

# Revisiting the progressive/perfect ambiguity of *-te iru* in Japanese: A scale-based analysis

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## 1 Introduction

### Overarching goal of the project:

Work out a detailed compositional semantics of aspectual composition in Japanese in terms of a scale-based approach (Kennedy and McNally, 2005; Kennedy, 2007; Kennedy and Levin, 2008).

### Why do this?:

- Japanese has relatively rich verbal morphology for expressing aspectual meanings.
- Some aspects of it (especially the aspectual marker *-te iru*) has been discussed extensively in the descriptive tradition, going back to Kindaichi (1950).
- But to date, there's no formally explicit theory of aspectual composition that explains this accumulated knowledge from the descriptive tradition.

- (There has been some attempts in the recent literature of formal semantics, e.g., Ogihara (1998), Nishiyama (2006), Kiyota (2008). I won't discuss them today, but I don't think any of them is entirely successful.)
- Also, previous work is limited in scope in empirical coverage as well. Not much work has been done on aspectual markers other than *-te iru*.

### Goal for today:

- I'll mainly focus on the problem of *-te iru*.
- I'll propose a scale-based aspectual classification of verbs in Japanese and propose an analysis of *-te iru* that accounts for its core meanings in a principled manner.

## 2 The ambiguity of *-te iru*

### Why *-te iru* is important

- Since Kindaichi (1950), work on verbal aspect in Japanese in the descriptive tradition has almost entirely focused on making sense of the meaning of *-te iru*.
- In a sense, this is rightly so, because the opposition between the unmarked form and the *-te iru* is at the core of the the aspectual system of Japanese verbs (see, e.g., Okuda (1977); Kudo (1995)).
- In fact, Kindaichi's (1950) seminal work takes the meaning differences of the *-te iru* as the primary basis for distinguishing between different verb classes in Japanese. (In this short paper, Kindaichi comes up with a classification that predates and resembles in some important respects Vendler's (1957) classification of English aspectual types.)

## Some basic morphology

Japanese has past and nonpast tenses. For each of these tenses, *-te iru*-marking is optional. (I'll call the form in which *-te iru* doesn't appear the unmarked form.)

- (1) a. John-ga hasi-**ru**.  
John-NOM run-NPST  
'John runs.'
- b. John-ga hasit-**te i-ru**.  
John-NOM run-TE IRU-NPST  
'John is running.'
- (2) a. John-ga hasit-**ta**.  
John-NOM run-TE IRU-PAST  
'John ran.'
- b. John-ga hasit-**te i-ta**.  
John-NOM run-TE IRU-PAST  
'John was running.'

## Key data: *-te iru* with different aspectual classes

- (3) John-ga hasit-**te iru**.  
John-NOM run-TE IRU-NPST  
'John is running.' (activity, progressive)
- (4) Ki-ga taore-**te iru**.  
tree-NOM lie.down-TE IRU-NPST  
'The tree has fallen down.' (achievement, resultative perfect)
- (5) John-ga sintyo-o kai-**te iru**.  
John-NOM new.book-ACC write-TE IRU-NPST  
'John is writing a new book.' / 'John has written a new book.'  
(accomplishment, ambiguous)
- (6) Mizu-ga atatamat-**te iru**.  
water-NOM warm-TE IRU-NPST

'The water is getting warmer.'/'The water has become warm.'  
(gradual change of state, ambiguous)

- With activities, *-te iru* unambiguously has the progressive interpretation like English progressive.
- With achievements, the so-called 'resultative perfect' interpretation obtains. (4) means that the tree has fallen down and is still lying down on the ground.
- Accomplishments and gradual change of state predicates induce ambiguity between the progressive and 'result state' interpretations. Cf.: (5) and (6). (But the progressive interpretation is more salient for accomplishments; I'll come back to this point later.)

## Note:

Besides the progressive and resultative perfect readings, *-te iru* is known to exhibit the 'habitual' (or 'repetitive') and 'experiential perfect' readings. These latter two readings are available regardless of lexical aspect, which suggests that they are derived meanings. So, I'll set them aside for now.

