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

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1 Introduction

Recent advances in scale-based approaches to verb meaning:
- degree achievements (Kennedy and Levin, 2008)
- incremental theme verbs (Piñón, 2008; Kennedy, 2010)
- deverbal adjectives (Koontz-Garboden, 2011; Baglini, 2011)

Scale-based approaches to verb meaning have so far mostly focused on problems strictly within the lexicon. However, compositional semantics of, e.g., aspectual morphemes and verbs is also a central question in aspectual composition.

In this paper, I take up one classical problem in the literature of Japanese semantics, namely, the interpretation of the aspectual marker *-te iru*, and argue that a scale-based approach provides a new insight in this domain as well.

2 Data and core idea

Correlation between lexical aspect and the interpretation of *-te iru* (cf., e.g., Kindaichi (1950)):

(1) John-ga hasit-TE iru.
    John-NOM run-TE IRU-NPST
    ‘John is running.’ (activity, progressive)

(2) Ki-ga taore-te iru.
    tree-NOM lie.down-TE IRU-NPST
    ‘The tree has fallen down.’ (achievement, resultative perfect)

(3) John-ga atarasii hon-o kai-te iru.
    John-NOM new book-ACC write-TE IRU-NPST
    ‘John has written a new book.’ / ‘John is writing a new book.’ (ambiguously)

(4) 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. (2) 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 the resultative perfect interpretations. Cf.: (3) and (4).

Note:

Besides the progressive and resultative perfect readings, *-te iru* is known to exhibit the ‘habitual’ (or ‘repetitive’) and ‘experiential perfect’ readings.

(5) John-wa saikin kenkoo-no-tame maiasa hasit-te
    John-TOP recently health-GEN-sake every.morning run-TE
    IRU-NPST
    ‘John is running every morning recently to keep good health.’ (habitual)

(6) 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.’ (experiential perfect)

These latter two readings are available regardless of lexical aspect and they require special contexts that make such readings felicitous.

So, I take them to be derived meanings and will not treat them explicitly in this talk.
2.1 Outline of the basic idea

Teramura (1984) (slightly paraphrased):\footnote{Similar ideas have been expressed by subsequent authors such as Takami and Kuno (2006); Fukushima (2007); Miyakoshi (2008).}

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

Two big questions:
- What counts for an event to ‘take place’?
- 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 scale-based approaches to semantics.

Basic idea:
Assume that all non-stative predicates denote functions that map objects (and intervals) to degrees on a scale.

Underlying intuition:
- Verbs are associated with scales that measure how much of the event/process named by the verb has unfolded in time.
- Truth is determined relative to the standard values on these scales.

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 Scale-based classification of aspectual types

3.1 Kennedy & Levin’s (2008) analysis of degree achievements

Variable telicity with degree achievements:

(8) The water cooled for/in 10 minutes.

The core idea of Kennedy & Levin’s (2008) (K&L) analysis is to take degree achievements to denote scalar changes.

For (8), the scale involved is the temperature scale. The two interpretations arise by setting the standard for evaluating truth differently.

- differential interpretation: ‘The water became cooler.’
  ⇒ standard: onset degree
- definite interpretation: ‘The water became cool.’
  ⇒ standard: conventional standard of coolness

3.2 Extending the scale-based approach to other types of verbs

I extend K&L’s approach to all aspectual types (except for stative verbs).

(9) a. aruk: \( \lambda x \lambda t. \text{walk}(x)(t) \)
    b. tate: \( \lambda y \lambda x \lambda t. \text{build}(y)(x)(t) \)
    c. taore: \( \lambda x \lambda t. \text{fall}(x)(t) \)
    d. atatamar: \( \lambda x \lambda t. \text{warm}(x)(t) \)

- 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.

Truth of the unmarked form (i.e. simple past and nonpast without *-te iru*) can be defined by the following verbal positive morpheme which converts the measure function denoted by the verb root to a predicate of individuals (relativized to temporal intervals).

(10) \[
\text{[pos]} = \lambda P_{(e,i,d)} \lambda x \lambda t : \exists t', P(x)(t') < \text{std}(P)(t').
\]

\[
P(x)(t) \geq \text{std}(P)(t)
\]

(the underlined part is presupposition; \( \lessapprox \) means ‘immediately before’)

This basically says that the sentence is true iff the standard (of the scales that the verb meanings refer to) is reached at the end of the relevant interval.

Tense morphemes:

(11) a. \([\text{pres}] = \lambda P_t. P(\text{now})\)
    b. \([\text{past}] = \lambda P_t. \exists t < \text{now. } P(t)\)
Activities

- Activities consist of indefinite changes of state (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 count as walking.
- I assume that the measure function denoted by an activity predicate 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 if enough of these indefinite changes is carried out during the given interval to guarantee that the named activity has taken place.

