The Ambiguity of the *-te iru* Form in Japanese*

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Abstract

This article presents a formal semantic account of the ambiguity associated with the *-te iru* construction in Japanese. This construction is known to receive at least two distinct interpretations: on-going process interpretations analogous to the English progressive and so-called resultative interpretations. The latter are sub-classified by some researchers into concrete result state readings and experiential state readings. Based upon the distributional properties of adverbials, we suggest that progressive interpretations of DURATIVE VERBS and concrete result state interpretations of INSTANTANEOUS VERBS should be grouped together, as opposed to experiential readings of DURATIVE or INSTANTANEOUS VERBS. To account for the distinction between these two types of interpretation, the proposed system analyzes the *-te iru* form into the morpheme *-te*, which is claimed to bear a perfect feature, and the aspectual auxiliary *iru*. Our proposal for the aspectual auxiliary *iru* is an extension of Landman's (1992) proposal and offers a unified account of the multiple interpretations of *-te iru* on the basis of a new analysis of INSTANTANEOUS VERBS.

1. Introduction

In this article, we will discuss the semantics of the *-te iru* form in Japanese and propose an account of its multiple interpretations in a formal semantic framework. Kindaichi (1950) points out that the *-te iru* form in Japanese is ambiguous between two interpretations. Consider the following examples:

(1) a. Taroo-wa ima ie-o tate-te iru.
Taro-Top now house-Acc build-TE IRU-Pres
'Taro is now building a house.'

b. Hito-ga asoko-de sin-de iru.[1]
person-Nom there-at die-TE IRU-Pres
'There is a body there.' (Lit.: 'A man is dead there.')

If we assumed that the *-te iru* form in Japanese has exactly the same meaning as the English progressive, we would predict that (1a–b) translate into English as (2a–b).

(2) a. Taro is building a house.

b. A man is dying.

Both (1a) and (2a) have an on-going process interpretation and fail to entail that Taro will eventually finish building a house. On the other hand, (1b) and (2b) do not share the same meaning. In fact, they have opposite entailments. (1b) entails that the man is dead, whereas (2b) entails that the man is not (yet) dead. (1b) is said to have a result state (*kekka zanzon*, literally 'result remain') interpretation.

Given that *-te iru* and *be -ing* produce the same interpretation in (1a) and (2a), it is surprising that they yield opposite entailments in (1b) and (2b). The interpretation of (1b) somewhat resembles that of *The man has died*, but its "main focus" (however it is analyzed formally) is the current result state, rather than the past event that produced this state. The states described by the *-te iru* form are often concrete ones best described in English by the adjectival use of past participles. Here are some examples of the result state use of the *-te iru* form along with their English translations with past participles.[2]

(3) a. Ko-no ha-ga oti-te iru.
tree-Gen leaf-Nom fall-TE IRU-Pres
'There are fallen leaves (on the ground).'

b. Sono ronbun-wa syuppansa-re-te iru.
that paper-Top publish-PASS-TE IRU-Pres
'That paper is published.'

c. Ie-ga tubure-te iru.
house-Nom collapse-TE IRU-Pres
'There is a collapsed house over there.'

Kindaichi's work on aspectual properties of Japanese verbs motivated many other researchers to work on the same topic. Fujii (1966) points out that some finer distinctions should be made among the possible interpretations of the *-te iru* form. Consider the following example:

(4) Taroo-wa zyukken-mo ie-o tate-te iru.
Taro-Top 10-CL-as-many-as house-Acc build-TE IRU-Pres
'Taro has the experience of having built as many as ten houses.'

(1b) and (4) are similar in that the event described by the sentence must be located wholly in the past in relation to the speech time. But they also have differences. (1b) is true only when a body is actually lying on the floor now, whereas (4) can be true even if the ten houses Taro built have since been torn down. Intuitively, (4) says that some aftereffect of Taro's building ten houses still obtains now. But the result state that obtains now cannot be the existence of the ten houses Taro built, as the above case demonstrates; it is something more abstract. I claim that what obtains now is Taro's experience of having built ten houses.[3] For example, (4) can imply that Taro is an experienced builder (by virtue of the fact that he has built as many as ten houses) as in the following discourse:

(5) Hanako: Dare-ni ie-o tate-te morau-no?
who-Dat house-Acc build have-Pres-Q
'Who shall we have build our house?'
Jiro: Taroo-ga ii.
Taro-Nom good-Pres
Taroo-wa zyuk-ken-mo ie-o tate-te iru.
Taro-Top 10-CL-as-many-as house-Acc build-TE IRU-Pres
'Let's ask Taro. He built as many as ten houses so far. (Thus, he is an experienced builder.)'

N.B. CL = classifier

This conversation is completely natural. This receives an account if we assume that the italicized sentence in (5) conveys some information about the utterance time. If the italicized sentence in (5) were replaced with (6), which is in the simple past tense, the resulting discourse would be anomalous.

(6) Taroo-wa zyuk-ken-mo ie-o tate-ta.
Taro-Top 10-CL-as-many-as house-Acc build-Past
'John built as many as ten houses.'

We can assume that unlike (4), (6) merely describes a past event without relating it to the current state of affairs. In what follows, an attempt will be made to explain the complex behavior of the *-te iru* construction in a principled manner.

2. The Semantics of the Progressive in English

It is our main concern in this article to investigate the semantic properties of *-te iru*, which interacts in an interesting way with the Aktionsarten (action types) of the verbs to which it is attached. Thus, let us briefly discuss some important issues that concern aspectual properties of verbs. For details, the reader is referred to Dowty (1979) and the subsequent literature. Let us start with a brief overview of Vendler's (1957) classification system because it is perhaps best known among the modern proposals. Vendler's classification system has four categories:

STATES, ACTIVITIES, ACHIEVEMENTS, and ACCOMPLISHMENTS. As shown in (7a), STATES can occur in the simple present tense to describe situations that obtain at the utterance time. They normally cannot occur in the progressive form, as shown in (7b). ACTIVITIES and ACCOMPLISHMENTS occur in the progressive form to indicate that the associated processes go on at the utterance time. ACTIVITIES indicate events that do not have built-in goals, whereas ACCOMPLISHMENTS describe those that do. They are exemplified by (7c) and (7d), respectively.

(7) a. John knows Mary.
b. *John is knowing Mary.
c. John is watching T.V.
d. John is building a house.

The progressive is a good diagnostic for distinguishing between STATES, on the one hand, and ACTIVITIES and ACCOMPLISHMENTS, on the other. However, the status of ACHIEVEMENTS in relation to the progressive is not clear-cut. Intuitively, ACHIEVEMENTS are those that describe instantaneous events (at least at the conceptual level). The original Vendlerian system assumes that they cannot occur in the progressive. However, Dowty (1979) and others have noticed that most of what are classified as ACHIEVEMENTS can occur in the progressive. (8a–b) seem to indicate that *fall asleep* and *die* are ACHIEVEMENT VERB PHRASES, but they can occur in the progressive as shown in (8c–d).

(8) a. John fell asleep at 12 noon.

b. John died at 11:35 P.M.

c. John is falling asleep.

d. John is dying.

Given these descriptive generalizations about the four Vendlerian aspectual sentence types, let us present the semantic account of the progressive that we will assume for the purpose of this article.

We will adopt Landman's (1992) proposal for the progressive, which provides a solution to the imperfective paradox (Dowty (1979)). The imperfective paradox is characterized by the lack of the following entailment:

(9) NP is V-ing. ⇒ NP will have V-ed.

For example, (10a) does not entail (10b).

(10) a. Mary is building a house.

b. Mary will have built a house.

Some possible solutions to this puzzle are proposed by Dowty (1979, 149) and Vlach (1981, 285–286), among others. But these solutions are known to suffer from some empirical problems. Landman's account incorporates the insights of the previous analyses and yet avoids the problems associated with them. For example, Landman analyzes (11a) as in (11b).

(11) a. Mary was building a house.

b. $\exists e_1[\tau(e_1) < \text{now} \ \& \ \text{PROG}(e_1, \lambda e \exists x[\text{HOUSE}(x) \ \& \ \text{BUILD}(e) \ \& \ A(e)=m \ \& \ TH(e)=x])]$

(11b) informally reads, "There is a past event that stands in the PROG relation to the set of events of Mary's building a house." τ denotes the temporal trace function, a partial function that applies to an event and yields its temporal extension (its "run time") as its value. *A* and *TH* are thematic roles standing for agent and theme, respectively. They denote partial functions from events to individuals. $A(e)=m$ reads, "The agent of *e* is Mary." The semantics of the operator PROG is given as follows:

(12) For any eventuality variable *e* and an expression P_e that denotes a set of eventualities, $[\![\text{PROG}(e, P_e)]\!]_{w, g} = 1$ iff
$\exists e' \exists w'[\langle e', w' \rangle \in \text{CON}(g(e), w) \ \& \ [\![P_e]\!]_{w',g}(e') = 1]$.