## Habitual:

- (7) John-wa saikin kenkoo-no-tame maiasa hasit-te  
John-TOP recently health-GEN-sake every.morning run-TE  
iru.  
IRU-NPST  
'John is running every morning recently to keep good health.'
- (8) John-wa saikin kenkoo-no-tame maiasa ringo-o  
John-TOP recently health-GEN-sake every.morning apple  
ik-ko tabe-te iru.  
one-CL eat-TE IRU-NPST

‘John is eating one apple every morning recently to keep good health.’

- (9) Kono kopii-ki-wa saikin syottyuu koware-te  
this copy-machine-TOP recently frequently break-TE  
iru.  
IRU-NPST  
‘This copier goes out of order frequently recently.’
- (10) Kono denki-potto-no oyu-wa saikin syottyuu  
this electronic-pot-GEN water-TOP recently frequently  
same-te iru.  
cool-TE IRU-NPST  
‘The water in this electronic pot cools down frequently recently.’

I believe that the habitual reading will be derived in terms of some kind of aspectual coercion in a way closely resembling the habitual readings of English progressive.

### Experiential perfect:

- (11) John-wa *izen* sono miti-o arui-te iru.  
John-TOP before that road-ACC walk-TE IRU-NPST  
‘John has walked on that road before.’
- (12) John-wa *itido* kekkonsi-te iru.  
John-TOP once marry-TE IRU-NPST  
‘John was once married.’
- (13) John-wa *izen* taityo-o arawasi-te iru.  
John-TOP before magnum.opus-ACC write-TE IRU-NPST  
‘John has written a magnum opus before.’
- (14) Sono mizu-wa *itido* atatamat-te iru.  
that water-TOP once warm-TE IRU-NPST  
‘That water has once warmed/was once warm.’

One thing that’s peculiar about this experiential perfect reading (if it’s a perfect reading at all) is that it can occur with explicit time adverbials as well.

- (15) John-wa *7-nen-mae-ni* sono miti-o arui-te iru.  
John-TOP 7-year-ago-at that road-ACC walk-TE IRU-NPST  
‘John has the experience of walking on that road 7 years ago.’

Also, with achievements, there is the implicature that the result state does not obtain at the speech time (so, (12) implicates that John has divorced).

Given these, it seems reasonable to assume that the experiential perfect reading results from some kind of aspectual coercion which derives (out of any verb) an achievement predicate with the meaning that the subject of the sentence acquires some special property by virtue of undergoing the event denoted by the original verb.

## 3 Scale-based analysis

### 3.1 Outline of the basic idea

The analysis I formulate below builds on Teramura’s (1984) analytic intuition. Here’s (my slight paraphrase of) what Teramura says:<sup>1</sup>

- (16) *-te iru*’s core meaning is:
- the event denoted by the predicate has already ‘taken place’
  - and its ‘effect’ persists until the reference time

I think his core intuition is right, but two big questions:

- What counts for an event to ‘take place’?

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<sup>1</sup>Similar ideas have been expressed by subsequent authors such as Takami and Kuno (2006); Fukushima (2007); Miyakoshi (2008).

- What does it exactly mean for the ‘effect’ of an event to ‘persist’?

I will attempt to make Teramura’s idea more precise with the notion of ‘standard’ as it is used in recent approaches to scale-based semantics.

**Basic idea:** Assume that all non-stative predicates denote scales.

(The intuition here is that a verb denotes a scale that measures how much of the event/process named by the verb has unfolded in time.)

Then:

- ‘The event has taken place’ (in Teramura’s sense) means: the standard is reached.
- ‘Its effect persists’ means: the standard is still satisfied.

### 3.2 Background: Kennedy & Levin (2008)

#### Variable telicity of English degree achievements

- (17) a. The gap widened for/??in an hour.  
 b. The line lengthened for/??in an hour.
- (18) a. The rod straightened for/in an hour.  
 b. The clothes dried for/in an hour.

