‘Hanako has been in her room since 1 o'clock and will continue to be there until 1:10.’ (Assume that it is 1:05 right now.)
 [Literal translation] ‘Hanako is in her room from 1 to 1:10.’
- b. ?Hanako is in her room from 1 till 1:10. (Assume that it is 1:05 right now.)

A Japanese sentence with an achievement verb and the same type of temporal adverbial that indicates a definite interval cannot occur in the simple present assuming the same scenario: the interval indicated by the adverbial contains the utterance time in the middle, as shown in (27).

- (27) #Kono ki-wa iti-zi kara ni-zi -made dooro-ni taore-ru.
 This tree-TOP one-o'clock from two-o'clock -until street-on fall.over.PRES
 [Intended] ‘This tree fell over at 1 o'clock and will continue to be lying on the street until 2:00.’ (Assume that it is 1:30 right now and the tree will be picked up at 2:00.)

The above data suggests that Japanese achievement verbs themselves do not make reference to target states when they occur without the morpheme *-te iru*.

Similarly, the fact that manner adverbials such as *yukkuri* ‘slowly’ and *slowly* can occur in (28a, b) shows that falling can be treated like a protracted event in both English and Japanese.

- (28) a. The tree fell over slowly.
b. Sono ki-wa yukkuri taore-ta.
That tree-TOP slowly fall.over-PAST
'The tree fell over slowly.'

The data considered above suggests that the two verbal expressions in question, *taoreru* 'fall over' in Japanese and *fall over* in English, treat the event being described the same way and the source of the difference between English progressive achievement and Japanese *-te iru* achievement sentences should be sought elsewhere.

The above discussion suggests that the semantic properties of achievement verbs in English and Japanese are essentially alike, and it is not reasonable to posit lexical semantic differences between them in the manner proposed by Ogihara (1998). Given this finding, some might suggest that we are better off adopting the existing proposals about aspect shift that may be coerced under certain conditions (Moens and Steedman 1998; de Swart 1998, 2000; Rothstein 2004).¹² This would mean that English achievements can be converted to accomplishments, and Japanese achievements can be turned into forms that indicate their target states. Since aspect shift rules have already been proposed in the literature, we could say that we get what we want without positing anything new. I contend, however, that the data under discussion is better served by some specific proposals about the English progressive and the Japanese *-te iru* construction, rather than by the aspect shift rules.

I shall motivate my own proposal in the next two sections. Before closing this section, I summarize the reasons why we will not adopt aspect shift rules. First, adopting different aspect shift rules means that English and Japanese achievements must be dealt with differently and as such does not explain the difference in behavior between English and Japanese achievements.

¹² This possibility was suggested by one of the reviewers.

Second, this would mean that Japanese needs a “special aspectual type” consisting of a change of state combined with the duration of the target state associated with this change of state. This “new aspectual type” does not fit any of the four Vendlerian aspectual classes. This is a problem for Ogihara’s (1998) proposal, too. One could perhaps defend this analysis by saying that the derived verb is an activity. This account is problematic, however, as we saw in the anomaly of (24). Note that (29a) (= (24)) is anomalous when ‘from one till 1:10’ occurs, whereas a true activity can occur with the same adverbial as shown in (29b).

- (29) a. #Hanako-wa iti-zi kara iti-zi zyup-pun-made dake yuka-ni taore-ta.
 Hanako-TOP one-o’clock from one ten until only floor-on fall.over-PAST
 [Intended] ‘Hanako was lying on the floor (after falling over) only from 1 to 1:10.’
- b. Hanako-wa iti-zi kara iti-zi zyup-pun-made dake hasit-ta.
 Hanako-TOP one-o’clock from one ten until only run-PAST
 ‘Hanako ran only from 1 to 1:10.’

In this way, an analysis based on aspect shift rules suffers from the same problems that Ogihara’s analysis does. Thus, I will seek a different solution.

In Sections 5 and 6, I shall develop and defend a novel analysis of *-te iru* that interacts with the semantics of subject thematic roles. This proposal has an added advantage of being able to explain the semantics of the English progressive, including progressive achievements and “futate progressives.”

5. Toward a Solution

A key to a satisfactory account of the data in Japanese (as opposed to English) is paying attention to subject thematic roles. As mentioned in Section 1, the semantics of the *-te iru* construction in Japanese is sensitive to the thematic role of the subject (Okuda 1978; Kudo 1995; Shirai 2000). Specifically, when the subject of an active sentence form is an agent, using the *-te iru* form in

this sentence generally conveys a progressive interpretation; when the subject of an active sentence form is a theme/undergoer, the sentence in the *-te iru* form indicates the existence of a current target state produced by the event denoted by the containing verb. By contrast, the English progressive is not sensitive to subject thematic roles.

In what follows, I will show that the thematic role differences do not translate into differences in temporal duration. Let us look at the examples in English and Japanese in (30), which involve verbs that are considered to be translational equivalents.

- (30) a. Mary is closing the door.
 b. Mary-ga doa-o sime -te iru.
 Mary-NOM door-ACC close (transitive verb)-TEIRU.PRES
 ‘Mary is closing the door.’
 c. The door is closing.
 d. # Doa-ga simat -te iru.
 door-NOM close (intransitive verb)-TEIRU.PRES
 [It cannot mean ‘The door is closing.’] It can only mean ‘The door is closed.’

Let us think of a situation where Mary closed the main door of a house. Since it was a huge and heavy door, it took Mary more than 30 seconds to completely close it. Assume that Mary closed the door from inside the house in such a way that she was not visible from the outside. The speakers of (30a) and (30b) are inside the house and were able to see what Mary was doing. This makes it natural for them to use an agentive transitive verb to describe what was happening as in (30a, b). They are both felicitous and can describe the situation in question when the door was still in motion, as expected. Suppose that the same scene is also described by a Japanese speaker and an English speaker from outside the house who could not see the agent, i.e., Mary. Since the agent is not visible, it seems natural to use an unaccusative (non-agentive intransitive) verb *close* or *simaru* ‘close (intransitive)’ to describe the event in progress. The English sentence (30c) is

indeed felicitous and describes an ongoing event. By contrast, the Japanese sentence (30d) is not felicitous when the door is still in motion; it can only describe the door's being completely closed and is no longer in motion. Since the sentences (30a-d) all concern the same event, the duration of the event is the same and is long enough to make progressive interpretations pragmatically plausible. The crucial difference between (30b) and (30d) is that (30b) contains an agentive subject whereas (30d) has a theme (or undergoer) as its subject.¹³ We can thus conclude that the availability of progressive interpretations with the *V-te iru* form depends on the thematic role of the subject DP, rather than the temporal duration of the event in question. That is, when the subject denotes an agentive entity, an ongoing process reading is available, but when the subject denotes a theme/undergoer, a target state interpretation is forced upon us. By contrast, the semantic interpretation of the English progressive is not sensitive to the thematic role of the subject. This is a clear difference between Japanese and English regarding their “progressive” forms.

To clarify the point being made, let me add a comment on (30c, d). The scenario is such that the speaker of (30c) or (30d) cannot see Mary and this encourages the speaker to use an unaccusative verb (*simaru* ‘close’ intransitive) rather than an agentive verb (*simeru* ‘close’ transitive). Note that the key point being made concerns the semantic differences between the sentences (30b) and (30d), and whether or not the speaker can see the agent has no bearing on the semantics of (30d); even if the speaker of (30d) can see Mary, this sentence cannot convey an ongoing process interpretation, and can only indicate a target state of the event of the door's

¹³ One could perhaps argue that Japanese achievements only deal with changes of states and ignore the “process portion” that leads to the change of state. However, this account does not explain why the English and Japanese achievements behave differently. We then need to provide its explanation in terms of thematic roles of the subject DP. So we ultimately need this perspective anyway.

closing, i.e., the door's state of being completely closed.

At this point, we turn our discussion to the so-called futurate progressive in English. This term refers to progressive sentences that clearly indicate future events, not currently ongoing events.¹⁴ Dowty (1979) discusses examples like (31a, b).

- (31) a. John is leaving town tomorrow.
b. Tomorrow, the Yankees are playing the Red Sox.

The temporal adverbial *tomorrow* in (31a, b) indicates the time interval within which each event takes place. A future-oriented adverbial like *tomorrow* is an indicator of a futurate progressive. Clearly, the events in question are not ongoing at the utterance time; they are “future events” that are currently planned. Given appropriate scenarios, such English progressive sentences are acceptable and can be true. Dowty (1979: 158) proposes the analysis of *tomorrow ϕ* given in (32).

- (32) [tomorrow ϕ] is true at I iff (1) ϕ is true (in all histories containing I) at some interval I' such that I' is included within the day following the day that includes I , and (2) the truth of ϕ at I' is planned or predetermined by facts or events true at some time $t \leq I$.