The term "eventuality" is due to Bach (1986) and is used to refer collectively to states and events. Henceforth, double brackets ("⟦⟧") are used to indicate denotations of expressions. For example, $[\![\alpha]\!]_{w,g}$ means the denotation of α (with respect to the world *w* and the value assignment *g*). (12) requires that there be an eventuality *e′* and a world *w′* such that $\langle e', w' \rangle$ is an element of the "continuation branch" of $\langle g(e), w \rangle$, which is symbolized as $\text{CON}(g(e), w)$. For example, $[\![\text{PROG}(e, \lambda e_1 \exists x[\text{HOUSE}(x) \ \& \ \text{BUILD}(e_1) \ \& \ A(e_1)=\text{Taro} \ \& \ TH(e_1)=x])]\!]_{w,g}$ is determined as

follows: If the continuation stretch of $g(e)$ in w is a complete eventuality of Taro's building a house, this formula is true. If the continuation stretch of $g(e)$ in w stops without yielding a desired eventuality, we go to the closest world w_1 where it does not stop, if it is reasonable to do so, and check whether its continuation stretch in w_1 is a desired eventuality. If we obtain a desired eventuality in w_1, then the above formula is true. If not, we continue the search in the closest world w_2 where the eventuality does not stop. This can be repeated any number of times until it becomes unreasonable to do so. This informal summary of Landman's proposal should be adequate for our purposes.

Before we leave this topic, we shall discuss a problem associated with PROGRESSIVE ACHIEVEMENTS. As far as I can see, all previous proposals including Landman's suffer from this problem, though this fact has not attracted much attention in the literature. If ACHIEVEMENTS describe (nearly) instantaneous events, Landman's account has difficulty with examples like (8a–d). Intuitively, when (8b) is true, (8d) could still be true at 11 P.M. However, if we assume that the eventuality of John's dying that makes (8b) true is a instantaneous or semi-instantaneous event, there exists no progressive dying eventuality at 11 P.M. that could be extended to the complete eventuality of John's death, the temporal extension of which is presumably 11:35 P.M.

To solve this problem, we will propose the following definition (originally due to Mats Rooth, personal communication) of TENSELESS ACHIEVEMENT SENTENCE, assuming that any tenseless sentence denotes a set of eventualities.[4]

(13) TENSELESS ACHIEVEMENT SENTENCE is defined as a sentence ϕ such that for any eventuality e that belongs to $[\![\phi]\!]$, the following holds: (i) there is an instantaneous event e' that is a subevent of e such that $e' \in [\![\phi]\!]_{w,g}$, where e and e' can be the same eventuality; (ii) any subeventuality e' of e belongs to $[\![\phi]\!]$ iff e and e' share the same end point (formally, $\forall e[e \in [\![\phi]\!] \rightarrow [\exists e'[e' \subseteq e$ & MOMENT$(\tau(e'))$ & $e' \in [\![\phi]\!]_{w,g}] \; \& \; \forall e_1[[e_1 \; o e] \rightarrow [\text{FINAL}(\tau(e))=\text{FINAL}(\tau(e_1)) \leftrightarrow e_1 \in [\![\phi]\!]]]]]$, where $e' \subseteq e$ reads 'e' is a subpart of e', e_1 o e reads 'e_1 overlaps with e', MOMENT(t) = 1 iff t is a moment of time, FINAL(t) (if defined) is the final point of t).[5]

(13) says among other things that for any eventuality e that belongs to the extension of some ACHIEVEMENT ϕ, any e' that overlaps with e belongs to the extension of ϕ iff e and e' share the same ending point. For example, *John dies* can be true both "at" an interval $\{t \mid 3$ P.M. $\leq t \leq 5$ P.M.$\}$ and at 5 P.M. But it cannot be true both at $\{t \mid 3$ P.M. $\leq t \leq 5$ P.M.$\}$ and at $\{t \mid 3{:}30$ P.M. $\leq t \leq 4{:}30$ P.M.$\}$. This allows us to accommodate two seemingly contradictory observations about ACHIEVEMENTS, that they appear to describe instantaneous events in the simple past as in (8a–b), and that they seem to describe protracted events in the progressive as in (8c–d). This account is compatible with our intuition that the process described in (8d) led to John's death described in (8b). To see how this is executed technically, consider (14a) and (14b). First, (14a) translates as in (14c). (14c) is true in the actual world w_0 if (but not iff) there is a past eventuality in w_0 that is part of a complete eventuality of John's dying in w_0. Assume that a

complete dying eventuality involving John starts earlier than 11 P.M. and ends at 11:35 P.M. (13) then requires that there be an instantaneous dying eventuality of which John is the theme that obtains at 11:35 P.M. These two eventualities end simultaneously and can be regarded as describing one and the same death.

(14) a. John was dying at 11 P.M.

b. John died at 11:35 P.M.

c. $\exists e_1[\tau(e_1) < \text{now} \ \& \ \text{PROG}(e_1, \lambda e[TH(e)=j \ \& \ \text{DIE}(e)])]$

On the basis of this analysis of the English progressive, we will return to the *-te iru* form in Japanese and discuss how to account for its ambiguity.

3. Toward a Descriptive Generalization About Aktionsarten in Japanese

The first important modern work that deals with the Aktionsarten in Japanese is Kindaichi (1950), whose proposal we discussed briefly in section 1. The verb classification system that Kindaichi proposes is very much like Vendler's, and it predates Vendler's article (1957). In Kindaichi's classification system, the *-te iru* form plays an important role. Kindaichi classifies verbs into four groups as shown in (15).[6]

(15) a. STATIVE VERBS — *iru* 'exist' (for animate beings), *aru* 'exist' (for non-animate objects), *dekiru* 'can'

b. DURATIVE VERBS — *yomu* 'read', *kaku* 'write'

c. INSTANTANEOUS VERBS — *sinu* ‘die’, (*denki-ga*) *tuku* ‘(the light) comes on’

d. FOURTH VERBAL CATEGORY — *sobieru* ‘towers’, *arihureru* ‘be a commonplace’

Kindaichi proposes the following criteria for drawing these distinctions: (a) STATIVE VERBS are defined as those to which *-te iru* cannot be attached; (b) DURATIVE VERBS are those that can occur with *-te iru* for on-going process readings. They roughly correspond to ACTIVITIES and ACCOMPLISHMENTS in Vendler’s system; (c) INSTANTANEOUS VERBS (≈ ACHIEVEMENTS) are defined as those that are required to receive result state interpretations in the *-te iru* form. They intuitively describe instantaneous events; (d) Those verbs that must be used in the *-te iru* form in simple sentences are said to belong to THE FOURTH VERBAL CATEGORY. (Kindaichi gives this category no mnemonic name.) The verbs that belong to this category cannot occur in the simple past in simple sentences. Let us present some sentences that exemplify these verb classes.

(16) a. Tukue-wa ima heya-ni aru.
desk-Top now room-Dat be-Pres
‘The desk is in the room now.’

b. *Tukue-wa ima heya-ni at-te iru.
desk-Top now room-Dat be-TE IRU-Pres
[Lit.] ‘The desk is being in the room now.’

(16a) and (16b) involve the verb *aru* (‘exist’), which is used exclusively for inanimate objects. (16a) shows that it can depict a situation obtaining at the speech time in the simple present tense. In fact, as (16b) shows, affixing *-te iru* to the verb results in ungrammaticality. Thus, *aru* is a STATIVE VERB according to Kindaichi. Unlike English, Japanese has a relatively small number of STATIVE VERBS. They usually describe existence, modal concepts, and timeless relations among objects (e.g., *iru* ‘exist’ (used for animate beings), *dekiru* ‘can’, *ataru* ‘correspond to’).

(17) a. John-wa ima hon-o yon-de iru.
John-Top now book-Acc read-TE IRU-Pres
‘John is reading a book now.’ [on-going process]

b. Asoko-de hito-ga sin-de iru.
over-there-at person-Nom die-TE IRU-Pres
‘There is a dead person over there.’ [result state]

(17a) shows that the verb phrase *hon-o yomu* ‘read (a/the) book(s)’ can occur with *-te iru* for a progressive interpretation. Thus, *hon-o yomu* is a DURATIVE VERB PHRASE. (17b) shows that *sinu* can occur with *-te iru*, but it can only have a result state interpretation. Therefore, *sinu* is categorized as an INSTANTANEOUS VERB.

Note that the class of INSTANTANEOUS VERBS in Japanese does not completely correspond to the class of ACHIEVEMENT VERBS in English.[7] The former are intransitive verbs that have certain non-agentive subjects. Japanese has many pairs of morphologically and semantically related verbs such that one

member of each pair is a transitive verb and the other is an intransitive verb whose sole argument bears the same non-agentive theta-role as the internal (i.e., object NP) argument of the transitive verb (Kindaichi (1950), Jacobsen (1992)). Some examples of transitive-intransitive pairs are provided in (18):

(18)

TRANSITIVE	INTRANSITIVE	ENGLISH TRANSLATION
taosu	taoreru	fell (*or* knock down)/fall
hiraku/akeru	hiraku/aku	open
kowasu	kowareru	break
mitukeru	mitukaru	find/be found

In English, a transitive verb and its intransitive counterpart behave alike when they occur in the progressive form. By contrast, Japanese exhibits a clear difference between transitive verbs and their intransitive counterparts with regard to their interactions with the *-te iru* form.

(19) a. John is opening the door. [transitive]

b. The door is opening. [intransitive]

c. John-wa doa-o ake-te iru. [transitive]
John-Top door-Acc open-TE IRU-Pres
'John is opening the door.' [or 'John has the experience of having opened the door.']

d. Doa-wa ai-te iru. [intransitive]
door-Top open-TE IRU-Pres

‘The door is open.’

In English, the transitive verb *open* and the intransitive verb *open* are both ACCOMPLISHMENTS in that both can describe on-going processes in the progressive. In Japanese, the transitive verb *akeru* ‘open’ can express an on-going process interpretation in the *-te iru* form, whereas the intransitive verb *aku* ‘open’ cannot. Kindaichi’s system puts *akeru* in the DURATIVE CLASS and *aku* in the INSTANTANEOUS CLASS.