Kennedy & Levin (2008) (K&L) propose an analysis of English degree achievements as scalar predicates.<sup>2</sup>

<sup>2</sup>Following Kennedy (2007), in the metalanguage I use English adjectives (or verbs) to name measure functions. So, in this notation, the expression ‘**wide (the-gap)**’ is not the translation of the English sentence ‘The gap is wide’ but denotes the degree to which the gap is wide. In other words, (19) could be written less confusingly (but more clumsily) as:

(i)  $\llbracket \text{wide} \rrbracket = \lambda x.\lambda d.d$  is the width of  $x$

- (19) adjective: measure function of type  $\langle e, d \rangle$   
 $\llbracket \text{wide} \rrbracket = \lambda x.\mathbf{wide}(x)$  (returns the degree to which  $x$  is wide)
- (20) positive morpheme for adjectives:  
 $\llbracket \text{pos} \rrbracket = \lambda g\lambda x.g(x) \geq \mathbf{stnd}(g)$
- (21)  $\llbracket \text{The gap is wide} \rrbracket = \mathbf{wide}(\mathbf{the-gap}) \geq \mathbf{stnd}(\mathbf{wide})$
- (22) verb (degree achievement): measure function of type  $\langle e, \langle ev, d \rangle \rangle$   
 $\llbracket \text{widen} \rrbracket = \lambda x\lambda e.\mathbf{wide}_{\mathbf{wide}(x)(\text{init}(e))}^{\uparrow}(\text{fn}(e))$   
 $= \mathbf{wide}_{\Delta}(x)$  (abbrev.)  
 (returns the degree to which  $x$ ’s coolness has increased from the onset of the cooling event)
- (23) positive morpheme for verbs:  
 $\llbracket \text{pos}_{v\_eng} \rrbracket = \lambda g\lambda x\lambda e.g(x)(e) \geq \mathbf{stnd}(g)$
- For adjectives, the positive morpheme is an empty operator that converts the type of the adjective from a measure function to a predicate of individuals, which can be thought of as a null, default measure phrase (*John is 180cm tall/John is (pos) tall*).
  - For verbs, it might seem less obvious how to make sense of the positive morpheme conceptually. In the analysis of Japanese below, I’ll assume that *-te iru* is an aspectual marker that converts a verbal measure function to a predicate of individuals. The verbal positive morpheme can then be thought of as a default, phonologically empty aspectual marker.

### Variable telicity explained:

(24) The gap widened for/??in an hour.

$$\llbracket (24) \rrbracket = \mathbf{widen}_{\Delta}(\mathbf{the-gap}) \geq \mathbf{stnd}(\mathbf{widen}_{\Delta})$$

widen:                    +----- . . .  
                           init(e)  
                           (stnd)

(25) The rod straightened for/in an hour.

$$\llbracket (25) \rrbracket = \mathbf{straight}_{\Delta}(\mathbf{the-rod}) \geq \mathbf{stnd}(\mathbf{straight}_{\Delta})$$

straighten:                +-----+  
                               init(e)  
                               (stnd)                (stnd)

### 3.3 Scale structure and aspectual types

**Basic approach:** Extend K&L's approach and analyze all non-stative predicates as scalar predicates.

- (26) a. aruk:  $\lambda x \lambda t. \mathbf{walk}(x)(t)$   
       b. tate:  $\lambda y \lambda x \lambda t. \mathbf{build}(y)(x)(t)$   
       c. taore:  $\lambda x \lambda t. \mathbf{fall}(x)(t)$   
       d. atatamar:  $\lambda x \lambda t. \mathbf{warm}(x)(t)$

- All non-stative verbs denote measure functions of type  $\langle e, \langle i, d \rangle \rangle$  (functions from individual and temporal intervals to degrees).
- The measure function returns a degree that the object in question possesses *at the end* of the interval.