Adopting Dowty's analysis is like embedding a sentence skeleton with a future adverb (like *tomorrow*) as the complement of a covert predicate that means ‘plan’ or ‘be predetermined that’,

¹⁴ Copley (2008) makes precise the concept of planning that is involved in futurate interpretations of some progressive sentences in English. This becomes relevant for my proposal to be presented regarding how to determine a modal base and an ordering source in specific utterance contexts.

which in turn is in the scope of the progressive aspect morpheme in the present tense: ‘what is going on is John’s plan of leaving tomorrow’ in the case of (31a). Assuming that this is the right approach, any event that is planned can be described with a progressive sentence. (32) does not say that ϕ must be in the (present) progressive form and predicts that [tomorrow ϕ] for any ϕ should be able to occur in the simple present tense as well as in the present progressive form. Unfortunately, there are cases where the futurate progressive variant is acceptable but the simple present variant is only marginally acceptable. Consider (33a, b).

- (33) a. We are visiting New York next week.
b. ? We visit New York next week.

This may mean that Dowty’s proposal warrants a more careful examination. Regardless, it is clear that the English progressive can indicate future events in addition to ongoing ones. This is a fact that is not discussed frequently in the literature. However, I believe that it is a very significant characteristic of the English progressive, especially in comparison with the behavior of the Japanese morpheme *-te iru*.

Dowty (1979) considers the possibility that a single meaning of the progressive can deal with both ongoing process and futurate interpretations. However, he concludes that futurate progressives are semantically different from regular (ongoing process) progressives. He cites Prince’s (1973) example in (34), which is ambiguous between an ongoing process reading and a futurate reading. The former involves an atelic sense of going to Radcliffe (i.e., be a registered student and attend classes) and entails that Lee did go to Radcliffe. The latter involves a telic sense of going to Radcliffe (i.e., joining the institution) and does not entail that Lee attended Radcliffe; in fact, it conversationally implicates that she did not. These two readings, therefore, are semantically distinct.

- (34) Lee was going to Radcliffe until she was accepted by Parsons.

This is a significant observation. However, I argue that this fact does not endanger the claim that the *be V-ing* form has one constant meaning. The key idea is that there is a current state or situation that constitutes a plan such that if this plan is carried out successfully without encountering any interruptions, there will be a future event conveyed by the sentence skeleton in question. If a relevant event is ongoing, we do not rely on the existence of a plan or predetermination to license a progressive sentence; we have access to a portion of a concrete event that licenses the progressive sentence. If a relevant event is wholly in the future, we can only have access to it through an existing plan or predetermination. In the case of the English progressive, a relevant event can only be located at a non-past time. This is empirically accurate.

In contrast to the English progressive, the Japanese *-te iru* form has a clear non-future orientation in that (i) events described by the main predicate can be placed entirely in the past (when the entire sentence receives a target state interpretation or resultant state interpretation) and (ii) it can never describe events located wholly in the future. McClure (1994) presents an important hypothesis regarding the meaning of *-te iru*, which is that it describes an event that is at least partially located in the past of the utterance time. Nishiyama (2006) has a similar proposal: a subpart of a relevant eventuality precedes the reference time interval (the utterance time when the entire sentence is in the present tense). However, it is not accurate to say that *-te iru* simply places a relevant event at a non-future time. Put more colloquially, ϕ -*te iru* does not mean that ϕ is ongoing right now or ϕ took place in the past. Actual *-te iru* sentences make more specific assertions. As mentioned earlier, a *-te iru* sentence in the present tense makes a claim about the utterance time; an ongoing event or current target state is claimed to occur at the utterance time.¹⁵

¹⁵ A *Journal of Semantics* reviewer asks an important question concerning the fundamental difference between *-te iru* in Japanese and the English progressive regarding their temporal

Let us now turn to some apparent counterexamples to our hypothesis in Japanese. In some restricted circumstances, a *-te iru* sentence with an agentive subject expresses a reading akin to a target state reading, at least to the extent that the relevant event can be located wholly in the past. For example, (35) is acceptable if the speaker observes something, such as the addressee writing a summary of the book, which can be regarded as an aftereffect of a past event of reading the book on the part of the agent. The original example appears in Kindaichi (1950).¹⁶ Kindaichi explains the availability of the “result state” reading by saying that *yomu* ‘read’ is an achievement verb (*shunkan doosi* ‘instantaneous verb’) meaning ‘finish reading (the book)’. I find this explanation less than satisfactory since reading a book clearly takes time; we should seek a better explanation.

- (35) Ima (hon-o) yomi-hazime-ta to omot-ta ra, moo yon-de iru!
 now (book-ACC) read-start-PAST that think-PAST then already read-TEIRU.PRES
 ‘(You) started to read (the book) just now, and you have already finished it.’

I argue that the “result state” reading of (35) under discussion strictly speaking does not refer to a target state in that the state in question is not lexically defined. The interpretation is such that the addressee has a property *P* at the utterance time indicating that under normal circumstances there

orientation. A possible explanation is that English has the perfect as well as the progressive, and the perfect (and the past participle form of each verb) often describes the target state of a past event. So the progressive tends to cover the semantic areas that complement what the perfect covers. By contrast, Japanese has no robust construction that indicates target states of past events. This situation may have allowed the *-te iru* form to expand its temporal coverage. However, this is a speculative and informal explanation based on “semantic coverage”.

¹⁶ This is a short version of the example sentence presented in Kindaichi (1950).

is an event *e* of her reading the book at a non-future time. Since the general restriction on the semantic interpretation of *-te iru* is that the event cannot be located wholly in the future, it can in principle be placed in the past of the utterance time. How this can be done technically will be discussed in our formal presentation of the proposal.

(36) is a similar example, and this question was actually used in a Japanese comedy drama episode on TV.¹⁷

(36) Nande hasit-te ru-n-da?

why run-TEIRU.PRES-GEN-ENDING

[Literal] ‘Why (are they) running?’

[More natural English translation] ‘Why did they run?’

When (36) is uttered, the speaker is looking at the intercom monitor, which shows that the guests are breathing hard. The point of (36) is that the sentence is acceptable because the fact that the guests are out of breath suggests that they have run. What transpired before the utterance of (36) helps to make this an acceptable question. The speaker of (36) met the guests at the local train station and asked them to walk slowly to his apartment. Then he ran back home to prepare for the guests’ arrival. However, the guests arrived shortly thereafter, which alone indicates that they did not follow his request. The background knowledge of the speaker and the current property of the guests jointly indicate strongly that they have run. Given this background information, (36) is a perfectly natural utterance.

The above examples are not instances of resultant state interpretations (Parsons 1990) in that the guests’ current properties indicate the existence of a causing event, not the other way

¹⁷ Episode 2 of *Nigeru wa haji daga yakuni tatsu* ‘Running away is a shame, but useful’ (Autumn 2016), TBS Television, Japan.

around.¹⁸ Meanwhile, the fact that the guests are breathing hard is not a lexically defined target state of their running; the link between their running and their breathing hard is only established pragmatically in the context of utterance. As in the case of (35), I analyze (36) as making a claim based on some state of affairs at the utterance time. The guests (the agents) have a property *P* such that it is reasonable for us to conclude from *P* that their running has taken place.

We can hypothesize that a sentence in the *-te iru* form is true iff the subject entity has a property *P* now such that *P* indicates the existence of an associated event that is located not wholly in the future. Let us now present our preliminary proposal about the semantics of *-te iru* in (37). Here, I will not be precise about the nature of “accessible worlds”. The basic idea is that we restrict our attention to a selected set of possible worlds as in Dowty’s (1979) inertia worlds or in Landman’s (1992) proposal based on “continuation branch” but unlike the standard analyses of the English progressive, the relevant accessible worlds are allowed to differ from the actual one in the past or in the future of the utterance time. This point will be discussed in more

¹⁸ As mentioned earlier, we will not discuss resultant state readings (Parsons 1990) of *-te iru* in this article, which are indicated by the placement of optional past-oriented temporal adverbials such as *kyonen* ‘last year’. The relevant reasoning on the part of the speaker is very different. When (i) is uttered, the speaker must hold independent evidence of the past event and the sentence as a whole suggests the existence of some salient aftereffect (often invisible), not the other way around.

- (i) Jiro-wa kyonen-no reesu-de yuusyoosi-te iru.
Jiro-TOP last.year-GEN race-at win.first.prize-TE IRU.PRES
‘Jiro won the first prize in the race last year, (and he has some salient property associated with this past event).’

detail below. We assume here that a sentence denotes a function of type $\langle w, \langle i, t \rangle \rangle$, where w is a type for worlds and i is the type for time intervals.