Given a transitive verb and an intransitive verb in Japanese that form a pair, we can describe one and the same event with either of them. However, the process associated with such an event can only be described by the transitive verb. Let us look at one concrete example: Taro goes to Hanako’s house and knocks on the door. Hanako opens the door from inside the house in such a way that Taro could not see her open it. Jiro is inside the house and sees Hanako open the door. Taro and Jiro can describe this situation in two different ways.[8]

(20) a. Taro: Doa-ga ai-ta.
door-Nom open-Past
‘The door opened.’

b. Jiro: Hanako-ga doa-o ake-ta.
Hanako-Nom door-Acc open-Past
‘Hanako opened the door.’

Suppose that Hanako opens the door so slowly that both Taro and Jiro can describe what is happening when the door is half open. Since (20a) and (20b) describe the same situation, they are expected to have exactly the same temporal properties. Therefore, it seems reasonable to expect that both (21a) and (21b), which are *-te iru* versions of (20a) and (20b), can describe the on-going process in question.

(21) a. Taro: #Doa-ga (dandan) ai-te iru.[9]
door-Nom gradually open-TE IRU-Pres
[Intended] 'The door is opening.'

b. Jiro: Hanako-ga doa-o ake-te iru.
Hanako-Nom door-Acc open-TE IRU-Pres
'Hanako is opening the door.'

However, there is an asymmetry between (21a) and (21b). Despite the fact that both Taro and Jiro are observing the same protracted event, only Jiro can describe the on-going process associated with it.[10] Thus, DURATIVE VERBS and INSTANTANEOUS VERBS in Japanese do not completely correspond to ACCOMPLISHMENTS (or ACTIVITIES) and ACHIEVEMENTS in English. The contrast observed in (21) also tells us that the distinction between two Aktionsarten classes cannot always be drawn in terms of intrinsic differences in the real-world situations being described. In many cases, the difference stems from different ways of describing the same state of affairs. The observations made so far about *-te iru* will be incorporated in the formal system to be proposed later.

In simple sentences, the verb *niru* must be in the *-te iru* form to indicate a current state as in (22a). If it occurs in the simple past tense in a simple sentence as in (22b), the resulting sentence is ill-formed. Thus, *niru* belongs to the FOURTH VERBAL CATEGORY in Kindaichi's terms.

(22) a. Hanako-wa hahaoya-ni ni-te iru.[11]
Hanako-Top mother-Dat resemble-PROG-Pres
'Hanako resembles her mother.'

b. *Hanako-wa hahaoya-ni ni-ta.
Hanako-Top mother-Dat resemble-Past
Intended: 'Hanako came to look like her mother.'

In some special constructions, *niru* can occur without *-te iru*, as shown in (23).

(23) a. Taroo-wa kinoo
Taro-Top yesterday
[$_{NP}$ Hanako-ni ni-ta hito]-ni at-ta.
Hanako-Dat resemble-Past person-Dat meet-Past
'Taro met a person who resembles Hanako.'

b. Hanako-wa dandan hahaoya-ni ni-te ki-ta.
Hanako-Top gradually mother-Dat resemble-TE KURU-Past
'Hanako has come to look more and more like her mother.'

(23a–b) show that *niru* is an independent verb at least from the morphological point of view. (23a) shows that the simple past tense form of the verb *niru* can be used in a relative clause to describes a current state.[12] (23b) indicates that *niru* can combine with *-te kuru* to convey an inchoative meaning. *Kuru* literally means 'come' and is used as an auxiliary verb in (23b).

As mentioned in section 1, Fujii (1966) notes that the *-te iru* construction can be used to talk about two different types of result states, i.e., "regular" result states and what he calls experiences. Fujii notices that "regular" result state readings can only occur with adverbials like *ima* 'now', whereas experience readings can only occur with adverbials that indicate completed events or past intervals, such as *kyonen* 'last year' and *mae-ni* 'in the past'. Consider (24a–b), which involve the INSTANTANEOUS VERB *taoreru* 'fall down'.

(24) a. Kare-wa ima taore-te iru.
he-Top now fall-down-TE IRU-Pres
'He is now lying [on the ground/on the floor] (as a result of having fallen).'

b. Kare-wa zenkai totyuu-de taore-te iru node,
he-Top last-time half-way-at fall-down-TE IRU-Pres since
konkai-mo abunai.
this-time-also uncertain
'Since he fell down half way through (the race), he probably won't make it this time, either.'

The state described by (24a) is the physical state of his lying on the ground, which has been brought about by his having fallen down on the ground. That is, (24a) entails that he is lying on the ground now. Note that the adverbial *ima* 'now' occurs in the sentence. The state in question is transient and is very much like the properties denoted by "stage-level predicates" (Carlson (1977)). By contrast, (24b) does not entail that he is lying on the ground at the utterance time. What obtains now is his experience that he acquired when he collapsed during the race. (24b) states that judging from his performance in the last race, he is not expected to do well in this one, either. The experience involved can be regarded as a permanent property of the individual in question and is reminiscent of those properties denoted by individual-level predicates (Carlson (1977)).[13]

The distributional properties of adverbials also help us to distinguish between the two types of interpretation associated with DURATIVE VERBS in the *-te iru* form.

(25) a. John-wa ima tabe-te iru.
John-Top now eat-TE IRU-Pres
'John is eating (now).'

b. John-wa kesa kitinto tabe-te iru.
John-Top this-morning adequately eat-TE IRU-Pres
'John has the experience of having eaten well this morning.'

In both (25a) and (25b), the verb *taberu* ‘eat’ occurs in the *-te iru* form and is in the present tense. Nevertheless, (25a) describes an on-going event, whereas (25b) refers to John’s experience of having eaten adequately this morning. Note that (25a) occurs with *ima* ‘now’, whereas (25b) occurs with *kesa* ‘this morning’. (25b) does not entail that John is eating now. In fact, it pragmatically suggests otherwise. Just as in (24b), (25b) talks about one of John’s current properties that has resulted from having eaten adequately this morning. (25b) can be used as in (26), which mentions one possible result of eating adequately: being full of energy.

(26) John-wa [kesa kitinto tabe-te iru node]
John-Top this-morning adequately eat-TE IRU-Pres because
genki-da.
be-fine-Pres
‘John is full of energy because he ate adequately this morning.’

The descriptive generalization obtained from the above discussion is that the two major types of interpretation associated with *-te iru* can be distinguished in terms of the distribution of adverbials. The proposal presented in the next section incorporates this new classification.

In the next section, I will try to develop a formal proposal that answers the following question: why can the *-te iru* construction be used for such different concepts as processes and result states? In answering this question, Jacobsen (1992) notes that sentences in the *-te iru* form have the subinterval property

(Bennett and Partee (1972)). For example, when *Taroo-ga hasit-te iru* ‘Taro is running’ is true at some interval *t*, this sentence is true at all subintervals of *t*. The same is true of *Ki-ga taore-te iru* ‘A tree is lying on the ground’. We shall provide a compositional semantic analysis of sentences in the *-te iru* form that yields this property as a consequence.

4. Toward an Analysis

To the best of my knowledge, the previous works on aspectual properties of Japanese verbs fall into two major groups. Kindaichi (1950), Ota (1971), and others distinguish between progressive interpretations and resultative interpretations. For these researchers, the distinction between concrete result states and experiential states is not a major distinction. Other researchers such as Fujii (1966) recognize the importance of the difference between concrete result states and experiences, but they do not put progressive readings for DURATIVE VERBS and result state readings for INSTANTANEOUS VERBS in the same class. They regard progressive, resultative, and experience as three separate aspectual types, without discussing the relations among them. Nakau (1976) also posits various independent aspectual meanings (e.g., progressive, durative, resultative) to account for the ambiguity of *-te iru*.

Prima facie, the position that only recognizes progressive and resultative readings for *-te iru* appears to be valid because they have opposite entailments. On this assumption, the task of the researcher is to explain why the *-te iru*

construction is capable of producing these two types of interpretation. We tentatively define them as in (27a–b).

(27) a. *NP-wa V-te iru* has an ON-GOING PROCESS INTERPRETATION iff it does not entail *NP-wa moo V-te simat-ta* 'NP already V-ed' or 'NP finished/stopped V-ing'.

b. *NP-wa V-te iru* has a RESULT STATE INTERPRETATION iff it entails *NP-wa moo V-te simat-ta* 'NP already V-ed' or 'NP finished/stopped V-ing'.[14]

Now consider (28a–d).

(28) a. Taroo-wa ima ie-o tate-te iru.
Taro-Top now house-Acc build-TE IRU-Pres
'Taro is now building a house.'

b. Taroo-wa zyuk-ken-mo ie-o tate-te iru.
Taro-Top 10-CL-as-many-as house-Acc build-TE IRU-Pres
'John has the experience of having built as many as ten houses.'

c. Taroo-wa (genzai) kekkonsi-te iru.
Taro-Top now get-married-TE IRU-Pres
'Taro is married (now).'

d. Taroo-wa 1970-nen-ni kekkonsi-te iru.
Taro-Top 1970-year-in get-married-TE IRU-Pres
'Taro has the experience of getting married in 1970.'

According to (27a–b), (28a) has an on-going process interpretation, whereas (28b–d) have result state interpretations. This analysis groups together concrete result states (e.g., (28c)) and experiences (e.g., (28b) and (28d)), as opposed to on-going process interpretations (e.g., (28a)). This position is schematically represented as in (29). We tentatively designate these two types of interpretation as -TE IRU$_1$ and -TE IRU$_2$.