For the unmarked form, I assume that the following verbal positive morpheme converts the measure function denoted by the verb root to a predicate of individuals (parameterized on temporal intervals).

$$(27) \llbracket pos \rrbracket = \lambda P_{\langle e, id \rangle} \lambda x \lambda t : \exists t' \lesssim t. \underline{P(x)(t')} < \mathbf{stnd}(P)(t').$$

$$P(x)(t) \geq \mathbf{stnd}(P)(t)$$

(the underlined part is presupposition;  $\lesssim$  here means 'immediately before')

Tense morphemes (note: the existential analysis of past is adopted here just for simplicity, and is arguably wrong, but I won't bother to fix this problem for now):

- (28) a.  $\llbracket pres \rrbracket = \lambda P_{it}. P(now)$   
       b.  $\llbracket past \rrbracket = \lambda P_{it}. \exists t < now. P(t)$

Now, the trick is to figure out what exactly the scales in (26) for different types of predicates are measuring, so that the right meanings can be assigned for both the unmarked form and the *-te iru* form. Is that possible? I'll argue below that it is.

### Activities

- Activities consist of indefinite changes of states (cf., e.g., Dowty (1979); Rothstein (2004)).
- For the case of walking, this is the sequence of leg movements, etc., such that, if they are repeated enough times, they counts as walking.
- I assume that the scale associated with an activity predicate like (26a) returns the degree to which such indefinite changes are carried out during the interval at which it is evaluated.

- The scale has a conventional standard which is satisfied iff enough of this indefinite change is carried out during the given interval to guarantee that the named activity has taken place.
- I assume that the standard is vague for these predicates; exactly how much of the relevant indefinite changes of states has to take place to count as the named activity partly depends on the context.

(29) John-ga arui-ta.  
 John-NOM walk-PAST  
 ‘John walked.’  
 $\exists t < now : \exists t' \lesssim t. \mathbf{walk}(j)(t') < \mathbf{stnd}(\mathbf{walk})(t'). \mathbf{walk}(j)(t) \geq \mathbf{stnd}(\mathbf{walk})(t)$   
 ‘There is a past internal  $t$  such that, immediately before  $t$ , walking wasn’t taking place but during  $t$  walking is taking place.’

### Achievements

- The scale involved is a simplex one, having only the values 0 and 1, corresponding to states before and after the relevant (punctual) change.
- Also, I assume that, for achievements, being above the standard (or having the value 1 on the scale) means that the ‘result state’ persists to hold (in the case of *taore* ‘fall’ in (30), this is the state in which John is lying on the ground). This will become important in the analysis of *-te iru*.

(30) John-ga taore-ta.  
 John-NOM fall-PAST  
 ‘John fell down.’  
 $\exists t < now : \exists t' \lesssim t. \mathbf{fall}(j)(t') < \mathbf{stnd}(\mathbf{fall})(t'). \mathbf{fall}(j)(t) \geq \mathbf{stnd}(\mathbf{fall})(t)$

### Gradual change of state predicates (‘degree achievements’)

- I assume that the scales involved in gradual change of state verbal predicates in Japanese are exactly the same as that for the corresponding adjectival predicates.
- This correctly predicts that these change of state predicates do (generally) entail that the adjectival property (in the positive sense) holds of the object in question at the end of the relevant change (unlike with English DAs).<sup>3</sup>

(31) Oyu-ga same-ta.  
 hot.water-NOM cool-PAST  
 ‘The water became cool.’  
 $\exists t < now : \exists t' \lesssim t. \mathbf{cool}(w)(t') < \mathbf{stnd}(\mathbf{cool})(t'). \mathbf{cool}(w)(t) \geq \mathbf{stnd}(\mathbf{cool})(t)$

Caveats:

- The above characterization of the meanings of gradual change of state predicates is actually a simplification since some of these predicates actually allow for differential interpretations. These cases require a more careful consideration of the competition between different standard values (contextual, vague standard vs. the initial degree). See section 4 for some discussion on this point.
- Also, gradual change of state predicates come in different varieties, with different scale structures (open, maximally closed and minimally closed). I’ll gloss over the difference in scale structures since it doesn’t have much consequence for the analysis of *-te iru*.

