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

The interpretation of the Japanese aspectual marker *-te iru* is notoriously complex, but at its core is the opposition of the 'progressive' vs. the so-called 'resultative perfect' interpretations, sensitive to the lexical aspect of the predicate it attaches to. As in (1)–(2), with activity verbs, *-te iru* induces the progressive interpretation (analogous to English progressive), but if it attaches to an achievement, it exhibits the so-called 'resultative perfect' interpretation, according to which the change of state denoted by the verb has taken place, with its resultant state obtaining at the current time (i.e., the tree is still lying down on the ground). (3) and (4) show that, with accomplishments and gradual change of state predicates, the sentences are ambiguous between the two readings. (For some speakers, the progressive reading might be difficult to obtain for (4), but note that this reading can be brought out with the addition of adverbs like *zyozyoni* 'gradually'.)

(1) John-ga   hasit-te iru.
     John-NOM run-TE IRU

     'John is running.'

(2) Ki-ga   taore-te   iru.
     tree-NOM lie.down-TE IRU

     'The tree has fallen down.'

(3) John-ga   sintyo-o   kai-te   iru.
     John-NOM new.bk-ACC write-TE IRU

     'John is writing a new book.'
     OR 'John has written a new book.'

(4) Mizu-ga   atatamat-te iru.
     water-NOM warm-TE   IRU

     'The water is getting warmer.'
     OR 'The water has become warm.'

Various attempts have been made to account for the meaning of *-te iru* (cf., e.g., Ogihara 1998 and Nishiyama 2006 for approaches in formal semantics), but to date no formally explicit analysis is available that explains the ambiguity of *-te iru* and its correlation with lexical aspect uniformly. This paper proposes a uniform analysis of the meaning of *-te iru* that provides a principled account of the patterns observed in (1)–(4). The analysis builds on a novel, scale-based classification of lexical aspectual types of verbs in Japanese. (*-Te iru* induces the so-called 'experiential perfect' and habitual interpretations in addition, but these are arguably derived meanings since they are available regardless of the lexical aspect of the predicate; for this reason I set aside these meanings in this paper.)

For a uniform analysis of *-te iru*, I will build on Teramura's (1984) idea (cf. also Fukushima 2007) that the core meaning of *-te iru* is that the event denoted by the predicate has already 'taken place', with its 'effect' persisting until the reference time. For example, (1) roughly means that John has already (started to) run and he is still in the process of running. Similarly, in (2), the tree has already fallen down and it's still in the state of having fallen down. Insightful as it is, this characterization by Teramura is still vague in two crucial respects: it is not clear what counts for an event to 'take place' and for its 'effect' to 'persist'. I will argue in this paper that the key assumption that enables making Teramura's intuition more precise is the notion of 'standard' as it is employed in recent scale-based semantics (cf., e.g., Kennedy & McNally 2005, Kennedy & Levin 2008). I assume that all non-stative predicates denote (definite or indefinite) changes of states (for details, see below) and that the point in time at which the standard is reached on the scale that measures the development of the event defines the point at which that event has 'taken place' in Teramura's sense. Similarly, for an effect of the event to persist means that the standard is still satisfied up until the reference time.

To be more specific, as in (5), I assume that predicates with different aspectual types all denote measure functions of type $\langle e, id \rangle$, functions that map individuals and temporal intervals to degrees on a scale that measure the progress of the relevant event, and that truth relative to an interval can be defined with the verbal *pos* operator (cf. Kennedy & Levin 2008) that converts a measure function to a predicate of individuals (and temporal intervals) in (6).

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

(6) $[\![pos]\!] = \lambda P \lambda x \lambda t.P(x)(t) \geq \textbf{stnd}(P)$

For example, with (6) applied to (5d), the truth conditions for a positive assertion (with no aspectual marker) of sentences involving the verb *atatamaru* ('become warm') ends up being true just in case the degree of warmness of the object in question reaches the (contextually determined) standard; achievements like *taoreru* 'fall' in (5c) are different from this only in that the scale involved is a

simplex one, with only the values 0 and 1. For activities like (5a), building on the intuition that activities consist of a repetition of indefinite changes of states (cf., e.g., Dowty 1979), I assume that the scale measures the degree to which the smaller set of changes of states that constitute the whole activity is realized. The standard value is reached on this scale (i.e., the plain assertion of a sentence involving an activity predicate is judged true for a given interval) just in case these smaller changes of states is repeated enough times to determine that the named activity has taken place (during that interval). The scale posited for an accomplishment predicate measures the progress of the process that leads up to the culmination of the whole event (with the maximum endpoint corresponding to the culmination of the event, thus, entailing completion of the event in plain assertion).