(29)

verb class	-TE IRU$_1$	-TE IRU$_2$
DURATIVE VERBS	on-going process	resultative
INSTANTANEOUS VERBS	————	resultative

(29) indicates that *-te iru* can yield two types of interpretation. -TE IRU$_1$ only occurs with DURATIVE VERBS and produces on-going process interpretations. -TE IRU$_2$ occurs with DURATIVE and INSTANTANEOUS VERBS and yields result state interpretations. The point here is that the progressive reading of *-te iru* is contrasted with all other readings of *-te iru*. I regard the generalization represented by (29) as unsatisfactory.

Recall the observation made in the previous section that on-going process readings and concrete result state readings produced by the *-te iru* form occur with the same type of adverbial, such as *ima* ‘now’, *mada* ‘still’, etc. By contrast, experiential state readings are characterized by a different type of adverbial, those that indicate completed events (e.g., *itido* ‘once’) or past intervals (e.g., *kinoo* ‘yesterday’, *kyonen* ‘last year’).[15] Let us propose the following revised

classification of the interpretations associated with *-te iru* based on the distribution of adverbials.

(30) a. *ϕ-te iru* has a "CURRENT SITUATION" INTERPRETATION iff *ϕ-te iru* has the same truth condition as *ima ϕ-te iru* .
N.B. *ima* means 'now'.

b. *ϕ-te iru* has an EXPERIENTIAL INTERPRETATION iff adding an appropriate adverbial indicating a past interval (e.g., *kinoo* 'yesterday', *kyonen*, 'last year') or a completed action/event (e.g., *itido* 'once') to *ϕ-te iru* does not change its truth conditions.

On the basis of (30a–b), we arrive at the following new classification of the interpretations associated with *-te iru*:

(31)

verb class	-TE IRU$_1$ (for "current situation")	-TE IRU$_2$ (for experience)
DURATIVE VERBS	on-going process	experience
INSTANTANEOUS VERBS	(concrete) result state	experience

In this classification system, -TE IRU$_1$ gives rise to on-going process readings associated with DURATIVE VERBS and result state readings associated with INSTANTANEOUS VERBS. On the other hand, -TE IRU$_2$ yields experience readings when combined with DURATIVE or INSTANTANEOUS VERBS. I believe that this

classification of the interpretations associated with *-te iru* is more natural than that represented by (29).

At this point, let us turn to what Kindaichi (1950) calls the FOURTH VERBAL CATEGORY. Consider the examples in (32).

(32) a. Taroo-wa suugaku-no seeseki-ga zubanuke-te iru.
Taro-Top math-GEN grade-Nom be-outstanding-TE IRU-Pres
'Taro is outstanding in math.'

b. Biru-ga takaku sobie-te iru.
building-Nom high tower-TE IRU-Pres
'A building stands tall.' (≈ 'There is a tall building in sight.')

As the glosses show, (32a–b) merely indicate the current state of Taro's being outstanding in math and the current state of the building's standing tall, respectively. Note that (33a–d) are ill-formed.

(33) a. *Taroo-wa suugaku-no seeseki-ga zubanuke-ru.
Taro-Top math-GEN grade-Nom be-outstanding-Pres
[Intended] 'Taro is (now) outstanding in math.'

b. *Taroo-wa suugaku-no seeseki-ga
Taro-Top math-GEN grade-Nom
itigatu-ni zubanuke-ta.
January-in be-outstanding-Past
[Intended] 'Taro became outstanding in math in January.'

c. *Yama-ga takaku sobieru.
mountain-Nom tall tower-Pres
[Intended] ‘The mountain (now) stands tall.’

d. *Yama-ga 1970-nen-ni takaku sobieta.
mountain-Nom 1970-year-in tall tower-Past
[Intended] ‘The mountain became tall in 1970.’

(33a) shows that *zubanukeru* is not a LEXICAL STATIVE VERB. (33b) shows that it does not have an inchoative event reading, either. Similarly for (33c–d). These observations cannot be accounted for in pragmatic terms. For example, it is quite possible that Taro’s grade on mathematics improved dramatically in January. (33b) is ill-formed even in this case. The same is true of (33d). It is conceivable that a mountain with low altitude became a tall mountain in 1970 as a result of its volcanic activity. Even in this scenario, (33d) is ill-formed. Therefore, the verbs in question are “defective” if they are taken to be INSTANTANEOUS VERBS. I shall pursue the hypothesis that they are in fact defective INSTANTANEOUS VERBS, rather than positing a new verb class for them. This hypothesis is substantiated by some data that involve relative clauses. (34a–b) contain relative clauses that have verbs that belong to the FOURTH VERB CLASS. On the other hand, (34c–d) involve relative clauses that contain regular INSTANTANEOUS VERBS. Note that (34a–d) are well-formed, and in each sentence the past tense form of the verb in the relative clause indicates a current state.[16, 17]

(34) a. Taroo-wa [Hanako-ni ni-ta hito]-to

Taro-Top Hanako-Dat resemble-Past person-with
hanasi-te iru.
talk-TE IRU-Pres
'Taro is talking with a person who resembles Hanako.'

b. Taroo-wa [takaku sobie-ta yama]-o mi-te iru.
Taro-Top high tower-Past mountain-Acc see-TE IRU-Pres
'Taro is looking at a mountain that stands tall.'

c. Taroo-wa [soko-no nuke-ta oke]-o mot-te iru.
Taro-Top bottom-GEN come-off-Past pail-Acc get-TE IRU-Pres
'Taro has a pail with no bottom.'

d. Taroo-wa [hyoosi-no yabure-ta hon]-o mot-te iru.
Taro-Top cover-GEN tear (vi.)-Past book-Acc get-TE IRU-Pres
'Taro has a book the cover of which is torn.'

By contrast, DURATIVE and STATIVE VERBS in the past tense cannot be used in relative clauses to indicate "current situations."

(35) a. Taroo-wa [butai-de odot-ta hito]-o sit-te iru.
Taro-Top stage-at dance-Past person-Acc learn-TE IRU-Pres
'Taro knows a person who danced on the stage.'

b. Taroo-wa [puuru-de oyoi-da hito]-ga suki-da.
Taro-Top swimming pool-at swim-Past person-Nom like-Pres
'Taro likes the person who swam in the swimming pool.'

c. Taroo-wa [heya-ni i-ta hito]-o sit-te iru.

Taro-Top room-at be-Past person-Acc learn-TE IRU-Pres
'Taro knows the person who was in the room.'

Odoru 'dance' and *oyogu* 'swim' are DURATIVE VERBS. When they occur in relative clauses in the past tense as in (35a–b), they can only refer to past events, as indicated by the glosses. For example, (35a) does not entail that the person is now dancing on the stage. In fact, it pragmatically suggests otherwise. (35c) shows that STATIVE VERBS such as *iru* 'exist' pattern with DURATIVE VERBS in that their past tense forms cannot convey current state readings.

The foregoing discussion supports the idea that verbs like *sobieru* 'tower' and *zubanukeru* 'be outstanding' are defective INSTANTANEOUS VERBS in that they cannot be used in the simple past tense to refer to the associated inchoative events, even if such events exist. This position is further substantiated by Kindaichi's (1950) observation that some regular INSTANTANEOUS VERBS such as *magaru* 'bend' (intransitive) can be used in the *-te iru* form to describe current states without entailing the existence of past events that gave rise to current states. (36a) does not entail that there was a past time at which this road became a winding road. It is compatible with a situation where the road was curved from the very start.[18] (36b) makes the same point. If true, it indicates that a human being knows the essence of human language when born. Therefore, there was no past time at which it was learned.

(36) a. Kono miti-wa magat-te iru.
this road-Top bend-TE IRU-Past

‘This road has a turn/is winding.’

b. Ningen-wa (umare-ta toki kara)
people-Top (be-born-Past time from)
gengo-no honsitu-o sit-te iru.
language-GEN essence-Acc learn-TE IRU-Pres
‘A human being knows the essence of human language (from birth).’

These examples show that INSTANTANEOUS VERBS sometimes behave like members of the FOURTH VERBAL CATEGORY. The behavior of these verbs in relative clauses is also consistent with the above findings. That is, *Magaru* ‘bend’ and *siru* ‘learn’ can be used in the past tense to refer to current states, rather than past events.[19]

(37) a. Taroo-wa [magat-ta miti]-o arui-te iru.
Taro-Top bend-Past road-Acc walk-TE IRU-Pres
‘Taro is walking on a winding road.’

b. [sit-ta kao]-wa miatara-nai.
learn-Past face-Top find(vi.)-Neg-Pres
‘There are no familiar faces (here).’

The above discussion points to the conclusion that the verbs that belong to THE FOURTH VERB CLASS should be regarded as defective INSTANTANEOUS VERBS (henceforth, QUASI-INSTANTANEOUS VERBS).

This should not lead the reader to believe, however, that when an otherwise INSTANTANEOUS VERB is used in the *-te iru* form, it is always used as a QUASI-INSTANTANEOUS VERB (i.e., always describe current states without entailing the existence of earlier inchoative events). Consider (38a–b).

(38) a. #Matto-ga yuka-ni oti-te iru.
mat-Nom floor drop-TE IRU-Pres
[intended] 'A mat is on the floor.'

b. Hei-ga taore-te iru.
wall-Nom fall-TE IRU-Pres
'There is a fallen wall [e.g., on the ground].'