<sup>3</sup>Note that this is crucially different from K&L’s analysis of degree achievements in English. For K&L, the degree achievement uniformly denotes a *minimally closed* scale whose minimum endpoint corresponds to the initial degree (relative to the event in question), regardless of the scale structure of the original predicate.

## Accomplishments

- Accomplishments have meanings that are more complex than other aspectual types, something along the following lines in event-decomposition terms:

[[x ACT ON y] CAUSE [y BECOME z]]

- The above representation is essentially saying that accomplishments are *complex* events composed of an ‘activity’ (or process) part and an ‘achievement’ (or change of state) part, connected via some kind of causal relation.
- I’ll depart from this kind of analysis somewhat and make an unorthodox assumption. Specifically, I’ll assume that accomplishment verbs in Japanese encode only the ‘process’ part linguistically.
- That is, the scale for an accomplishment like (26b) measures the progress of the process that the subject of the sentence gets involved in.
- This process is incrementally related (in some contextually relevant way) to a change that the object undergoes and which ultimately leads up to a culmination point at which the object is ‘totally affected’ (and the event is regarded as being completed at this point).
- So, the scale is fully closed, with the minimum endpoint designating the onset of the relevant process and the maximum endpoint designating the culmination point.

- (32) John-ga sono hon-o yon-da.  
 John-NOM that book-ACC read-PAST  
 ‘John read that book.’  
 $\exists t < now : \exists t' \lesssim t. \mathbf{read}(\mathbf{the-book})(\mathbf{j})(t') < \mathbf{stnd}(\mathbf{read}(\mathbf{the-book}))(t')$   
 $\mathbf{read}(\mathbf{the-book})(\mathbf{j})(t) \geq \mathbf{stnd}(\mathbf{read}(\mathbf{the-book}))(t)$

- In the unmarked form, culmination of the event is entailed by

default via the stronger meaning principle. (But this is only a default entailment which can be overridden; John might have read only part of the book.)

### Note:

- Unlike in the standard assumption in the decompositional approach, the causal relation between the ‘process’ meaning and the ‘change of state’ meaning is only implicitly encoded in the way in which the scale associated with the measure function is set up.
- Is this move good or bad? I’m not totally sure at this point. But note that in the decompositional analysis, the precise meanings of the primitives like ACT and CAUSE are never made clear, so, at the very least, my analysis is not less explicit than the more standard analysis.
- At least for Japanese, I think there are some advantages for representing the meanings of accomplishments this way, since the ‘process’ component seems to be more salient than the ‘result state’ component in the meanings of these predicates with respect to several empirical phenomena, including the interpretation of *-te iru*.

## 3.4 Analyzing *-te iru*

Given the scale-based analysis of the lexical meanings of verbs in different aspectual types from the previous section, we can now analyze the meaning of *-te iru* as an operator that converts a verbal measure function into a predicate of individuals (and temporal intervals) as follows:

$$(33) \quad \llbracket -te\ iru \rrbracket = \lambda P_{\langle e, id \rangle} \lambda x \lambda t. \exists t' \supset t : \underline{\exists t''' \lesssim t'. P(x)(t''') < \mathbf{stnd}(P)(t''')}. \\ \llbracket \mathbf{init}(t') < \mathbf{init}(t) \wedge \forall t'' \subseteq t' [P(x)(t'') \geq \mathbf{stnd}(P)(t'')] \rrbracket$$

This basically says that *V-te iru* is true for an interval  $t$  just in case  $t$  is part of a larger interval

- which starts earlier than  $t$  and
- which is homogeneous in that every subinterval of it satisfies the standard for  $V$ .

Further paraphrase:

- the standard has already been reached
- the standard is still satisfied

Note that this fully retains Teramura’s core insight (‘the event has taken place’ and ‘its effect persists’) and that it makes precise the aspects that remain vague in his approach in terms of the notion of standard.