In this scale-based analysis, the meaning of *-te iru* can be defined as an operator (of the same semantic type as *pos* in (6)) as follows:

(7) $[\![\textit{-te iru}]\!] = \lambda P \lambda x \lambda t. \exists t' \supset t[\mathbf{init}(t') < \mathbf{init}(t) \wedge \forall t'' \subseteq t'[P(x)(t'') \geq \mathbf{stnd}(P)]]$

This essentially says that *V-te iru* is true for an interval t just in case t is part of a larger interval (starting earlier than t) that is homogeneous in that every subinterval of it (that is sufficiently large) satisfies the standard for V (the 'sufficiently large' condition is not encoded in the simplified formulation in (7); a more adequate treatment will be given in the full paper). This captures Teramura's intuition fairly straightforwardly: the relevant event which counts as satisfying the standard for V has already taken place and its effect (of the standard still being satisfied) obtains up until the current interval.

With activity (5a), (7) yields the desired progressive interpretation:

(8) $[\![\,(1)\,]\!] = \exists t' \supset now[\forall t'' \subseteq t'[\mathbf{walk}(\mathbf{j})(t'') \geq \mathbf{stnd}(\mathbf{walk})]]$

(8) is true just in case walking has already taken place and is still ongoing.

With achievement (5c), on the other hand, the translation in (9) yields the result state interpretation, which is true just in case the tree has already fallen and that fallen state of the tree still obtains at the current time.

(9) $[\![\,(2)\,]\!] = \exists t' \supset now[\forall t'' \subseteq t'[\mathbf{fall}(\mathbf{the\text{-}tree})(t'') \geq \mathbf{stnd}(\mathbf{fall})]]$

This analysis straightforwardly accounts for the ambiguity of *-te iru* with accomplishments and gradable change of state predicates. For the sake of space, I will illustrate this with (4) alone, but essentially the same account goes for the case of (3). The translation for (4) is given in (10).

(10) $[\![\,(4)\,]\!] = \exists t' \supset now[\forall t'' \subseteq t'[\mathbf{warm}(\mathbf{the\text{-}water})(t'') \geq \mathbf{stnd}(\mathbf{warm})]]$

For gradual change of state predicates, there are potentially two standards for measuring the relevant change on the scale: the contextual standard that defines the norm of warmness and the differential standard which corresponds to the degree that the object in question possesses at the beginning of the relevant change. For plain assertions without the aspectual marker, the former is chosen since it yields a stronger meaning (cf. Kennedy & Levin 2008). However, with the aspectual marker *-te iru*, neither of these two choices entails the other and thus both choices of standard are available. If the contextual standard is chosen, we get the result state interpretation, which entails that the water has become warm (and is still warm). If, on the other hand, the differential standard is chosen for evaluating whether each subinterval of t' satisfies the condition in (4), then we get the progressive interpretation which entails that a continuous, gradual change of degree is ongoing. Thus, the ambiguity observed is reduced to two available options for standard setting for such predicates.

To summarize, the scale-based analysis of lexical aspect of Japanese verbs makes possible a unified analysis of *-te iru*'s meaning that accounts for the tight correlation between the ambiguity of *-te iru* and lexical aspect. The principled (and remarkably simple) solution that this analysis provides for the classical problem of *-te iru* suggests that a scale-based approach to the meaning of verbal predicates is a fruitful undertaking.

Selected References Kennedy, C. & B. Levin. 2008. Measure of change. In C. Kennedy & L. McNally, eds., *Adjectives and Adverbs,* 156–183. Oxford: OUP. **Kennedy, C. & L. McNally.** 2005. Scale structure, degree modification, and the semantics of gradable predicates. *Language* 81(2):345–381. **Nishiyama, A.** 2006. The meaning and interpretations of the Japanese aspect marker *-te-i-*. *JofS* 23(2): 185–216. **Ogihara, T.** 1998. The ambiguity of the -te iru form in Japanese. *JEAL,* 7(2): 87–120. **Teramura, H.** 1984. *Nihongo no sintakusu to imi (Syntax and semantics of Japanese) II.* Kurosio.