(37) The Semantics of *-te iru* [Preliminary Version]

Abbreviations: c_w = context world (the actual world), c_T = context time (the speech time)

$\llbracket \text{DP VP-te iru} \rrbracket^c(c_w)(c_T) = 1$ iff there is a property P the subject entity (i.e., $\llbracket \text{DP} \rrbracket^c$) has in c_w at c_T (= the utterance time) such that in all “accessible worlds” w for c_w at c_T among which $\llbracket \text{DP} \rrbracket^c$ has P in w at c_T , there is a time interval I not later than c_T such that $\llbracket \text{DP VP} \rrbracket^c(w)(I) = 1$.

(37) says that the subject entity has a property P now which leads us to conclude that if nothing unexpected happens regarding the subject’s obtaining or losing the property P , the sentence skeleton of the sentence with no tense or aspect morpheme is true at a time that does not follow the utterance time. This will do for a preliminary proposal. What (37) represents is an intensional analysis of *-te iru* that enables us to account for the progressive and target state interpretations simultaneously. The remaining requirement is to distinguish agentive subject cases from theme subject cases. We need to encode the idea that a *-te iru* sentence with an agentive subject (entity) can locate a relevant event at a non-future time (i.e., resulting in a progressive reading in most cases), but if a *-te iru* sentence in question contains a theme subject, a relevant event must be located at a past time. For example, (30d) cannot indicate that the door is being closed; it can only indicate that the door is now closed, which in turn requires that the event of the door’s closing (completely) is wholly located at a past time. I will present the definitive version of the proposal in the next section. Note also that (37) excludes resultant state readings by design.

The analysis of *-te iru* presented in (37) is partially based on the idea that *-te iru* has non-future orientation (represented in McClure’s (1994) and Nishiyama’s (2006) works, as mentioned above), but differs from it in that this form does not just locate a relevant event at a non-future time; instead, it asserts the existence of some situation available now which would be

caused by the event described by the sentence skeleton in those possible worlds in which the situation in question is dictated by the “normal course of events”. Since *-te iru* is sensitive to the “past course of events”, the selection of accessible worlds must be made in a different way than the standard approaches such as Dowty (1979) or Landman (1992). The basic intuition that applies to both English and Japanese cases is that we restrict our attention to those possible worlds in which the currently available event or situation is extended to the past and to the future in maximally natural ways. We must then find a time not wholly in the future at which the sentence skeleton is true. This shows the non-future orientation of *-te iru*, which is a mirror image of the non-past orientation of the English progressive. (37) must incorporate a novel interpretation of “inertia worlds” in order for the proposal to make the right empirical predictions. The new set of “accessible worlds” is similar to Dowty’s inertia worlds, except that there is no temporal asymmetry built into the selection of such worlds. In section 6, I shall present a compositional account of the Japanese and English data under discussion and show that this novel proposal about the calculation of “accessible worlds” was already implicit in Portner’s (1998) proposal.

6. Proposal

6.1. A neo-neo-Davidsonian system

The overall proposal is structured as follows: I will assume that the relevant achievement verbs in English and Japanese describe the same event with the same temporal trace. The different semantic effects in *be -ing* and *-te iru* sentences stem from the semantic differences in the aspectual morphemes. Specifically, *-te iru* interacts with the time argument of the subject thematic role, whereas the English progressive pays attention to the temporal trace of the event. This proposal presupposes that the temporal trace of the event described by a verb and the time argument of a thematic role associated with the verb are not necessarily identical. Another important difference between *V-te iru* and *be V-ing* is that the Japanese morpheme *-te iru* is

non-future oriented, whereas the English progressive is non-past oriented. This will be encoded in our account as well.

Since we need to refer to thematic roles in our semantics at least for the Japanese case, it is reasonable to adopt the neo-Davidsonian semantic framework (e.g. Parsons (1990)), which formalizes thematic roles as relations between individuals and events. When events and states are introduced into the overall semantic framework, times are usually introduced in an indirect way, for example via a temporal trace function that maps an event to the time interval that this event occupies. As an example, let us consider a pair of past tense sentences from Japanese and English in (38). Their standard translation in a neo-Davidsonian framework is given in (39). Here, TIME indicates the temporal trace function.

(38) a. A tree fell over.

b. Ki-ga taore-ta.

tree-NOM fall.over-PAST

‘A tree fell over.’

(39) $\exists e[\text{TIME}(e) < \text{now} \ \& \ \text{theme}(e, \text{the_tree}) \ \& \ \text{fall_over}(e)]$

In (39), the main predicate **fall_over** is a one-place predicate that takes as its sole argument an event variable. The thematic role **theme** is a predicate that denotes a relation between events and entities/individuals. The temporal location of the event in question is specified in terms of TIME and the temporal ordering relation $<$ as shown in (39). The symbolization in (39) says that there is an event e of the tree’s falling and the time of e is earlier than the utterance time. This yields the right result for sentences in the simple past tense.

However, we need to analyze *-te iru* sentences in a different way. Specifically, we will encode the idea that the time at which the subject entity bears its thematic role in relation to an event e may be distinct from the temporal trace of e . This is an innovative idea regarding thematic roles. I claim that the semantic interpretation of *-te iru* interacts with the time argument

of the subject thematic role, and not with the temporal trace of the event.

Let me elaborate on the idea and the technique. In a system in which times are fully specified in the object language, temporal expressions (including temporal terms) are introduced only when they are called for. This means that thematic roles such as agent or patient can be relations between eventualities and entities involving no time argument. The general assumption is that the time at which a relevant thematic role relation holds is the same as the temporal trace of the event in question, though this question has not been asked explicitly in the neo-Davidsonian literature. However, I propose an alternative in which the thematic role relation between an event and an individual can hold at a time not equivalent to the temporal trace of the event. Let us consider a couple of concrete examples.

Regarding an accomplishment sentence (skeleton) like *Jim build a house*, the event run time is the entire time Jim spent on the building of the house in question. In the standard neo-Davidsonian analysis, we do not specify the time at which Jim is related to the event of building explicitly. In other words, a thematic role is a two-place relation involving an individual and an event. Taken at face value, this means that Jim and the event in question are related via the thematic role of agent once and for all, i.e. timelessly. Conceptually, however, we normally assume that the thematic relation holds only when the event in question exists. This classical viewpoint seems reasonable in the case of the agentive subject of an accomplishment verb such as *build*. During the event in question, Jim continuously does something that contributes to the completion of the house. However, while the agent of an event is usually salient, visible, and virtually unchanged when the event is in progress, the theme of an event is arguably more salient when the event is over and the themehood of an undergoer is clearly established.

One possible way of encoding this intuitive difference is to introduce temporal arguments to thematic role predicates. Incremental themes (Dowty 1991) present one interesting case. When Jim builds a house, a full-fledged house definitely exists (at least in default cases) at the end of an extended building event. However, no building exists when he starts to build one; one generally starts building a house from scratch. By contrast, we can safely assume that the agent

exists throughout the duration of an event. Therefore, it is reasonable to at least entertain the possibility that different thematic roles require different temporal properties.

Given the above discussion, I suggest that (38b) should be translated as (40) rather than as (39). To highlight the difference between the role of an agent and that of a theme, I rename the role associated with *the tree* in (38b) as **TARGET STATE**; it is something that indicates that the tree has the target state of the event of falling. Based on this assumption, (40) shows that the temporal trace of the event is immediately followed by the entire duration of the tree's bearing the **TARGET STATE** role concerning the event. The relation **abuts** can be defined as follows: For any intervals i_1 and i_2 , i_1 abuts i_2 iff $i_1 < i_2$ and $\cup i_2$ is an interval and $i_1 \cap i_2 = \emptyset$. (In short, i_1 and i_2 jointly form an interval with no overlap.) In our compositional semantic proposal to be presented in Section 6.3, the fact that the time of the event e abuts the temporal argument the target state predicate is derived from the semantic constraint posited in the lexicon.

(40) $\exists e \exists t [\text{TIME}(e) < c_T \& \text{TIME}(e) \text{ abuts } t \& \text{TARGET STATE}(c_W, t, \text{the_tree}, e) \& \text{fall_over}(e)]$

In (40), past tense indicates that the time of the event is located at a past time (within a contextually salient time in most cases). The formula **TARGET STATE** ($c_W, t, \text{the_tree}, e$) shows that the tree bears the target state of e at t . The target state is guaranteed to immediately follow the time of the event e . However, we do not know whether the result state in question still holds at the utterance time. This is empirically accurate. The case of *-te iru* is different in that it indicates that the time argument of the subject thematic role contains the utterance time (if the entire sentence is in the present tense). For example, (41a) is rendered as in (41b).

(41) a. Ki-ga taore-te iru.

tree-NOM fall

‘A tree is lying on the ground (presumably because it fell over.)

b. $\exists e \exists t \exists t_I [c_T \subseteq t \& \text{TIME}(e) \text{ abuts } t \& \text{target state}(c_W, t, \text{the_tree}, e) \& \text{fall_over}(e)]$

(41b) shows that the *-te iru* form in the present tense indicates that the temporal argument of the subject thematic role includes the utterance time (indicated by inclusion of the utterance time c_T by the interval t). Since the thematic role in question is target state, this means that the tree is lying flat (on the ground) now. This in turn means that the event of the tree's falling over is necessarily located in the past.