### 3.5 Specific cases

**Upshot of the proposal:**

- Different meanings arise depending on the aspectual type of the predicate since what it means to be above the standard differs from one type of predicate to another.
- In particular, as we’ll see below, the ambiguity of *-te iru* arises for accomplishments and gradual change of state predicates since these predicates are associated with scales that have multiple options for standard setting, which give rise to distinct interpretations when they interact with the meaning of *-te iru*.

#### Activities and achievements

$$(34) \quad \llbracket(3)\rrbracket = \exists t' \supset now : \exists t''' \lesssim t'. \mathbf{walk(j)}(t''') < \mathbf{stnd(walk)}(t'''). \\ \llbracket \mathbf{init}(t') < \mathbf{init}(now) \wedge \forall t'' \subseteq t' [\mathbf{walk(j)}(t'') \geq \mathbf{stnd(walk)}(t'')] \rrbracket$$

- Walking has already taken place (i.e., has already started).
- Walking has continued to take place and is still ongoing.

$$(35) \quad \llbracket(4)\rrbracket = \exists t' \supset now : \exists t''' \lesssim t'. \mathbf{fall(the-tree)}(t''') < \mathbf{stnd(fall)}(t'''). \\ \llbracket \mathbf{init}(t') < \mathbf{init}(now) \wedge \forall t'' \subseteq t' [\mathbf{fall(the-tree)}(t'') \geq \mathbf{stnd(fall)}(t'')] \rrbracket$$

- The tree has already fallen.
- The tree has continued to be in the state of having fallen down (and lying on the ground) up until now.

#### Gradual changes of states

Ambiguity arises in these cases since there are multiple options for standard setting.

$$(36) \quad \llbracket(6)\rrbracket = \\ \exists t' \supset now : \exists t''' \lesssim t'. \mathbf{warm(the-water)}(t''') < \mathbf{stnd(warm)}(t'''). \\ \llbracket \mathbf{init}(t') < \mathbf{init}(now) \wedge \forall t'' \subseteq t' [\mathbf{warm(the-water)}(t'') \geq \mathbf{stnd(warm)}(t'')] \rrbracket$$

- Here, the measure function **warm** is the same as the one used for adjectival predication. So, it involves a totally open scale.
- The standard function takes this scale and a temporal interval as arguments and returns the standard.
- There are two choices for standard setting: the conventional, vague standard for warmth or the degree of warmth of the relevant object at the beginning of the interval.
  - If the conventional standard is chosen, we get the result state interpretation.
  - If the differential standard is chosen for each subinterval, we get the progressive interpretation.

- (It could be that for some of the intervals, a conventional standard is chosen, and for others, the differential standard is chosen, but that just results in a reading that entails the (strictly) differential interpretation. So, I think that can be treated as a special case of the progressive interpretation.)

So, here, what’s crucial is that *both* the onset degree and the contextually given vague standard are candidates for standard setting.

### Question:

But then why is it that only the latter option is available for the case of the unmarked form? Recall that I said above that, in the unmarked form, the unmarked form entails that the positive form of the corresponding adjective is true of the object in question in the result state of the event.

- (37) Oyu-ga same-ta.  
Hot.water-NOM cool-PAST  
‘The water became cool.’  
 $\exists t < now. \exists t' \lesssim t. \mathbf{cool}(\mathbf{w})(t') < \mathbf{stnd}(\mathbf{cool})(t'). \mathbf{cool}(\mathbf{w})(t) \geq \mathbf{stnd}(\mathbf{cool})(t)$

The difference between the unmarked form and the *-te iru* form is that in the former, choosing the contextual standard yields a reading that entails the differential reading.

That is: The water became cool.  $\models$  The water became cooler.

- I assume that in the case of the unmarked form, the stronger meaning principle (Dalrymple et al., 1998) favors the choice of the contextual standard.
- This doesn’t happen just in Japanese. In English, the same issue arises with degree achievements with maximally closed scales, like *the rod straightened*. Kennedy and Levin (2008)

explain why this sentence entails the rod became fully straight by the the stronger meaning principle.