   John-NOM walk-PAST
   ‘John walked.’
b. $\exists t < now : \exists t' : \text{walk}^\ast(j)(t') < \text{std}(\text{walk})(t')$. walk$^\ast(j)(t) \geq \text{std}(\text{walk})(t)$
   ‘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 the 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 $\text{taore}$ ‘fall’ in (13), this is the state in which John is lying on the ground). This will become important in the analysis of -te iru.

(13) a. John-ga $\text{taore}$-ta.
   John-NOM fall-PAST
   ‘John fell down.’
b. $\exists t < now : \exists t' : \text{fall}^\ast(j)(t') < \text{std}(\text{fall})(t')$. fall$^\ast(j)(t) \geq \text{std}(\text{fall})(t)$
   ‘There is a past internal $t$ such that, immediately before $t$, falling wasn’t taking place but during $t$ falling is taking place.’

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 degree achievements).

(14) a. Oyu-ga same-ta.
   hot.water-NOM cool-PAST
   ‘The water became cool.’
b. $\exists t < now : \exists t' : \text{cool}(w)(t') < \text{std}^\ast(\text{cool})(t')$. cool$^\ast(w)(t) \geq \text{std}^\ast(\text{cool})(t)$

Accomplishments

- For accomplishments, I assume that the measure function that the verb denotes measures the progress of the process that the subject engages in.
- Note that this is different from the more standard analysis of accomplishments as complex events consisting of a process part and a result part found, e.g., in decompositional approaches to verb meaning.
- Underlying intuition:
  - Accomplishments are similar to activities in that they consist of smaller parts that constitute the whole event.
  - But they are different from activities in that accomplishments have culmination points that clearly mark the endpoint of the event.
- The scale has a maximum endpoint designating the culmination point of the event.

   John-NOM that book-ACC read-PAST
   ‘John read that book.’
b. $\exists t < now : \exists t' : \text{read}(\text{the-book})(j)(t') < \text{std}^\ast(\text{read}(\text{the-book}))(t')$. read$^\ast(\text{the-book})(j)(t) \geq \text{std}^\ast(\text{read}(\text{the-book}))(t)$
In the unmarked form, the maximum endpoint of the scale is picked up as the standard for truth evaluation.

Thus, culmination of the event is entailed by default.

4 Analyzing -te iru

-Te iru can be analyzed as an operator that converts a verbal measure function into a predicate of individuals (relativized to temporal intervals) as follows:

\[(16) \quad [-te \text{ iru}] = \lambda P(x,t) \lambda x \lambda t. \exists t : \exists t'' \leq t. P(x)(t'') < \text{std}(P)(t'').\]

This basically says that \(V\)-te iru is true for an interval \(t\) just in case \(t\) is part of a larger interval \(t'\)
- 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

4.1 Specific cases

Activities and achievements

John-NOM walk-TE IRU-NPST
`John is walking.' (activity, progressive)

b. \(\exists t' \supset \text{now} : \exists t'' \leq t'. \text{walk}(j)(t'') < \text{std}(\text{walk})(t'').\)
   \[\text{init}(t') < \text{init}(\text{now}) \land \forall t'' \leq t' [\text{walk}(j)(t'') \geq \text{std}(\text{walk})(t'')]]\]

`Above standard for \(t'\) means that walking is ongoing during \(t\).

Thus, (17b) means:
- Walking has already taken place (i.e., has already started).
- Walking has continued to take place and is still ongoing.

Activities and achievements

(18) a. Ki-ga taore-te iru.
   tree-NOM lie.down-TE IRU-NPST
   `The tree has fallen down.' (achievement, resultative perfect)

b. \(\exists t' \supset \text{now} : \exists t'' \leq t'. \text{fall}(\text{the-tree})(t'') < \text{std}(\text{fall})(t'').\)
   \[\text{init}(t') < \text{init}(\text{now}) \land \forall t'' \leq t' [\text{fall}(\text{the-tree})(t'') \geq \text{std}(\text{fall})(t'')]]\]

`Above standard for \(t'\) means that the tree is on the ground at the end of \(t\).