(38a–b) involve regular INSTANTANEOUS VERBS and entail that there were earlier times at which some relevant inchoative events took place. For example, (38a) cannot be used to describe a properly placed mat. If *oti-te iru* were an expression that merely indicates the current state of the mat (i.e., its being on the floor), we would expect (38a) to be fully acceptable on the intended interpretation. However, (38a) is required to mean that the mat is there as a result of having fallen from an elevated location. In other words, the truth of (38a) cannot be determined merely by checking the current physical properties of the mat. How it obtained its current properties is part of the truth condition of the sentence. (38b) entails that the wall fell down (or that someone knocked it down) at an earlier time. It is not enough for the wall to be lying on the ground now to make the sentence true. Therefore, it is necessary to distinguish between those that only convey information about

current states in the *-te iru* form and those that entail the existence of inchoative events in addition to current states. I believe that it is best to regard verbs like *magaru* 'bend' as homophonous words. One is a regular INSTANTANEOUS VERB, and the other is a QUASI-INSTANTANEOUS VERB.

5. A Formal Proposal

On the basis of the above discussion and the descriptive generalizations, a formal proposal will be presented in this section to account for the multiple interpretations associated with the *-te iru* form. I use a typed and eventuality-based logical language that resembles Landman's (1992). I will explain any non-standard feature of the language later in this section using some concrete examples. Let us start with the specification of the model. The model is $\langle A, E, T, <, W, R, F\rangle$. A is the set of individuals. E is the set of eventualities. For the purpose of this article, we do not distinguish between events and states. T is the set of instants. $<$ is a strict linear ordering on T. The set of intervals I is defined as the set of all convex ("gapless") subsets of T.[20] W is the set of worlds. R is the set of thematic roles, which are partial functions from eventualities to individuals. A stands for agent, TH for theme, etc. (see Landman (1992)). F is the interpretation function for the language. The generalizations reached in the above discussion will be implemented in the following way: In our proposal, LF structures are largely S-structure based, except that at LF the tense morphemes *-ru* (present) and *-ta* (past) are adjoined to the minimal clause that contains them.

We now formalize the aspectual classes of sentences proposed by Kindaichi. Let us consider STATIVE SENTENCES first. TENSELESS STATIVE SENTENCE is defined as in (39).

(39) TENSELESS STATIVE SENTENCE is defined as a sentence ϕ such that for any element e of $[\![\phi]\!]_{w,g}$, if e' is a subpart of e, e' is also an element of $[\![\phi]\!]_{w,g}$ (formally, $\forall e \forall e_1[[e \in [\![\phi]\!] \,\&\, e_1 \subseteq e] \rightarrow e_1 \in [\![\phi]\!]]$).

(39) states that STATIVE SENTENCES have the subinterval property. Consider now (40).

(40) Taroo-wa Nihon-ni iru.
Taro-Top Japan-at exist-Pres
'Taro is in Japan.'

(40) is turned into its LF structure given in (41a), which in turn translates into our logical language as in (41b). The expression *now* indicates the utterance time. *TH* (= theme) is used to specify the sole argument of the verb *iru*.

(41) a. Taroo-wa Nihon-ni iru Pres
b. $\exists e[\tau(e)=\text{now} \,\&\, \text{EXIST}(e) \,\&\, \text{IN-JAPAN}(e) \,\&\, TH(e)=\text{Taro}]$

The translation given in (41b) says that there exists an eventuality e now, e is in Japan, and the theme of e is Taro. Suppose that Taro's stay in Japan started

yesterday and will last till tomorrow. Then there is an eventuality that corresponds to Taro's entire stay in Japan, and this eventuality is an element of the denotation of the tenseless sentence *Taroo-wa Nihon-ni iru*. (39) in turn guarantees that one of its subeventualities occupies the utterance time and belongs to the set of eventualities denoted by the sentence. Thus, our theory predicts that (41b) is true in the situation described. This is the desired result.

We now turn to some examples that involve DURATIVE SENTENCES and INSTANTANEOUS SENTENCES. We assume that DURATIVE SENTENCES like *Taroo-ga ie-o tateru* 'Taro builds a house' and *Taroo-ga aruku* 'Taro walks' denote sets of non-overlapping eventualities that occupy extended intervals, whereas so-called INSTANTANEOUS SENTENCES like *Taroo-ga sinu* 'Taro dies' and *Hee-ga taoreru* ' A/ The wall falls down' denote sets of eventualities that come in groups, so to speak. For example, suppose that Taro's heart stopped beating at 10 P.M. and his body was lying on the ground until 11 P.M. Then there is an eventuality *e* that belongs to the denotation of *Taroo-ga sinu* 'Taro dies' whose temporal extension is $\{t \mid 10\ \text{P.M.} \leq t \leq 11\ \text{P.M.}\}$. In addition, all sub-eventualities of *e* that start at 10 P.M. also belong to the denotation of *Taroo-ga sinu* 'Taro dies'. Since this semantic characterization renders the name "INSTANTANEOUS SENTENCE" misleading, I will adopt the term "INCHOATIVE EVENTUALITY" to characterize this set of sentences. Let us define tenseless DURATIVE SENTENCE and INCHOATIVE EVENTUALITY SENTENCE in Japanese here.

(42) a. TENSELESS DURATIVE SENTENCE is defined as a sentence ϕ such that for any element *e* of $[\![\phi]\!]_{w,g}$, $\tau(e)$ is an interval that is not an

instant, and no event e' that overlaps with e is an element of $[\![\phi]\!]$ (formally, $\forall e[e \in [\![\phi]\!]_{w,g} \rightarrow [\exists t_1 \exists t_2[t_1 \subseteq \tau(e)$ & $t_2 \subseteq \tau(e)$ & $t_1 \neq t_2]$ & $\neg \exists e_1[e_1$ o e & $e_1 \in [\![\phi]\!]_{w,g}]]]$).

b. TENSELESS INCHOATIVE EVENTUALITY SENTENCE (formerly, INSTANTANEOUS SENTENCE) is defined as a sentence ϕ such that for any element e of $[\![\phi]\!]_{w,g}$, the following holds: (i) there is a instantaneous subevent e' of e (where e and e' can be the same eventuality) such that $e' \in [\![\phi]\!]_{w,g}$; (ii) any e' that overlaps with e is an element of $[\![\phi]\!]_{w,g}$ iff e and e' share the same initial point (formally, $\forall e[e \in [\![\phi]\!] \rightarrow [\exists e'[e' \subseteq e$ & MOMENT$(\tau(e'))$ & $e' \in [\![\phi]\!]_{w,g}]$ & $\forall e_1[[e_1$ o $e] \rightarrow [$INITIAL$(\tau(e))=$INITIAL$(\tau(e_1)) \leftrightarrow e_1 \in [\![\phi]\!]]]]]$, where $e' \subseteq e$ reads 'e' is a subpart of e', e_1 o e reads 'e_1 overlaps with e', MOMENT(t) = 1 iff t is a moment of time, INITIAL(t) (if defined) is the initial point of t).[21]

On the basis of the above assumptions, we suggest the following semantic proposal for the *-te iru* form. First, we analyze the *-te iru* form into the morpheme *-te* and the aspectual auxiliary *iru*. Then we adopt Kuno's (1973, 195) idea that the morpheme *-te* can convey a temporal meaning. For example, in (43a) the event of eating is understood to precede the event of buying a book, but this temporal order is not required in (43b).[22]

(43) a. Gohan-o tabe-te, hon-o kat-ta.
meal-Acc eat-TE, book-Acc buy-Past

(I) had dinner and (then) bought a book.

b. Gohan-o tabe, hon-o kat-ta.
meal-Acc eat, book-Acc buy-Past
(I) had dinner and bought a book.

The temporal information conveyed by *-te* in (43a) is likened to that of a preterit interpretation associated with the English perfect. Note that in (44a) the morpheme *-te* does not indicate that the event of eating is in the past relative to the utterance time; it merely indicates that the meal time precedes the shopping time. Note also that *-te* does not always receive this type of interpretation, as shown in (44b). (44b) juxtaposes two events without imposing any order upon them.

(44) a. Gohan-o tabe-te, hon-o kau.
meal-Acc eat-TE, book-Acc buy-Pres
(I) will have dinner and (then) will buy a book.

b. Taroo-wa heya-ni i-te, terebi-o mi-te iru.
Taro-Top room-Dat be-TE TV-Acc watch-TE IRU-Pres
'Taro is in the room and is watching TV.'

Let us hypothesize that the morpheme *-te* bears a perfect feature. When *-te* has the feature [+perfect], the predicate to which *-te* is attached receives a perfect-like interpretation; if it is marked [–perfect], it does not affect the temporal

interpretation of the main predicate. To be more precise, we propose the following for *-te*:

(45) a. VP $\underset{[-\text{perfect}]}{\text{-te}}$ $\Rightarrow$ **VP**

b. VP $\underset{[+\text{perfect}]}{\text{-te}}$ $\Rightarrow \lambda x \lambda e \exists e_1[\mathbf{VP}(x)(e_1) \,\&\, \text{IN}(x, e) \,\&\, ES(e_1, e)]$[23]

(45a) says that when *-te* has the feature [–perfect], VP-*te* has exactly the same interpretation as the VP. On the other hand, (45b) says that when *-te* bears the feature [+perfect], VP-*te* denotes a function from individuals to sets of "experiential states." *ES* (mnemonic for 'experiential state') denotes in any world *w* a partial function from pairs of eventualities to truth values. We write $ES(e, e')$ to indicate that e' is an "experiential state" triggered by e. For any eventualities e_1 and e_2, if $ES(e_1, e_2)$ holds then $e_1 \supset\subset e_2$ ('e_1 abuts e_2'), where $e_1 \supset\subset e_2$ holds iff $\tau(e_1) < \tau(e_2)$ holds and $\tau(e_1) \cup \tau(e_2)$ is an interval. We impose the following additional restriction upon the denotation of *ES*: for any e_1, e_2, and e_3 such that $ES(e_1,e_2)$ holds and $e_3 \subseteq e_2$, $ES(e_1,e_3)$ holds iff $\text{INITIAL}(\tau(e_2)) = \text{INITIAL}(\tau(e_3))$. The idea is that an expression of the form "VP-te [+perfect] " for any VP and an expression of the form "VP-te [–perfect]," where the VP contains an inchoative eventuality verb, denote the same type of semantic object: a function that applies to an individual to yield a set of eventualities such that any overlapping members of this set share the same initial point. The predicate IN denotes a relation between individuals and eventualities. It is used to represent our intuition that any experiential eventuality concerns some individual. $\text{IN}(x, e)$ reads, "x is in the

experiential state *e*." As we shall see below, this proposal about *-te* will help us to account for the distinction between "current situation" interpretations and experiential state interpretations.