Crucially, in the case of the *-te iru* form, unlike in the unmarked form, neither of two readings entails the other.

- Progressive reading (P-reading): ‘temperature is increasing’
- Result state reading (R-reading): ‘temperature is above standard’

Contexts that make one reading true and the other false:

- P-reading false, R-reading true situation:

The temperature of the water has reached the conventional standard and then has been going up and down above it.

- P-reading true, R-reading false situation:

The temperature is constantly increasing but hasn’t yet reached the conventional standard.

So, unlike in the case of plain positive assertion, the stronger meaning principle doesn’t prefer either reading over the other and thus the sentence is ambiguous.

### Accomplishments

Accomplishments induce ambiguity similar to that with gradual changes of states, but the progressive interpretation is more salient.

- (38)  $\llbracket (5) \rrbracket =$   
 $\exists t \supset now : \exists t''' \lesssim t'. \mathbf{write}(\mathbf{the-bk})(\mathbf{j})(t''') < \mathbf{stnd}(\mathbf{write}(\mathbf{the-bk}))(t''')$   
 $[\mathbf{init}(t') < \mathbf{init}(now) \wedge \forall t'' \subseteq t' \{ \mathbf{write}(\mathbf{the-bk})(\mathbf{j})(t'') \geq \mathbf{stnd}(\mathbf{write}(\mathbf{the-bk})) \}]$

Some loose ends:

- The analysis simply predicts that *-te iru*-marked accomplishments are ambiguous. Something needs to be said about why the progressive interpretation is often more salient with them.

I suspect that this is not something that one would need to worry about too much, though. With accomplishments, the boundedness of the object affects the telicity of the predicate (Krifka, 1989; Tenny, 1994), and the interpretation of *-te iru* is sensitive to it in just the way one would expect.

(39) John-wa *biiru-o* non-**de** **iru**.  
John-TOP beer-ACC drink-TE IRU-NPST  
'John is drinking beer.'

(40) John-wa *biiru-o 2-hon* non-**de** **iru**.  
John-TOP beer-ACC 2-CL drink-TE IRU-NPST  
'John has drunk two bottles of beer.'

- Also, for accomplishments, to account for the 'imperfective paradox', the analysis needs to be embedded in some kind of modal semantics, in a way analogous to how English progressive is analyzed (see, e.g., Portner (1998)). But I wouldn't worry about this too much for the moment either, since, as far as I can see, there is no obstacle for extending the analysis that way.

## 4 The notion of standard

Two kinds of (open-scale) gradual change of state predicates:

(41) a. (ambiguous in the unmarked form)  
*tuyomaru* 'strengthen' – *yowamaru* 'weaken'  
*takamaru* 'heighten' – *hikumaru* 'lower'  
*agaru* 'rise' – *sagaru* 'fall'  
*hueru* 'increase' – *heru* 'decrease'

*hutoru* 'become fat(ter)/gain weight' – *yaseru* 'become thin(ner)/lose weight'

*hirogaru* 'widen' – *sebamaru* 'get narrow(er)'

- b. (unambiguously telic in the unmarked form)

*atatamaru* 'warm' – *sameru* 'cool'

*ureru* 'ripen'

*kusaru* 'spoil'

*itamu* 'spoil'

*hukuramu* 'get swollen' – *sibomu* 'shrink'

*sora-ga kuragaru* 'sky darkens' – *sora-ga akarumu* 'sky brightens'

*sora-ga kumoru* 'get cloudy'

*nodo-ga kawaku* 'get thirsty' – *nodo-ga uruou* 'get one's thirst quenched'

- Whether these predicates have open scales or maximally closed scales is somewhat subtle.
- Some of the ones in (41b) allow for modification with *kanzen-ni* ('completely') for the corresponding stative predicates.
- But the standards for making truth judgements are arguably vague (e.g., there is no fixed and precise degree of fermentation which determines whether something is ripe).
  - One can felicitously assert 'x is A-er than y' for objects that both count as A on the vague standard.
  - 'x is A, but it could be A-er' is also possible.
  - These predicates induce the Sorites Paradox.