The point here is that the main clause tense interacts with the temporal trace of the event specified by the main predicate, the event of falling over, whereas the aspectual morpheme *-te iru* (in the present tense) interacts with the temporal argument of the subject's thematic role, which may not be the same as the temporal trace of the main event. In the case of the target state role, they are indeed different, and this enables us to distinguish between progressive and target state interpretations of *-te iru*.

6.2. Portner's (1998) system

At this point, we turn to Portner's (1998) analysis of the English progressive, which is based on Kratzer's (1981) theory of modality utilizing a modal base and an ordering source. The major point that Portner makes in his proposal is that the line of research that originates in Dowty's (1979) idea about inertia worlds can be subsumed under Kratzer's analysis of modality. For example, when Mary is crossing the street (i.e., when it is true to say "Mary is crossing the street."), we need a circumstance in which Mary is moving toward the other side of the street. We can think of the worlds in which this condition is satisfied as the modal base. We then restrict our attention to some "idealized subset" in the modal base in which the natural course of events takes precedence over any forces that may interrupt it. This idealization can be stated in terms of an ordering source. According to Portner, the modal base for (42a) is a circumstantial variety and is the set of facts about Mary relevant to the issue of whether *Mary cross the street* (the sentence skeleton) is true. In other words, the ordering source is the set of outside factors that need to go right for Mary if the proposition *Mary cross the street* is to be true. Put

informally, those are propositions that collectively ascertain that the ongoing event in question will not be interrupted. According to Portner's proposal, (42a) is semantically analyzed as in (42b).

- (42) a. Mary was crossing the street.
 b. $\exists e[\text{PAST}(e) \ \& \ \text{PROG}(e, \ ^\wedge\lambda e[\text{cross}(e, \text{Mary}, \text{the-street})])]$

The details of Portner's semantic proposal about the English progressive, especially the semantics of PROG in (42b), are given in (43a, b). P represents a property of events.

- (43) a. $\text{Best}(\text{Circ}, NI, e, P)$ = the set of all world w' in $\cap \text{Circ}(e, P)$ such that there is no w'' in $\cap \text{Circ}(e, P)$ where $w'' <_{NI,e} w'$.¹⁹
 b. $\text{PROG}(e, P)$ is true at a world w iff for each world w' in $\text{Best}(\text{Circ}, NI, e, P)$, there is an event e' which includes e as a nonfinal subpart, such that $P(w')(e')$ is true.

Circ (Circumstantial Modal Base) is a function that applies to event-event property pairs and yields a set of propositions that serves as the modal base. We can turn this set of propositions into a set of worlds via generalized intersection \cap . *NI* (Non-interruption Ordering Source) is a function that applies to event-event property pairs and returns as its value a set of propositions that acts as the ordering source. The ordering source provides the conditions that have to be met for the event to be uninterrupted. For example, the truth conditions of (42) are explained as follows. There is an event e in the actual world now such that in all the best possible worlds w'

¹⁹ Given a set of worlds X and a set of propositions Y , define the strict partial order $<_Y$ as follows: $\forall w_1, w_2 \in X$: the maximal set of propositions $\max_Y(X) = \{w \in X : \neg \exists w' \in X : w' <_Y w\}$. Informally, for any w_1 and w_2 , $w_1 <_Y w_2$ indicates that w_1 is closer to the ideal characterized by Y than w_2 is.

calculated in terms of *Circ*, *NI*, *e* and $\lambda e[\text{cross}(e, \text{Mary}, \text{the-street})]$, there is an event e' which includes e as a nonfinal subpart such that $\lambda e[\text{cross}(e, \text{Mary}, \text{the-street})](w')(e') = \text{true}$. In this process, *Circ* applies to an event and an event property (rather than just an event) to yield a set of propositions (the modal base). Portner argues for this way of obtaining the modal base because we need to be able to distinguish two progressive sentences that appear to concern the same event such as (44a, b). Assuming that (44a, b) describe one and the same event, we must have access to two different event properties to distinguish between them, according to Portner.

- (44) a. Mary is crossing the street.
 b. Mary is walking into the path of an oncoming bus.

I find that Portner's idea of adopting Kratzer's approach to tackle the semantics of the progressive is very appealing. However, I am not convinced that the selection of the modal base must have access to the event property derived from the sentence skeleton. Since we only need to find *some* event that forms the basis of our progressive statement, we could find different events associated with (44a, b). For example, we could restrict our attention to what Mary is doing right now (i.e., her moving toward the other side of the street) to make (44a) true. Alternatively, we could expand our view to include the bus that is fast approaching her. If so, the truth of (44b) is also supported. No contradiction results from this approach as long as we are willing to accept the idea that (44a) and (44b) concern different events.²⁰

One other important issue is whether or not the event e in (43a, b) is an initial part of an extended event that can be described by a sentence skeleton like *Mary cross the street*. My

²⁰ This is different from the approach that Portner (1998) adopts. He assumes that (44a) and (44b) concern the same event. However, Portner concedes that the fine-grained way of analyzing events I suggest is a viable option.

understanding of the discussion in Portner (1998) is that the event e is just a short internal subpart of an extended event associated with the sentence skeleton and does not have to be an initial part. Portner (1998: 774) presents his preliminary analysis of the English progressive as in (45).

- (45) $\text{PROG}(\phi)$ is true at a pair of an interval and world $\langle i, w \rangle$ iff there is an event e in w such that $T(e) = i$ and for all worlds w' in $\text{Best}(\text{Circ}, \text{NI}, e)$, there is an interval i' which includes i as a nonfinal interval, such that ϕ is true at $\langle i', w' \rangle$.

Although this is a preliminary proposal, the essential idea in Portner's definitive proposal given above in (43) is already in place here. What is crucial here is that $T(e)$ (the temporal trace of e) = i , which equals the time of evaluation (i.e., the utterance time for a sentence in the present tense). Since it is a short interval, the event in question is also one that occurs at the utterance time and, therefore, not (necessarily) an initial sub-event of a complete "sentence skeleton" event. This furthermore means that the worlds in the modal base selected in terms of this short event are allowed to be different in the past as well as in the future.²¹ Thus, Portner's account provides indirect support for our account of *-te iru* to be presented in the next subsection (6.3).

At this point, I shall introduce the reader to Ferreira's (2016) rendition of Portner's (1998) system. Unlike Portner (1998), the semantics of the Imperfective form (or the progressive) in Ferreira's proposal refers to times and worlds instead of events. Like Portner, Ferreira also relies on the event property provided by the target sentence to obtain a modal base

²¹ The examples of the propositions in the modal base for *At 7 o'clock, Mary was climbing Mount Toby* are indeed those that seem to concern the evaluation time (7 o'clock) or a short interval surrounding this time, such as 'Mary is in good physical condition', 'It was raining lightly on Mount Toby at 7 o'clock', etc. (Portner 1998: 772).

and an ordering source. Here's the lexical entry of Imp (= Imperfective, which is the progressive for our purposes) in Ferreira's version:²²

- (46) $\llbracket \text{Imp} \rrbracket = \lambda \wp. \lambda t. \lambda w. \forall w' \in \text{BEST}(\wp, M, O, w, t) \exists e : t \subseteq \text{TIME}(e) \ \& \ \wp(w')(e).$
- (47) $\text{BEST}(\wp, M, O, w, t) =$ the set of worlds w' in $\cap M(\wp, w, t)$ such that there is no world w'' in $\cap M(\wp, w, t)$ where $w'' <_{O(\wp, w, t)} w'$. ($\cap M(\wp, w, t)$ indicates the modal base (a set of worlds) obtained from the property of events \wp , and the world w and the time t . Similarly, $O(\wp, w, t)$ is the ordering source calculated from the same three (\wp, w and t).)

Glossing over the details, $\text{BEST}(\wp, M, O, w, t)$ yields the set of worlds analogous to the inertia worlds in Dowty's (1979) proposal based on the event property \wp derived from the sentence skeleton and the information about the world and the time.

6.3 Compositional Semantics

Based on Portner (1998) and Ferreira (2016), I will propose an augmented version for the Japanese *-te iru* morpheme as well as for the English progressive. Although Ferreira's execution is streamlined and elegant, it does not show any context dependency, which may turn out to be indispensable. For example, a sentence like *A man is building a house* is almost definitely not a sentence just about a world and a time; its reference is restricted to a particular place where the speaker is located. I do not believe that relying on the event property is sufficient. Portner's original proposal relies on the information of a specific event in the context, and we need something similar in order to make our proposal successful. On the other hand, Portner's proposal relies on an event and an event property derived from the target sentence in order to

²² For our purposes, we assume that Imperfective as analyzed by Ferreira applies to the English progressive without any modification.

obtain a modal base and an ordering source. In my proposal, a relevant modal base is calculated by means of a property that the subject entity has. By contrast, I adopt the claim made by Portner and Ferreira that an ordering source is obtained from the event property associated with the sentence.