We are now ready to present the semantic rule for the aspectual auxiliary *iru*.

(46) For any eventuality term *e* and an expression P_e that denotes a set of eventualities, $[\![\text{IRU}(e, P_e)]\!]_{w, g} = 1$ iff
$\exists e' \exists w' [\langle e', w' \rangle \in \text{CON}(g(e), w) \ \& \ [\![P_e]\!]_{v,g}(e') = 1]$

The logical expression IRU is assumed to translate a tenseless form of *iru*. That is, the aspectual auxiliary *iru* and tense morphemes are translated separately. Our proposal is an extension of Landman's (1992) in that it is designed for both on-going process interpretations and result state interpretations of *-te iru*. Landman implicitly assumes that we search into the future to find a relevant continuation stretch of $g(e)$ because this accounts for the semantics of the English progressive. To account for the ambiguity of *-te iru*, we extend Landman's original idea in such a way that one can also search into the past to find a desired eventuality. This enables us to account for the semantics of INCHOATIVE EVENTUALITY VERBS in the *-te iru* form.

Let us look at some example sentences.

(47) a. Taroo-wa ima arui-te iru.
Taro-Top now walk-TE IRU-Pres
'Taro is walking now.'

b. Taroo-wa ima ki-o taosi-te iru.
Taro-Top now tree-Acc fell-TE IRU-Pres
'Taro is felling a tree now.'

c. Ki-ga taore-te iru.
tree-Nom fall-TE IRU-Pres
'There is a tree that is lying there [on the ground] as a result of having fallen.'

(47a) receives the following analysis. We can translate (47a) into our logical language via its LF-structure (48).

(48) $[_S[_S$ Taroo-wa $[_{VP}$ ima$[_{VP}[_{VP}$ arui$]$ $\underset{[-\text{perfect}]}{\text{-te}}$ iru]]] Pres]

Unlike many other event-based proposals (e.g., Krifka (1992)), we take *Taroo-ga aruku* 'Taro walks' to denote a set of eventualities each of which is a maximal walking by Taro. To be more specific, if Taro walks from 5 P.M. to 5:30 P.M. without stopping, we posit an eventuality of Taro's walking the temporal extension of which corresponds exactly to this interval. We assume that VP-*te iru* (tenseless) translates as in (49).

(49) VP-te iru (tenseless) $\Rightarrow \lambda x \lambda e$[IRU($e$, **VP-te**($x$))]
N.B. **VP-te** indicates the translation of VP-te.

Since (47a) receives an on-going process interpretation, *-te* has no semantic contribution to make here. As a result, *arui-te iru* (tenseless) translates as in (50).

(50) arui -te iru (tenseless) ⇒
[–perfect]

$\lambda x \lambda e[\text{IRU}(e, \lambda e[\text{WALK}(e) \,\&\, A(e)=x])]$

(50) combines with the adverb *ima* 'now' to yield (51).

(51) [ima[[$_{\text{VP}}$ arui] -te iru]] ⇒
[–perfect]

$\lambda x \lambda e[\tau(e) = \text{now} \,\&\, \text{IRU}(e, \lambda e_1[\text{WALK}(e_1) \,\&\, A(e_1)=x])]$

(51) then incorporates the subject NP *Taro* and the tense morpheme to yield (52a). We assume that an existential closure rule applies to (52a) to produce the final translation given in (52b).

(52) a. Taroo-wa ima arui-te iru Pres ⇒

$\lambda e[\tau(e) = \text{now} \,\&\, \text{IRU}(e, \lambda e_1[\text{WALK}(e_1) \,\&\, A(e_1)=\text{Taro}])]$

b. $\exists e[\tau(e) = \text{now} \,\&\, \text{IRU}(e, \lambda e_1[\text{WALK}(e_1) \,\&\, A(e_1)=\text{Taro}])]$

(52b) says that there exists an eventuality *e* now such that *e* can be extended to an eventuality of Taro's walking. This corresponds to a process interpretation: there is an on-going process of Taro's walking now.

Let us now consider (47b–c). We assume that *taosu* ‘knock down/fell’ (transitive) is a DURATIVE VERB in that *Taroo-ga ki-o taosu* ‘Taro knocks down the tree’ denotes a set of non-overlapping eventualities each of which is a protracted eventuality that starts when Taro starts pushing the tree in an attempt to knock it down and stops when the tree lies flat on the ground. Based upon this proposal for *taosu*, (47b) translates into our logical language as follows:

(53) Taroo-wa ima ki-o taosi -te$_{[-\text{perfect}]}$ i Pres ⇒

$\exists e[\tau(e) = \text{now} \;\&\; \text{IRU}(e, \lambda e_1 \exists x[\text{TREE}(x) \;\&\; \text{KNOCK-DOWN}(e_1) \;\&\; A(e_1)=\text{Taro} \;\&\; TH(e_1)=x])]$

(53) has a process interpretation as desired. On the other hand, *taoreru* ‘fall’ (intransitive) is an INCHOATIVE EVENTUALITY VERB in that *Ki-ga taoreru* ‘A/The tree falls’ denotes a set of eventualities any element of which consists of an obligatory portion that describes a tree’s hitting the ground after falling down and an optional portion that describes its lying on the ground. To be more precise, the lexical meaning of *taoreru* ‘fall’ can be specified as follows:

(54) taoreru ⇒ $\lambda x \lambda e[[\text{HIT-THE-GROUND-AFTER-FALLING}(e) \vee \exists e_1 \exists e_2[\text{HIT-THE-GROUND-AFTER-FALLING}(e_1) \;\&\; \text{LYING-ON-THE-GROUND}(e_2) \;\&\; e_1 \sqsupset\sqsubset e_2 \;\&\; e_1 \oplus e_2 = e]] \;\&\; TH(e) = x]$

$\oplus$ denotes a function from pairs of eventualities to eventualities. $e_1 \oplus e_2 = e$ says informally that e results when e_1 and e_2 are glued together.[24] The translation of (47c) proceeds as follows:

(55) Ki-ga taore -te[–perfect] iru Pres

1. taore -te[–perfect] iru $\Rightarrow$

   $\lambda x \lambda e$[IRU(e, λe_3[[HIT-THE-GROUND-AFTER-FALLING(e_3) $\vee$ $\exists e_1 \exists e_2$[HIT-THE-GROUND-AFTER-FALLING(e_1) & LYING-ON-THE-GROUND(e_2) & $e_1 \supset\subset e_2$ & $e_1 \oplus e_2 = e_3$]] & $TH(e_3) = x$])]

2. Ki-ga taore -te[–perfect] iru Pres $\Rightarrow$

   $\exists e \exists x$[$\tau(e)$= now & TREE(x) & IRU(e, λe_3[[HIT-THE-GROUND-AFTER-FALLING(e_3) $\vee$ $\exists e_1 \exists e_2$[HIT-THE-GROUND-AFTER-FALLING(e_1) & LYING-ON-THE-GROUND(e_2) & $e_1 \supset\subset e_2$ & $e_1 \oplus e_2 = e_3$]] & $TH(e_3) = x$])]

The truth condition is satisfied iff the current eventuality of the tree's lying on the ground can be extended to an initial part of an eventuality that consists of an obligatory initial portion of a tree's hitting the ground (after falling down) and an optional portion of its lying on the ground, which immediately follows the initial portion. This yields the interpretation that a tree is lying on the ground as a result of having fallen down.

Another major issue is how to represent so-called experience readings. We shall deal with this problem in the following way. First, recall that any sentence

that is considered to have an experience reading cannot have an adverbial that refers to the current moment. (56a–b) therefore cannot receive experience readings. That is, (56a) requires that Taro be actually lying on the floor now; (56b) requires that Taro be trying to knock down the wall now. The only adverbs that are compatible with experience readings are the ones that refer to past times, as in (56c–d).

(56) a. Taroo-wa/ga ima yuka-ni taore-te iru.
Taro-Top/Nom now floor-at fall-TE IRU-Pres
'Taro is lying on the floor (as a result of having fallen).'

b. Taroo-ga/wa ima hee-o taosi-te iru.
Taro-Nom/Top now wall-Acc knock-down-TE IRU-Pres
'Taro is now knocking down a/the wall.'

c. Taroo-wa kyonen zyugyoo-tyuu-ni taore-te iru.
Taro-Top last year lecture-middle-at fall-TE IRU-Pres
'Taro has the experience of having fallen down during a lecture last year.'

d. Taroo-wa kyonen hee-o taosi-te iru.
Taro-Top last year wall-Acc knock-down-TE IRU-Pres
'Taro has the experience of having knocked down a wall last year.'