**Premise 1:** The sky is cloudy.

**Premise 2:** If the sky is cloudy, then if it's just a little bit less cloudy, it's still cloudy.

**Conclusion:** A clear sky is cloudy.

(Nobody would accept the second premise for closed-scale predicates such as 'the door is closed'.)

- So, I'll assume that these predicates have open scales.

Telicity:

- (42) a. Taihuu-no seiryoku-ga 3-zikan-de/3-zikan  
 typhoon-GEN power-NOM 3-hour-in/3-hour  
 tuyomat-ta.  
 strengthen-PAST  
 'The typhoon strengthened in/for 3 hours.'
- b. Oyu-ga 3-zikan-in/??3-zikan same-ta.  
 hot.water-NOM 3-hour-in/??3-hour cool-PAST  
 'The water became cool in 3 hours/??became cooler in 3 hours.'

Interpretation of punctual temporal adverbial (Kiyota, 2008):

- (43) a. Taihuu-no seiryoku-ga kesa 8-zi-ni  
 typhoon-GEN power-NOM this.morning 8-o'clock-at  
 tuyomat-ta.  
 strengthen  
 'The typhoon has strengthened at 8 this morning.' (= started becoming stronger at 8/ got substantially strong at 8)
- b. Mizu-ga kesa 8-zi-ni atatamat-ta.  
 Water-NOM this.morning 8-o'clock-at warm-PAST  
 'The water got warm at 8 this morning.'

-Te iru:

- (44) a. Taihuu-no seiryoku-ga (zyozyoni/daibu)  
 typhoon-GEN power-NOM gradually/fairly  
 tuyomat-te iru.  
 strengthen-TE IRU-NPST  
 'The typhoon is gradually strengthening/has strengthened considerably.'

- b. Oyu-ga (zyozyo-ni/daibu) same-te iru.  
 water-NOM gradually/fairly cool-TE IRU-NPST  
 'The water is gradually cooling down/has become fairly cool.'

**Question** (again):

So, how is the standard determined for these predicates? In particular, why is the differential standard available in the unmarked form for the predicates in (41a) but not for those in (41b) (at least, not as readily)?

**Answer:**

The difference seems to lie in the fact that for the predicates in (41b), some (partly context-dependent, and vague) standard is conventionally associated with the meaning of the predicate which determines the 'natural transition point' for the change in question whereas no such 'natural transition point' is salient for the predicates in (41a).

**Kennedy's (2007) Interpretive Economy:**

(45) **Interpretive Economy**

Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions.

- The intuition behind Kennedy's (2007) Interpretive Economy is that for closed-scale predicates such as *straight/bent* and *clean/dirty*, the endpoint of the scale stands out, as a natural cut-off point for distinguishing between entities in terms of the gradable property in question, whereas for open-scale predicates such as *long*, there is no such cut-off point that is conventionally associated with the meaning of the predicate.
- People seem to tend to take (45) as saying something simpler:

- If the scale is closed, choose the endpoint as the standard for truth judgement.
- Otherwise, choose the contextually vague standard for truth judgement.

(And Kennedy (2007) could be read as suggesting that that’s what he intends, at least as far as gradable adjectives go.)

- But this simpler interpretation seems to miss the point of what (45) is really trying to capture. Especially, for change of state predicates, it seems reasonable to think that the notion of ‘natural transition point’ becomes relevant in a way that is more subtle and complex than with stative predicates.

## 5 Conclusion

- I have proposed a scale-based classification of basic aspectual types of verbal predicates in Japanese.
- This classification enables a simple and uniform analysis of the meaning of *-te iru*, which builds on the insights from the descriptive literature and is at the same time formally explicit.
- The notion of standard plays a crucial role in this analysis. The present study in turn has larger implications for the general program of scale-based semantics in that it sheds some light on the issue of how to make sense of the notion of standard.

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