There are three key points to be encoded in the lexical semantics of *-te iru*: (i) An event described by the sentence skeleton can be located wholly in the past but cannot be located wholly in the future; (ii) When the event in question is located in the past (as in the case of target state interpretations of *-te iru* sentences), one cannot “extend” an existing event (or state) to find a desired event because what exists now is a target state of the event, not part of the event; (iii) What one finds at the utterance time must be a property of the subject entity, and we claim that the presence of this property on the part of the subject strongly indicates the presence of an event described by the sentence skeleton (at a past time) (assuming idealized circumstances). (48) is the proposed lexical semantics of the morpheme *-te iru*, and (49) shows in detail what $BEST_{\text{Japanese}}$ does. In order to streamline the entire tense-aspect system of Japanese, I adopt the idea that we must make an aspectual choice even when there is no aspectual morpheme in the sentence under consideration. That is, as shown in (50), when no overt aspect morpheme is present, we assume that there is a covert aspect morpheme in the head position of Asp Phrase that says that the time to be manipulated by the tense morpheme, which is coming up, is the temporal extension of the event indicated by the main predicate. This simplifies the compositional semantic mechanism that makes the correct empirical predictions for all combinations of tense and aspect morphemes in Japanese.

$$(48) \quad \llbracket -te\ iru \rrbracket = \lambda f_{\langle e, \langle \varepsilon, \langle i, \langle w, t \rangle \rangle \rangle} . \lambda x . \lambda e . \lambda t . \lambda w . \exists P[P(x)(t)(w) \ \& \\ \llbracket \forall w' \in BEST_{\text{Japanese}}(P, f, x, M, O, w, t) \exists e \exists t' [t \prec t' \ \& f(x)(e)(t')(w')] \rrbracket]]$$

$$(49) \quad BEST_{\text{Japanese}}(P, f, x, M, O, w, t) = \text{the set of worlds } w_1 \in \cap M(P, x, w, t) \text{ such that there is} \\ \text{no world } w_2 \text{ in } \cap M(P, x, w, t) \text{ where } w_2 <_{O(f, x, w, t)} w_1$$

$$(50) \quad \llbracket -\emptyset_{\text{Asp}} \rrbracket = \lambda f_{\langle e, \langle \varepsilon, \langle i, \langle w, t \rangle \rangle \rangle} . \lambda x . \lambda e . \lambda t . \lambda w . [\text{TIME}(e) = t \ \& \ \exists t' [f(x)(e)(t')(w)]]$$

In (48), f is a variable of type $\langle e, \langle e, \langle i, \langle w, t \rangle \rangle \rangle \rangle$, where ϵ , i and w are types for events, intervals, and worlds, respectively, and P is a property variable of type $\langle e, \langle i, \langle w, t \rangle \rangle \rangle$. (49) shows how the set of “best worlds” is calculated in terms of the modal base and the ordering source. The calculation of each set of worlds is complex, so let me explain how this is done. $M(P, x, w, t)$ equals $\{p \mid p = \lambda w . P(x)(t)(w) = 1\}$. So the modal base $\cap M(P, x, w, t) = \lambda w . P(x)(t)(w) = 1$, which is simply the proposition of x 's having the property P at t . Unlike Portner's proposal, the calculation of the modal base does not require access to the event property associated with the sentence skeleton. I assume that different *-te iru* sentences can feature different current properties that the subject entity has even if they are uttered in exactly the same situation. This allows us to evaluate such *-te iru* sentences as (44a, b) with respect to different modal bases, thereby predicting different results. Note also that since the determination of the modal base is based on a property that the subject has at the utterance time, the worlds in the modal base could be different from each other in the past and in the future. This is crucial for *-te iru*. The ordering source $O(f, x, w, t)$ specifies a set of propositions that allow smooth transition of x 's properties before and after t in such a way that any f -type event involving x at a time not later than t does not meet any external obstacles.

In (51) and (52), I provide the lexical meaning of the present and past tense morphemes and the truth definition, which are needed for the calculation of truth conditions.

$$(51) \quad \llbracket \text{PRES} \rrbracket^c = \lambda f_{\langle e, \langle \epsilon, \langle i, \langle w, t \rangle \rangle \rangle \rangle} . \lambda x . \lambda e . \lambda t . \lambda t_1 . \lambda w . t = t_1 \ \& \ f(x)(e)(t)(w) = 1$$

$$\llbracket \text{PAST} \rrbracket^c = \lambda f_{\langle e, \langle \epsilon, \langle i, \langle w, t \rangle \rangle \rangle \rangle} . \lambda x . \lambda e . \lambda t . \lambda t_1 . \lambda w . t < t_1 \ \& \ f(x)(e)(t)(w) = 1$$

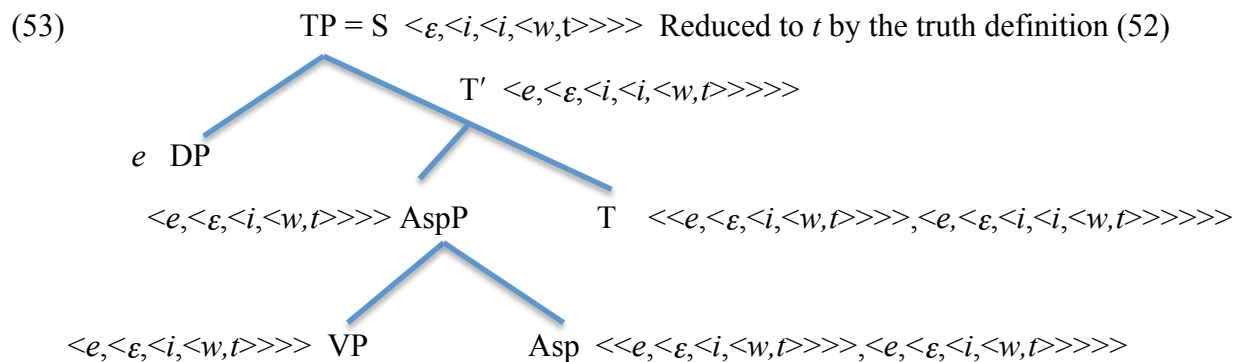
(52) **Truth Definition**

A matrix sentence S is true in the context c iff there is an event e and a time t_2 such that

$$\llbracket \text{matrix clause} \rrbracket^c(e)(t_2)(c_T)(c_W) = 1$$

We assume for the purpose of this article the LF configuration given in (53). The subject is

base-generated in the TP Spec position. Although this is not the standard view in the recent syntactic theory such as Chomsky (1994), this simplified syntactic structure allows me to access the subject in the semantics of the aspectual head *-te iru* without complicating the syntax-semantics interface any further. The semantic type of each node is provided here for the reader's convenience.



A sample derivation of a *-te iru* sentence with an agentive subject is given in (55), which provides a semantic analysis of the progressive interpretation of (54). The essential point is that a structure that contains no subject (VP) combines with an aspect morpheme and then with the tense, and the subject DP comes after that. Here, I only show the final result of each semantic calculation.

(54) Hanako-ga miti-o watet-te iru.

Hanako-NOM street-ACC cross-TEIRU.PRES

‘Hanako is crossing the street.’

- (55) 1. **VP**: $\llbracket \text{miti-o wataru} \rrbracket^c = \lambda z . \lambda e'' . \lambda t'' . \lambda w'' . [\text{AGENT}(w'', t'', z, e'')] \ \& \ \text{crossing-the-street}(e'')$
2. **AspP**: $\llbracket \text{miti-o wataru-te iru} \rrbracket^c = \lambda x . \lambda e . \lambda t . \lambda w . \exists P[P(x)(t)(w) \ \& \ [\forall w' \in \text{BEST}_{\text{Japanese}}(P, [\lambda z . \lambda e'' . \lambda t'' . \lambda w'' . [\text{AGENT}(w'', t'', z, e'')] \ \& \ \text{crossing-the-street}(e'')], x, M, O, w, t) \ \exists e \exists t' [t \prec t' \ \& \ \text{AGENT}(w', t', x, e) \ \& \ \text{crossing-the-street}(e)]]]$