Thus, (18b) means:
- 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 state

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

   water-NOM warm-TE IRU-NPST
   `The water is getting warmer.'/`The water has become warm.'
   (gradual change of state, ambiguous)

b. \(\exists t' \supset \text{now} : \exists t'' \leq t'. \text{warm}(\text{the-water})(t'') < \text{std}(\text{warm})(t'').\)
   \[\text{init}(t') < \text{init}(\text{now}) \land \forall t'' \leq t' [\text{warm}(\text{the-water})(t'') \geq \text{std}(\text{warm})(t'')]]\]

Two choices for standard setting:
- conventional, vague standard for warmness \(\Rightarrow\) resultative perfect
  `The water has become warm (and is still warm).'
- onset degree (for each subinterval) \(\Rightarrow\) progressive
  `The water is getting warmer.'

So, here, what’s crucial is that both the onset degree and the contextually given vague standard are candidates for standard setting.
Question: Why isn’t the unmarked form similarly ambiguous?

Answer: For the unmarked form, the conventional standard wins over the differential standard since it yields a stronger meaning.

(21) ‘The water became warm.’ |= ‘The water became warm.’

- 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.
- Cf. the (concealed) ambiguity of The rod straightened (degree achievements with maximum endpoints) in English.

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

- Progressive reading (P-reading): ‘The temperature is increasing.’
- Result state reading (R-reading): ‘The 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 unmarked form, 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 of gradual changes of state.

(22) a. John-ga atarasii hon-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)

b. $\exists t' \supset \exists t'' \leq t'. \text{write(}\text{the-bk}(j)(t'') < \text{stdn(}\text{write(}\text{the-bk})(t''))$. 

Two choices for standard:

- Since the measure function for an accomplishment verb measures the progress of some process that the subject is involved in, the onset degree is salient for each subinterval evaluated.
  standard: onset degree $\Rightarrow$ progressive interpretation
- The maximum endpoint of the whole scale that marks the culmination point of the event is also salient.
  standard: max endpoint $\Rightarrow$ resultative perfect interpretation

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.
- In relation to the recent literature of scale-based approaches to verb meaning, the present proposal is novel in that it shows the significance of the scale-based approach for the more compositionally-oriented side of the whole domain of aspectual composition.

References


Nishiyama (2006) proposes a unified analysis of the meaning of -te iru that is somewhat different from the present proposal. In this appendix, I point out some (potential) problems for Nishiyama’s approach.

\[ (23) \]

\[
\begin{array}{c}
\text{s, } e', r \\
\text{Impfv}_{\text{te}}(e', \lambda e(\text{MAX } \phi(e))) \\
\tau(e') < r \\
\tau(s) \circ r
\end{array}
\]

where

\[ \text{Impfv}_{\text{te}}(e', \psi)(w) = 1 \iff \forall w' \in \text{intertia}_\\text{world}(w), \exists e, \psi(e)(w') \land e' \leq e \]

- Nishiyama analyzes -te iru as a special kind of imperfective operator that takes some event description \( \phi \) as argument and produces as output an event \( e' \) that is either a proper subpart or the whole of an event \( e \) that satisfies this event description.

- The (apparent) ambiguity between progressive and perfect interpretations is ascribed to the underspecified nature of the relation between \( e \) and \( e' \) (which can be either a proper subpart relation or complete identification).

- The output event \( e' \) is restricted to precede the reference time \( r \) and a state \( s \) that overlaps with the reference time is invoked that is further constrained to hold some pragmatically invoked relation with \( e' \).

Problems:

- Not clear how the progressive interpretations of activity verbs are accounted for. To ensure this interpretation, it seems that the state \( s \) needs to be identified with the state in which the relevant activity is ongoing.
  - However, \( s \) is related to \( e' \) merely by means of some pragmatically invoked property, so this is not guaranteed.
  - Moreover, identifying the unfolding of an activity-type event as a type of state is dubious in that it obliterates the distinction between events and states in the formal ontology.

- Nishiyama’s analysis doesn’t get the following entailment right:

\[ (24) \] ‘John was walking.’ (-te iru + past) = ‘John walked.’ (simple past)

- In her analysis, \( e' \) can be a proper subpart of \( e \) which satisfies \( \phi \).
  - So, \( e' \) itself doesn’t need to satisfy \( \phi \).
  - But then, from the assertion of -te iru + past, the existence of an event that satisfies \( \phi \) isn’t entailed.

- Not clear how the ambiguity of gradual change of state predicates is accounted for.
  - For the progressive reading to be true, the temperature of the water has to be constantly rising, but if the -te iru form simply says ‘imperfective (= non-completion) of a (definite) change of state’, this is not guaranteed.
  - Moreover, a situation in which the temperature of the water has increased somewhat (but is currently stable and below the conventional standard), there is a suitable candidate for \( s \) from the entailment of the sentence alone, so, Nishiyama’s analysis seems to wrongly predict that the sentence is true and felicitous in such a situation.