I analyze this fact as follows. All adverbs that occur in a single clause must be mutually compatible. When two (or more) mutually incompatible adverbs co-

occur in one clause, the resulting sentence is ill-formed. I assume further that any sentence in the *-te iru* form that receives an experience interpretation must have an overt or covert adverb that specifies some past interval as the temporal location of the event that gives rise to the experiential state.[25] This analysis goes well with the assumption that a sentence in the *-te iru* form receives an experiential state interpretation when the morpheme *-te* has the feature [+perfect]. Based upon these assumptions, I claim that (56a–b) cannot receive experiential state readings because the adverb *ima* 'now' prevents the occurrence of an adverb that denotes a past interval.

Let us now examine (56c–d). An adverb indicating a past interval is understood to indicate the time of the eventuality that gives rise to an "experiential state." This means that in (56c) the verb (phrase) first combines with the adverb *kyonen* 'last year' before combining with *-te*. The syntactic and semantic analysis of (56c) is given in (57).

(57) $[_S[_S$ Taroo-wa $[_{VP}[_{VP}$ kyonen $[_{VP}$ zyugyoo-tyuu-ni taore]] -te$_{[+perfect]}$ iru] Pres]

1. zyugyoo-tyuu-ni taore $\Rightarrow \lambda x \lambda e$[FALL($e$) & DURING-A-LECTURE($e$) & *TH*($e$)=$x$]
2. kyonen $\Rightarrow \lambda \boldsymbol{P} \lambda x \lambda e[\tau(e) \subseteq$ LAST-YEAR & $\boldsymbol{P}(x)(e)]$
3. kyonen zyugyoo-tyuu-ni taore $\Rightarrow \lambda x \lambda e[\tau(e) \subseteq$ LAST-YEAR & FALL(e) & DURING-A-LECTURE(e) & *TH*(e)=x]
4. kyonen zyugyoo-tyuu-ni taore -te$_{[+perfect]}$ $\Rightarrow$

$\lambda x \lambda e \exists e_1[\tau(e_1) \subseteq$ LAST-YEAR & FALL(e_1) & DURING-A-LECTURE(e_1) & $TH(e_1)=x$ & IN(x, e) & $ES(e_1, e)]$

5. kyonen zyugyoo-tyuu-ni taore -te [+perfect] iru (tenseless) $\Rightarrow$
6. Taroo-wa kyonen zyugyoo-tyuu-ni taore -te [+perfect] iru (tenseless) $\Rightarrow$

   λe_2[IRU$(e_2, \lambda e \exists e_1[\tau(e_1) \subseteq$ LAST-YEAR & FALL(e_1) & DURING-A-LECTURE(e_1) & $TH(e_1)$=Taro & IN(Taro, e) & $ES(e_1, e)$])]
7. Taroo-wa kyonen zyugyoo-tyuu-ni taore -te [+perfect] iru Pres $\Rightarrow$

   $\exists e_2[\tau(e_2)=$ now & IRU$(e_2, \lambda e \exists e_1[\tau(e_1) \subseteq$ LAST-YEAR & FALL(e_1) & DURING-A-LECTURE(e_1) & $TH(e_1)$=Taro & IN(Taro, e) & $ES(e_1, e)$])]

The final line reads, "There is an eventuality e_2 now such that e_2 can be extended to an initial portion of an experiential state John gained when he collapsed during a lecture last year." IN(Taro, e) reads, "Taro is in the state e." This enables us to bring out our intuition that the state concerns Taro.

(56d) is analyzed as in (58).

(58) LF: Taroo-wa kyonen hee-o taosi -te [+perfect] iru Pres

1. hee-o taosi $\Rightarrow \lambda x \lambda e \exists y$[WALL$(y)$ & KNOCK-DOWN(e) & $A(e)=x$ & $TH(e)=y$]
2. kyonen hee-o taosi $\Rightarrow \lambda x \lambda e[\tau(e) \subseteq$ LAST-YEAR & $\exists y$[WALL(y) & KNOCK-DOWN(e) & $A(e)=x$ & $TH(e)=y$]]

3. kyonen hee-o taosi -te$_{[+perfect]}$ ⇒

   $\lambda x \lambda e \exists e_1[\tau(e_1) \subseteq$ LAST-YEAR & $\exists y$[WALL(y) & KNOCK-DOWN(e_1) & $A(e_1)=x$ & $TH(e_1)=y$] & IN(x, e) & $ES(e_1, e)$]

4. Taroo-wa kyonen hee-o taosi -te$_{[+perfect]}$ iru Pres ⇒

   $\exists e_2[\tau(e_2) =$ now & IRU(e_2, $\lambda e \exists e_1[\tau(e_1) \subseteq$ LAST-YEAR & $\exists y$[WALL(y) & KNOCK-DOWN(e_1) & $A(e_1)$=Taro & $TH(e_1)$=y] & IN(Taro, e) & $ES(e_1, e)$])]

The final translation in (58) says that there is a current eventuality *e* (understood as a state) such that a backward stretch of *e* is an initial part of an experiential state that Taro is in after knocking down the wall. This is then subject to various pragmatic interpretations. One possibility is that he is very tough.

We claim that the experiential state reading of *-te iru* concerns the denotation of a topic NP because (59a) and (59b) have different interpretations.

(59) a. Kono heya-wa mae-ni Michael Jackson-ga tomat-te iru.
this room-Top before Michael Jackson-Nom stay-TE IRU-Pres
'This room is in the state of having had Michael Jackson as its guest. (Therefore, everybody wants to stay here.)'

b. Michael Jackson-wa mae-ni kono heya-ni tomat-te iru.
Michael Jackson-Top before this room-at stay-TE IRU-Pres
'Michael Jackson is in the state of having stayed in this room before. (This suggests that he likes this type of room.)'

(59a–b) show that the experience that each sentence describes is that of the individual denoted by a topic NP, which is not necessarily an "underlying subject."[26] Our proposal could accommodate sentences like (59a). But this would require more detailed discussion of syntax, and I must leave it for another occasion.

Lastly, we shall discuss how to deal with QUASI-INCHOATIVE EVENTUALITY VERBS. As mentioned above, they only describe simple states best characterized by adjectives like *tall*, *outstanding*, etc. Let us take up the verb *niru* 'come to resemble' and illustrate how our system deals with it. Note first that in a simple sentence *niru* must occur with an auxiliary verb. I assume that although *niru* means 'come to resemble', a syntactic restriction is imposed on it to the effect that it cannot be used in the simple past in simple sentences. Given the fact that an inchoative interpretation is available when the morpheme *kuru* is attached to *niru* (see (23b) introduced earlier), the lexical information of the verb should include reference to an inchoative eventuality of coming to resemble someone. To be more precise, we assume the following semantic characterization of *niru*:

(60) niru $\Rightarrow \lambda x \lambda y \lambda e$[[COME-TO-RESEMBLE($e$) $\vee$ $\exists e_1 \exists e_2$[COME-TO-RESEMBLE(e_1) & RESEMBLE(e_2) & $e_1 \supset\subset e_2$ & $e_1 \oplus e_2 = e$] & $EX(e) = y$ & $TH(e) = x$]

N.B. *EX* stands for 'experiencer'.

According to (60), *niru* denotes a set of eventualities *e* such that *e* is made up of an eventuality of coming to resemble someone, which is an obligatory part, and an eventuality of resembling someone, which is an optional part. The following translation rules are used to account for the special semantic effect associated with QUASI-INCHOATIVE EVENTUALITY VERBS in the *-te iru* form:

(61) a. If δ is a QUASI-INCHOATIVE EVENTUALITY VERB and translates into $\lambda x \lambda e[[\alpha(e) \vee \exists e_1 \exists e_2[\alpha(e_1) \& \beta(e_2) \& e_1 \supset\subset e_2 \& e_1 \oplus e_2 = e]] \& \theta(e) = x]$, where α is an instantaneous eventuality predicate, β a stative eventuality predicate, and θ some relevant theta role, *δ-te [–perfect] iru* (tenseless) translates into $\lambda x \lambda e[\text{IRU}(e, \lambda e_3[\beta(e_3) \& \theta(e_3) = x])]$.

b. If δ is a QUASI-INCHOATIVE EVENTUALITY VERB and translates into $\lambda y \lambda x \lambda e[[\alpha(e) \vee \exists e_1 \exists e_2[\alpha(e_1) \& \beta(e_2) \& e_1 \supset\subset e_2 \& e_1 \oplus e_2 = e]] \& \theta_1(e) = x \& \theta_2(e) = y]$, where α is an instantaneous eventuality predicate, β a stative eventuality predicate, and θ_1 and θ_2 some relevant theta roles, *δ-te [–perfect] iru* (tenseless) translates into $\lambda y \lambda x \lambda e[\text{IRU}(e, \lambda e_3[\beta(e_3) \& \theta_1(e_3) = x \& \theta_2(e_3) = y])]$.[27]

(61a–b) represent the idea that when a QUASI-INCHOATIVE EVENTUALITY VERB occurs in the *-te iru* form, its inchoative eventuality meaning disappears. Applying (61b) to *Hanako-ni niru* ‘come to resemble Hanako’, we obtain (62).

(62) $\lambda x \lambda e$[IRU(e, λe_3[RESEMBLE(e_3) & $EX(e_3) = x$ & $TH(e_3)$ = Hanako])]

(62) has the same interpretation as (63), which is assumed to be the translation of the English VP *resembles Hanako*.