3. **T'**: $\llbracket \text{miti-o wataru-te iru (+present tense)} \rrbracket^c = \lambda x . \lambda e . \lambda t . \lambda t_1 . \lambda w . t = t_1 \ \&$
 $\exists P[P(x)(t)(w) \ \& \ [\forall w' \in \text{BEST}_{\text{Japanese}}(P, [\lambda z . \lambda e'' . \lambda t'' . \lambda w'' . [\text{AGENT}(w'', t'', z, e'')] \ \&$
 $\text{crossing-the-street}(e'')]], x, M, O, w, t) \ \exists e \exists t' [t \prec t' \ \& \ \text{AGENT}(w', t', x, e) \ \&$
 $\text{crossing-the-street}(e)]]]$
4. **TP**: $\llbracket \text{Hanako-ga miti-o wataru-te iru (present tense)} \rrbracket^c = \lambda e . \lambda t . \lambda t_1 . \lambda w . t = t_1 \ \&$
 $\exists P[P(\text{Hanako})(t)(w) \ \& \ [\forall w' \in \text{BEST}_{\text{Japanese}}(P, [\lambda z . \lambda e'' . \lambda t'' . \lambda w'' . [\text{AGENT}(w'', t'', z, e'')] \ \&$
 $\text{crossing-the-street}(e'')]], \text{Hanako}, M, O, w, t) \ \exists e \exists t' [t \prec t' \ \& \ \text{AGENT}(w', t', \text{Hanako},$
 $e) \ \& \ \text{crossing-the-street}(e)]]]$
5. **Truth conditions of (54) (based on the truth definition (52))**:
 $\exists P[P(\text{Hanako})(c_T)(c_W) \ \& \ [\forall w' \in \text{BEST}_{\text{Japanese}}(P, [\lambda z . \lambda e'' . \lambda t'' . \lambda w'' . [\text{AGENT}(w'', t'', z,$
 $e'')] \ \& \ \text{crossing-the-street}(e'')]], \text{Hanako}, M, O, c_W, c_T) \ \exists e \exists t' [c_T \prec t' \ \& \ \text{AGENT}(w', t',$
 $\text{Hanako}, e) \ \& \ \text{crossing-the-street}(e)]]]$

In words, this means that Hanako has a property now which naturally leads us to conclude that her crossing of the street takes place at a time not following the utterance time. Since the subject entity is an agent, the *-te iru* sentence requires that in all accessible worlds, an event of Hanako's crossing the street occurs at a non-future time. The default option is that the temporal trace of such an event encloses within it the utterance time, resulting in a progressive reading. The final line of (55) says that Hanako has a property *P* now which suggests that if in all “best” worlds in which she has this property and her crossing the street does not meet interruptions, then she crosses the street at a time not following the utterance time.

We are now ready to delve into how the proposal deals with (56), which is a *-te iru* sentence containing an unaccusative verb and an undergoer subject and receives a target state interpretation. (57) details how the semantics of (56) is obtained compositionally in the system being proposed.

(56) Hanako-ga taore -te iru.

Hanako-NOM fall.over-TEIRU.PRES

‘Hanako is lying on the ground. She must have fallen over.’

- (57) 1. **VP**: $\llbracket \text{taore- ‘fall over’} \rrbracket = \lambda z . \lambda e'' . \lambda t'' . \lambda w'' [\text{TARGET STATE}(w'', t'', z, e'') \& \text{falling.over}(e'')]$
2. **AspP**: $\llbracket \text{taore-te iru ‘fall over + TEIRU’} \rrbracket = \lambda x . \lambda e . \lambda t . \lambda w . \exists P [P(x)(t)(w) \& [\forall w' \in \text{BEST}_{\text{Japanese}}(P, [\lambda z . \lambda e'' . \lambda t'' . \lambda w'' . \text{TARGET STATE}(w'', t'', z, e'') \& \text{falling.over}(e'')], x, M, O, w, t) \exists e \exists t' [t \prec t' \& \text{TARGET STATE}(w', t', x, e) \& \text{falling.over}(e)]]]$
3. **T'**: $\llbracket \text{taore-te iru ‘fall over + TEIRU + PRES’} \rrbracket = \lambda x . \lambda e . \lambda t . \lambda t_7 . \lambda w . [t = t_7 \& \exists P [P(x)(t)(w) \& [\forall w' \in \text{BEST}_{\text{Japanese}}(P, [\lambda z . \lambda e'' . \lambda t'' . \lambda w'' . \text{TARGET STATE}(w'', t'', z, e'') \& \text{falling.over}(e'')], x, M, O, w, t) \exists e \exists t' [t \prec t' \& \text{TARGET STATE}(w', t', x, e) \& \text{falling.over}(e)]]]]]$
4. **TP**: $\llbracket \text{Hanako-ga taore-te iru ‘Hanako fall over + TEIRU + PRES’} \rrbracket = \lambda e . \lambda t . \lambda t_7 . \lambda w . t = t_7 \& \exists P [P(\text{Hanako})(t)(w) \& [\forall w' \in \text{BEST}_{\text{Japanese}}(P, [\lambda z . \lambda e'' . \lambda t'' . \lambda w'' . \text{TARGET STATE}(w'', t'', z, e'') \& \text{falling.over}(e'')], \text{Hanako}, M, O, w, t) \exists e \exists t' [t \prec t' \& \text{TARGET STATE}(w', t', \text{Hanako}, e) \& \text{falling.over}(e)]]]$
5. **Truth conditions of (56) (based on the truth definition (52))**:
 $\exists P [P(\text{Hanako})(c_T)(c_W) \& [\forall w' \in \text{BEST}_{\text{Japanese}}(P, [\lambda z . \lambda e'' . \lambda t'' . \lambda w'' . \text{TARGET STATE}(w'', t'', z, e'') \& \text{falling.over}(e'')], \text{Hanako}, M, O, c_W, c_T) \exists e \exists t' [c_T \prec t' \& \text{TARGET STATE}(w', t', \text{Hanako}, e) \& \text{falling.over}(e)]]]$

The final result requires the following: Hanako has a property P now such that in all worlds where Hanako has P at t and the conditions are maximally conducive to Hanako’s having the target state of her falling over at some time not following t , Hanako indeed has the target state of her falling over at a non-future time. Since the triggering event (Hanako’s falling over event) must precede the target state, it must have taken place in the past unlike the case of progressive interpretations of *-te iru*.

We saw in (36) an example of a “progressive sentence” in which the relevant event is

located wholly in the past. Note that the proposal being defended also allows a target state to be located wholly in the past when *-te iru* attaches to an unaccusative verb. This may seem too liberal at first sight since all *-te iru* sentences with unaccusative verbs discussed so far locate target states at the utterance time rather than (entirely) at a past time. However, we could construct examples in which a relevant target state is located wholly in the past. (58) is one such example.

- (58) Hanako: Koron-deru ne.
 fall -TEIRU.PRES ENDING
 [Lit.] ‘(You are) falling over.’

Suppose that the addressee is Jiro, a 7-year-old boy, and Hanako, who is Jiro’s mother, told him not to fall over when outside because he wore new pants. Jiro went out to play on his own and returned to the house. Jiro claimed that he had not fallen over. However, Hanako found that Jiro’s pants were dirty. This is when Hanako made the utterance in (58). I think this is acceptable in the situation under discussion. In this case, the target state of falling, i.e., Jiro’s being on the ground, is wholly in the past, and the evidence for the claim is one of Jiro’s current properties, i.e. his pants are dirty. This shows that my semantic analysis of the Japanese *-te iru* construction is justified.

We now turn to the contrast between the *-te iru* construction and the simple (past or present) tense. The *-te iru* form refers to the time argument of the subject entity, whereas the simple (past or present) tense specifies the temporal location of a relevant event described by the verb. We will see how a sentence in the simple past tense is rendered in our system. The lexical semantics of the past tense was introduced in (51), and it is repeated here in (59). Informally speaking, PAST orders the time given by the Aspect Phrase before the newly introduced time (t_1). This new time (t_1) will be used as a temporal deictic center (the utterance time in the simplest case). Since we are now dealing with aspectless sentences, (50) (repeated here as (60)) is also

important. What $-\emptyset_{\text{Asp}}$ does is to take the raw interpretation of VP and create a temporal argument, which is the temporal trace of the event in question.

$$(59) \quad \llbracket \text{PAST} \rrbracket^c = \lambda f_{\langle e, \langle \varepsilon, \langle i, \langle w, t \rangle \rangle \rangle} . \lambda x . \lambda e . \lambda t . \lambda t_1 . \lambda w . t < t_1 \ \& \ f(x)(e)(t)(w) = 1$$

$$(60) \quad \llbracket -\emptyset_{\text{Asp}} \rrbracket = \lambda f_{\langle e, \langle \varepsilon, \langle i, \langle w, t \rangle \rangle \rangle} . \lambda x . \lambda e . \lambda t . \lambda w . [\text{TIME}(e) = t \ \& \ \exists t' [f(x)(e)(t')(w)]]$$

Given this semantics of PAST and $-\emptyset_{\text{Asp}}$, we can work on the semantics of (61). Our analysis is given in (62).

(61) Hanako-ga taore-ta.

Hanako-NOM fall.over-PAST

‘Hanako fell over.’

(62) 1. **AspP**: $\llbracket \text{taore-}\emptyset_{\text{Asp}} \text{ ‘fall over-}\emptyset_{\text{Asp}} \text{’} \rrbracket^c =$

$$\lambda x . \lambda e . \lambda t . \lambda w . [\text{TIME}(e) = t \ \& \ \exists t' [\text{TARGET STATE}(w, t', x, e) \ \& \ \text{falling.over}(e)]]$$

2. **T'**: $\llbracket \text{taore-}\emptyset_{\text{Asp}}\text{-ta ‘fall over-}\emptyset_{\text{Asp}}\text{-PAST’} \rrbracket^c = \lambda x . \lambda e . \lambda t . \lambda t_1 . \lambda w . t < t_1 \ \& \ \text{TIME}(e) = t$

$$\ \& \ \exists t' [\text{TARGET STATE}(w, t', x, e) \ \& \ \text{falling.over}(e)]$$

3. **TP**: $\llbracket \text{Hanako-ga taore-}\emptyset_{\text{Asp}}\text{-ta ‘Hanako fall over-}\emptyset_{\text{Asp}}\text{-PAST’} \rrbracket^c =$

$$\lambda e . \lambda t . \lambda t_1 . \lambda w . t < t_1 \ \& \ \text{TIME}(e) = t \ \& \ \exists t' [\text{TARGET STATE}(w, t', \text{Hanako}, e) \ \& \ \text{falling.over}(e)]$$

4. **Truth conditions of (61) (based on the truth definition (52)):**

$$\exists e \exists t [t < c_T \ \& \ \text{TIME}(e) = t \ \& \ \exists t' [\text{TARGET STATE}(c_w, t', \text{Hanako}, e) \ \& \ \text{falling.over}(e)]]$$

Here the time of the event is located at a past time thanks to the semantic contribution of the empty aspect morpheme $-\emptyset_{\text{Asp}}$ and the past tense morpheme. Since the tense does not interact with the time argument of the subject thematic role, the temporal argument of the target state thematic role has no specified temporal location in this translation. Since the target state of e must be located after the temporal trace of e itself, the target state may or may not be present at

the utterance time.²³ This is empirically accurate.

As mentioned earlier, one major innovation in our account is the proposal that the temporal trace of an event is in principle independent of the temporal argument of a thematic role (relation) that requires an event argument. This forces us to constrain the relationship between the temporal argument of some thematic role and the temporal extension of a relevant event. We assume that if an entity x is the agent of an event e , the temporal argument of this thematic role equals the temporal extension of the event. This semantic constraint is given in (63).

(63) Semantic Constraint on Agent Thematic Role

For any world w , time interval t , individual x , and event e such that $\text{AGENT}(w, t, x, e)$, $\text{TIME}(e) = t$. (This forces the time argument t of Agent to be identical with $\text{TIME}(e)$.)²⁴

By contrast, the TARGET STATE thematic role requires that its temporal argument associated with an event e immediately follows the temporal trace of e . That is, an entity e bears the target state role associated with e only after the event e is “over”. This is stated formally in (64).

(64) Semantic Constraint on Target State Thematic Role

For any individual x , event e , world w , and intervals t_1 and t_2 , $\text{TARGET STATE}(w, t_1, x, e)$ and $\text{TIME}(e) = t_2$ both hold only if t_2 abuts t_1 .

Since the time argument of target state predicates is abutted by a temporal extension of its

²³ Note the semantic constraint (64) to be presented below.

²⁴ I_2 is an initial subinterval of I_1 iff there is an interval I_3 such that both $I_3 \cup I_2$ and $I_3 \cup I_1$ are intervals, and there is another interval I_4 such that $I_4 \subseteq I_1$ and $I_2 \cup I_4 = I_1$. Note that $I_2 = I_1$ when $I_4 = \emptyset$.

triggering event, the triggering event must be located at a past time when the target state obtains at the utterance time. This is a desired empirical result.

Finally, to show a major difference between the English and Japanese aspect systems, we will present my rendition of the English progressive, which accommodates the futurate progressive as well as progressive achievements. My proposal about the English construction is based on Portner (1998) and Ferreira (2016). As in Portner’s (1998) proposal, the calculation of the modal base must be sensitive to contextual information. This can be accomplished by positing an event at the utterance time that does not necessarily extend to a complete event described by the sentence skeleton but would lead to such an event at a non-past time if the event in question develops naturally. Note that \wp and \wp' are used as variables for event properties of type $\langle \varepsilon, \langle w, t \rangle \rangle$.

(65) $\llbracket \text{be -ing} \rrbracket = \lambda \wp. \lambda t. \lambda w. \exists \wp'. \exists e': t \subseteq \text{TIME}(e') \ \& \ \wp'(e')(w) \ \& \ [\forall w' \in \text{BEST}_{\text{English}}(\wp', \wp, M, O, w, t) \ \exists e[\text{TIME}(e) \prec t \ \& \ \wp(e)(w')]]$.²⁵

(66) $\text{BEST}_{\text{English}}(\wp', \wp, M, O, w, t) =$ the set of worlds w' in $\cap M(\wp', w, t)$ such that there is no world w'' in $\cap M(\wp', w, t)$ where $w'' <_{O(\wp, w, t)} w'$. To be more precise, $\cap M(\wp', w, t) = \{w' \mid \exists e'[\wp'(e')(w') \ \& \ t \subseteq \text{TIME}(e')]\}$. $O(\wp, w, t)$ is the set of propositions that allow for smooth transitions of the relevant aspects of the world pertaining to any world w_1 and event e_1 such that $\wp'(e_1)(w_1) = 1$ and $\text{TIME}(e_1) \prec t$.

(65) is what I propose as the lexical meaning of the English progressive *be -ing*, and this analysis can be used to account for progressive achievements, futurate progressives as well as on-going process interpretations in which the evidence on the basis of which a progressive sentence is

²⁵ Here, \wp corresponds to the denotation of the sentence skeleton, and the truth definition “replaces” t and w with the utterance time (c_T) and the actual world (c_W).

asserted is more indirect than the previous accounts. This is the desired result for English.

(66) shows the details of how the “best” worlds are obtained from the evidence available in the actual world. $\cap M(\wp', w, t)$ is calculated in such a way that this is the set of worlds w' in which an event e described by \wp' occurs at t in w' . \wp' itself is not described by the sentence skeleton in question. Restricting our attention to this set of worlds, some of them are closest to our “non-interruption ideal” than others regarding the possibility that an event of type \wp , which *is* obtained from the sentence skeleton, occurs. In other words, we must choose the worlds from within the modal base worlds in which nothing prevents an event of the type \wp from being developed. This is also the desired result.

First, I shall use a concrete example to show how my proposal accounts for the semantics of progressive achievements. Consider (67) and its semantic interpretation in (68).

(67) The tree is falling over.

(68) $\exists \wp' \exists e' [c_T \subseteq \text{TIME}(e') \ \& \ \wp'(e')(c_W) \ \& \ [\forall w' \in \text{BEST}_{\text{English}}(\wp', [\lambda e . \lambda w . \exists t [\text{target state}(w, \text{the_tree}, e, t) \ \& \ \text{fall_over}(e)]], M, O, c_W, c_T) \exists e'' [\text{TIME}(e'') \not\prec c_T \ \& \ \exists t'' [\text{target state}(w', \text{the_tree}, e'', t'') \ \& \ \text{fall_over}(e'')]]]$

The truth of (67) requires that there be an event property and an event such that this event has this event property at the utterance time. The event property in question could be the tree’s being tilted, shaking, and being blown by the strong wind. This collective property can be used to calculate the modal base (corresponding to \wp' in (68)). We then choose the “best worlds” in the modal base by using the ordering source. The ordering source propositions make sure that no event of the tree’s falling over would be interrupted by external forces. What the sentence claims is that in each of such “best worlds” the tree indeed falls over at a time not preceding the utterance time. Since an achievement is an extremely short event, we understand the time of the tree’s falling to be located in the future. This is the desired interpretation of (67). This outcome is obtained without positing an aspect shift rule.

Second, activity and accomplishment cases are more straightforward, but they could still benefit from the setup in my proposal. For example, this account allows you to assert (69a) truthfully even when Mary has just stopped to take a short rest. Similarly, (69b) could be used truthfully when you can only observe Sue is just looking at the computer screen going over a preliminary version of her paper.

- (69) a. Mary is running outside.
 b. Sue is writing a paper.

I believe that this is an important improvement over the past approaches.

Lastly, I shall discuss a futurate progressive sentence. Consider (70).

- (70) Mary is buying a house soon.

Suppose that Mary has saved up for a down payment for a mortgage, and has visited many open house events for houses for sale. These facts allow us to select the modal base. We then select the set of “best worlds” in which any event of Mary’s buying a house is not interrupted. (70) then asserts that in each such world, Mary buys a house at a time not preceding the utterance time. Since it is not necessary to extend the existing event to find a complete event described by the sentence skeleton (i.e., an event of Mary’s buying a house), the event is allowed to be located wholly in the future. This is empirically accurate and intuitively appealing. (70) is interpreted as in (71).