(63) $\lambda x \lambda e_3$[RESEMBLE(e_3) & $EX(e_3) = x$ & $TH(e_3)$ = Hanako]

As to the reason why the semantic effect described in (61) is obtained, I offer the following informal account. If we applied the regular translation rules for the *-te iru* form (i.e., (45a–b) and (49)) to the translation of *Hanako-ni niru* 'come to resemble Hanako', we would obtain the translation given in (64).

(64) Hanako-ni ni -te iru ⇒
[+perfect]

$\lambda x \lambda e_3$[IRU(e_3, λe[[COME-TO-RESEMBLE(e) $\vee$ $\exists e_1 \exists e_2$[COME-TO-RESEMBLE(e_1) & RESEMBLE(e_2) & $e_1 \supset\subset e_2$ & $e_1 \oplus e_2 = e$]] & $EX(e) = x$ & $TH(e)$ = Hanako])]

Note that this expression has the subinterval property and, in this regard, is similar to LEXICAL STATIVE PREDICATES such as *aru* 'be'. Thus, it is natural to reanalyze this complex verbal expression as a LEXICAL STATIVE PREDICATE, which has no inchoative eventuality associated with it.

6. Conclusion

In this article, I have discussed the multiple interpretations of the *-te iru* construction in Japanese and have proposed an account in a formal semantic theory. The proposed account can be summed up as follows: (i) *-te iru* is analyzed into two morphemes *-te* and *iru*, each of which makes independent semantic contribution. (ii) Two major interpretation types associated with *-te iru* are "current situation" interpretations and experiential state interpretations classified in terms of adverbial distribution. These two interpretation types are elucidated in our proposal in terms of the ambiguity posited for the morpheme *-te*. (iii) Our semantic proposal for the aspectual auxiliary *iru* is an extension of Landman's (1992) account of the English progressive. The key ingredient of our proposal is the way in which INSTANTANEOUS VERBS (renamed as INCHOATIVE EVENTUALITY VERBS) are characterized. For example, if a tree falls to the ground at 1 P.M., a series of overlapping events that start at 1 P.M. belong to the denotation of *Ki-ga taoreru* 'A tree falls (to the ground)'. Intuitively, this means that result state portions of events are included in the lexical meaning of INSTANTANEOUS VERBS. This enables us to use Landman's proposal to deal with these verbs as well as DURATIVE VERBS. It is easy to verify that in our proposal all sentences in the *-te iru* form have the subinterval property. Thus Jacobsen's observation mentioned at the end of section 3 is obtained as a consequence of our proposal.

NOTES

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[1] *-de* is an allophonic variant of *-te* that occurs after a voiced obstruent or nasal.

[2] Bresnan (1982) offers English examples with similar semantic effects.

[3] The experiential reading associated with *-te iru* is very similar to the interpretation of *ϕ-ta koto-ga aru* (Lit. 'The fact that *ϕ* exists') construction exemplified by (i).

(i) Taroo-wa zyuk-ken-mo ie-o
Taro-Top 10-CL-as-many-as house-Acc
tate-ta koto-ga aru.
build-Past N-Nom exist-Pres
'Taro built as many as ten houses before.'
N.B. N = nominalizer

As far as I can see, the main difference between the two constructions is that the experiential reading of the *-te iru* construction allows for the possibility that the referent of the subject NP is dead, whereas the *koto-ga aru* construction does not.

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[4] Krifka (1992, 35) introduces the concept of SET TERMINAL POINT, which resembles the idea expressed in (13).

[5] To be more precise, MOMENT is a function from intervals into truth values such that for any interval *i*, MOMENT(*i*) = 1 iff *i* is a singleton set. FINAL is a partial function from intervals into intervals such that for any interval *i*, FINAL(*i*), if defined, is $\{t \mid t \in i$ and for every $t_1 \in i, t_1 \leq t\}$. When *i* has no final point (e.g., $i = \{t \mid 1$ p.m. $< t < 2$ p.m.$\}$), FINAL(*i*) is undefined.

[6] For a more detailed comparison between Vendler's system and Kindaichi's system, the reader is referred to Jacobsen (1992).

[7] INSTANTANEOUS VERBS in Japanese roughly correspond to so-called unaccusative verbs (Perlmutter (1978)).

[8] An anonymous reviewer notes that a similar point is made by Fillmore (1981, 163–165).

[9] If the adverb *dandan* 'gradually' is removed, the sentence is well-formed and describes a current state of the door's being (completely) open.

[10] It is possible to express an on-going process interpretation with the intransitive verb *aku* 'open', but this requires a suffix different from *-te iru.* When the outer part of the door is moving toward the speaker, (i) is used. On the other hand, when it is moving away from the speaker, (ii) is used.

(i) Doa-ga (dandan) ai-te kuru.
door-Nom gradually open (vi.)-TE come-Pres
'The door is opening (gradually).'

(ii) Doa-ga (dandan) ai-te iku.
door-Nom gradually open (vi.)-TE go-Pres
'The door is opening (gradually).'

[11] *Ni* is glossed as 'resemble' in (22a–b). However, for the reasons to be made clear in the text, this should be regarded as a convenient label, rather than its English equivalent.

[12] The *-te iru* form of the same verb (*ni-te iru hito*) is also used in relative clauses for roughly the same interpretation.

[13] Milsark (1974) should be credited for noting the difference between stage-level and individual-level predicates. He refers to these two types of predicates as states and properties, respectively.

[14] Note that the special construction *moo V-te simatta* is used in the definitions. This enables us to distinguish between an on-going process interpretation and a result state interpretation associated with an activity. For example, when Taro is running, one can use (i) to describe this situation. On the other hand, (ii) is used to describe a current state that has resulted from a past event of John's running.

(i) Taroo-wa (ima) hasit-te iru.
Taro-Top now run-TE IRU-Pres
'Taro is running now.'

(ii) Taroo-wa (kinoo) hasit-te iru.
Taro-Top yesterday run-TE IRU-Pres

'Taro now has the experience of having run yesterday.'

(i) and (ii) can be distinguished in terms of the definitions given in (27a–b). The sentence (i) (on its "progressive" interpretation) does not entail (iii), whereas the sentence (ii) does.

(iii) Taroo-wa (kinoo) hasit-te simat-ta.
Taro-Top yesterday run-to-finish-Past
'Taro now has the experience of having run yesterday.'

The simple past tense may not be adequate to make the necessary distinction here because it is arguable that (i) entails (iv) because if Taroo is running now he has already run some distance (see Bennett and Partee (1972)).

(iv) Taroo-wa hasit-ta.
Taro-Top run-Past
'Taro ran.'

[15] We assume here that the entire sentence is in the present tense.

[16] This fact is used only as a diagnostic for distinguishing among various aspectual classes of verbs. The formal proposal to be presented below does not provide an account of the "current state" interpretation of QUASI-INSTANTANEOUS VERBS in the past tense used in relative clauses.

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[17] INSTANTANEOUS and QUASI-INSTANTANEOUS VERBS in the past tense can also be used in other types of embedded constructions to describe current states. An anonymous reviewer points out that (i) is acceptable for the interpretation indicated by the gloss.

(i) Hanako-wa hahaoya-ni ni-ta tame ni,
Hanako-Top mother-Dat resemble-Past because
hukoo-ni nat-ta.
unhappy-Dat become-Past
'Hanako became unhappy because she resembled her mother.'

[18] The following example due to McCawley (1978, 73) makes the same point:

(i) Ningyoo-wa zubon-o hai-te iru.
doll-Top trousers-Acc put-on-TE IRU-Pres
'The doll has trousers on.'

(i) obviously does not entail that the doll put trousers on.

[19] (37b) is due to an anonymous reviewer.

[20] That is, $I = \{i \mid i \subseteq T$ & for every $t_1 \in i$ and $t_2 \in i$ such that $t_1 < t_2$, there is some t_3 such that $t_1 < t_3 < t_2$ and $t_3 \in i\}$.

[21] For any interval i, INITIAL(i) (if defined) = $\{t \mid t \in i$ and for every $t_1 \in i$, $t \leq t_1\}$.

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[22] The examples are due to Arikawa (1992, 30). I thank the editors of JEAL for calling my attention to Arikawa's work.

[23] We should perhaps use the translation (i) instead of the one given in (45b) in order to preclude the intuitively implausible possibility that an inchoative eventuality that includes a "state portion" can yield an experiential state.

(i) $\lambda x \lambda e \exists e_1[\mathbf{VP}(x)(e_1) \,\&\, \neg\exists e_2[e_2 \subseteq e_1 \,\&\, \mathbf{VP}(x)(e_2)] \,\&\, \text{IN}(x, e) \,\&\, ES(e_1, e)]$

(i) ensures that an eventuality that generates an experiential state must be a "minimal" eventuality of the right sort.

[24] Link (1983) introduces this type of approach to objects, and Krifka (1992) applies it to eventualities.

[25] I have no good explanation for why it is not possible for an overt adverbial to specify the temporal location of an "experiential state." This remains a topic for future research.

[26] By "underlying subject," I mean an NP that would be nominative case marked if the NP were not a topic.

[27] Instantaneous and stative eventuality predicates are defined as follows:

(i) *P* is a instantaneous eventuality predicate iff
$\forall e[e \in [\![P]\!] \rightarrow \text{MOMENT}(\tau(e))]$

(ii) *P* is a stative eventuality predicate iff
$\forall e \forall e_1[[e \in [\![P]\!] \,\&\, e_1 \subseteq e] \rightarrow e_1 \in [\![P]\!]]$

(i) says that an instantaneous eventuality predicate denotes a set of eventualities each of which last only for a moment. (ii) says that a stative eventuality predicate has the subinterval property.

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