- (71) $\exists e' \exists \wp' [c_T \subseteq \text{TIME}(e') \ \& \ \wp'(e')(c_W) \ \& \ [\forall w' \in \text{BEST}_{\text{English}}(\wp', [\lambda e . \lambda w. \exists z \exists t \exists t' [\text{buying}(e) \ \& \ \text{AGENT}(w, t, b, e) \ \& \ \text{house}(z) \ \& \ \text{THEME}(w, t', z, e)], M, O, c_W, c_T) \exists e'' \exists z \exists t \exists t' [\text{TIME}(e'') \ \nless c_T \ \& \ \text{buy}(e'') \ \& \ \text{AGENT}(w', t, b, e'') \ \& \ \text{house}(z) \ \& \ \text{theme}(w', t', z, e'')]]]]]$

(71) says that, for example, there is an event e' now such that it is a composite event of browsing some house hunting websites and having secured a mortgage, and in all worlds w in which the same type of event occurs now and Mary's house buying events do not get interrupted by external forces there will be an event of Mary's buying a house sometime in the future. This is exactly what our intuitions say about the meaning of (70).

7. Conclusion

In this article, I showed that by paying attention to the ways in which the Japanese aspectual morpheme *-te iru* interacts with different thematic roles associated with the subject DP, one can account for the apparent “variability” of its meaning. I agree with Okuda (1978), Kudo (1995), and Shirai (2000) that the “variability” resides in the subject thematic roles and not in the lexical meaning of *-te iru*. By contrast, the English progressive form is insensitive to the subject thematic roles and only interacts with the temporal trace of the event in question. This empirical difference between English and Japanese is encoded in a system in which thematic roles have temporal arguments that can be distinct from the temporal trace of the associated event. Another major difference between these two constructions that has hitherto been untouched is the fact that the English progressive has a clear future orientation — it deals with events that are ongoing or else located completely in the future — whereas the Japanese morpheme *-te iru* locates a relevant event at the utterance time or in the past (i.e., at a non-future time). A formal semantic analysis of the two aspectual constructions has been proposed in this article that is modeled upon Portner's (1998) and Ferreira's (2016) analysis of the English progressive, which is couched in Kratzer's (1981) general modal theory based on a modal base and an ordering source. My account posits a set of “accessible worlds” in such a way that they could be different from one another not just in the future but also in the past. This makes the modal analysis of *-te iru* possible. My proposal also makes a novel proposal about the selection of the modal base. The modal base is selected via a property of the subject available at the utterance time (Japanese) or an event that occurs at the utterance time (English). This property or event is not what is

expressed by the sentence skeleton. This allows us to account for the semantics of achievement sentences in Japanese and English. As an added bonus, it can also take care of futurate progressives in English.

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References

- Ahn, Pyeong-ho and Takenobu Fukushima (2005), *Chuusei-makki nihongo to gendai kankokugo no tensu • asupekuto taikai: Sonzai-gata asupekuto no bunpooka no doai* [Tense-Aspect systems of Late Medieval Japanese and Modern Korean: The problem of grammaticalization]. *Nihongo no Kenkyuu*, 1–3: 139–154.
- Bennett, Michael and Barbara Partee (1972), *Toward the Logic of Tense and Aspect in English*. Distributed by the Indiana University Linguistics Club, Bloomington, IN.
- Chomsky, Noam. (1994). *The Minimalist Program*, MIT Press.
- Copley, Brigit (2002), *The Semantics of the Future*, PhD dissertation, MIT. Cambridge, MA.
- Copley, Bridget (2008), Deconstructing Futurate Meanings, *Linguistic Inquiry* 39:261-274.
- de Swart, Henriëtte (1998), Aspect Shift and Coercion, *Natural Language & Linguistic Theory*, 16:347-385.

- de Swart, Henriëtte (2000), Tense, Aspect and Coercion in a Cross-linguistic Perspective, *Proceedings of the Berkeley Formal Grammar Conference*, Edited by Miriam Butt and Tracy Holloway King, CSLI Publications.
- Dowty, David R (1979), *Word meaning and Montague grammar*. Dordrecht: Kluwer.
- Dowty, David R. (1991), Thematic Proto-Roles and Argument Selection. *Language*, **67**: 547-619.
- Ferreira, M. (2016) The Semantic Ingredients of Imperfectivity in Progressives, Habituals, and Counterfactuals. *Natural Language Semantics* 24
- Fujii, Tadashi (1966), Dooshi+te iru no Imi [The meaning of V-te iru], *Kokugo Kenkyuushitsu* 5, Tokyo University, Tokyo. Reprinted in Kindaichi, Haruhiko, ed. (1976) *Nihongo doshi no asupekuto*, Tokyo: Mugi Shobo
- Igarashi, Yoshiyuki, & Gunji, T. (1998), The temporal system in Japanese. In Takao, G., & Koichi., H. (Eds.), *Topics in constraint-based grammar of Japanese*. Kluwer. Dordrecht. 81–97.
- Kaneko, Fuminori. (Director) (2016). Episode 2. In *Nigeru wa Haji da ga Yaku ni Tatsu* [Running away is a shame, but useful]. Television series. Tokyo Broadcasting System. Tokyo.
- Kindaichi, Haruhiko (1950), Kokugo Dooshi no Ichibunrui [A Classification of Japanese Verbs], *Gengo Kenkyuu*, **15**: 48–63. Reprinted in Kindaichi, Haruhiko, ed. (1976) *Nihongo doshi no asupekuto*, Tokyo: Mugi Shobo. 5–26.
- Kindaichi, Haruhiko (1955), Nihongo doshi no tensu to asupekuto [Tense and Aspect in Japanese Verbs]. *Nagoya Daigaku Kenkyuu Ronshuu X*. Reprinted in Kindaichi, Haruhiko, ed. (1976) *Nihongo doshi no asupekuto*, Tokyo: Mugi Shobo. 27–61.
- Klein, Wolfgang. (1994), *Time in Language*, New York: Routledge
- Kratzer, Angelika (1981), The notional category of modality. In Eikmeyer, Hans J. / Rieser, Hannes (eds.) *Words, worlds, and contexts: New approaches in word*. de Gruyter, Berlin. 8-74.

- Kudo, Mayumi (1995), *Asupekuto, Tensu Taikei to Tekusuto: Gendai Nihongo no Jikanno Hyougen* [Aspect, Tense System and Text: Temporal Expressions in Modern Japanese]. Hituzi Syobo. Tokyo.
- Kusumoto, Kiyomi (2003), The semantics of *-teiru* in Japanese. In Patricia M. Clancy (ed) *Japanese/Korean linguistics 11*. CSLI Publications. Stanford, CA. 367–380.
- Landman, Fred (1992), The Progressive. *Natural Language Semantics* 1:1-32.
- McClure, William (1994), *Syntactic projections of the semantics of aspect*, PhD Dissertation. Cornell University. Ithaca, NY.
- Moens, Marc and Mark Steedman (1998), Temporal Ontology and Temporal Reference, *Computational Linguistics* 14:15–28.
- Nishiyama, Atsuko (2006), The Meaning and Interpretations of the Japanese Aspect Marker *-te i-*. *Journal of Semantics*, 23(2):185-216.
- Ogihara, Toshiyuki (1998), The ambiguity of the *-te iru* form in Japanese. *Journal of East Asian Linguistics* 7:87–120.
- Okuda, Yasuo (1978a), *Asupekuto no kenkyuu o megutte, I* [On the Study of Aspect, I]. *Kyouiku Kokugo* 53:33–44
- Okuda, Yasuo (1978b), *Asupekuto no kenkyuu o megutte, II* [On the Study of Aspect, II]. *Kyouiku Kokugo* 54:14–27.
- Parsons, Terence (1990) *Events in the Semantics of English*. MIT Press. Cambridge, MA.
- Portner, Paul (1998), The progressive in modal semantics. *Language* 74:760-787.
- Prince, Ellen (1973), Futurate *be-ing* or why *Yesterday morning, I was leaving on the midnight special* is OK. Unpublished MS.
- Reichenbach, Hans (1947), The tenses of verbs. In *Elements of symbolic logic*. The Macmillan Company. New York. 287–298.
- Rothstein, Susan (2004), *Structuring events: A study in the semantics of lexical aspect*. Blackwell. Malden, MA.

Shirai, Yasuhiro (2000), The semantics of the Japanese imperfective *-teiru*: An integrative approach. *Journal of Pragmatics* **32**:327–361.

Vendler, Zeno (1967), *Linguistics in Philosophy*. Cornell University Press. Ithaca, New York.

Vlach, Frank (1981), The Semantics of the Progressive. in P. J. Tedeschi and A. Zaenan (eds.), *Syntax and Semantics Vol. 14: Tense and Aspect*. Academic Press.