An analysis of Japanese *ta* / *teiru* in a dynamic semantics framework and a comparison with Korean temporal markers *a nohta* / *a twuta*

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Abstract

In this paper I will shed new light on the semantics of Japanese tense-aspect markers *ta* and *teiru* from dynamic semantics and contrastive perspectives. The focus of investigation will be on the essential difference between *ta* and *teiru* used in an aspectual sense related to a perfect. I analyze the asymmetry between *ta* and *teiru* with empirical data and illustrate it in the DRT framework (Discourse Representation Theory: Kamp and Reyle (1993)). Defending the intuition that *ta* and *teiru* make respectively an eventive and a stative description of eventualities, I argue that *ta* is committed to an assertion of the triggering event whereas *teiru* is not. In the case of *teiru*, a triggering event, if there is any, is only entailed. In DRT, *ta* and *teiru* introduce respectively an event and a state as a codition into the main DRS. *Teiru* may introduce a triggering event only as a codition in an embedded DRS. I also illustrate how the proposed analysis of the perfect meaning fits into a more general scheme of *ta* and *teiru*. and analyze *ta* and *teiru* in a discourse. Furthermore, in DRT terms, I will compare Japanese *ta* / *teiru* with Korean perfect-related temporal markers *a nohta* / *a twuta* in light of Lee (1996).

1 Introduction

Japanese tense-asepct markers *ta* and *teiru* are both analyzed to have a perfect state meaning, among others. [1] However, in the literature, *ta* and *teiru* have been studied more or less individually, and the relation between their perfect state meanings is left to be investigated (Kudo (1995), Ogihara (2001)). They exhibit an asymmetry as Inoue (2000) observes it (Glosses and translations are mine): [2]

(1) a. [The water in the kettle comes to the boil while the speaker sees it.]
    Yoshi, o-yu-ga wai-{ta / ?? teiru}.
    All right, Hon-hot-water-Nom (come-to-the-)boil-{Past / State-Nonpast}
    o.k. 'All right, the water has (just) come to the boil.' / ?? 'The water is on the boil.'

   b. [The speaker put the kettle on the gas and left. Some time later he comes back and finds the water boiling.]
    Ah, o-yu-ga wai-{ta / teiru}.
    'Oh, the water has come to the boil.' / 'Oh, the water is on the boil.'

   c. [The speaker comes to the kitchen and finds the water boiling. (He doesn't know who put the kettle on the gas.)]

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[1] I assume that the Japanese tense / aspect is encoded in terms of *tei(ru)* (stative) / non-*tei(ru)* (non-stative) forms and *ta* (past) / non-*ta* (nonpast) forms. Here I focus on 'non-*tei(ru)* + *ta*' and '*tei(ru)* + non-*ta*' combinations.

[2] For practical reasons I use a single gloss 'Past' for *ta* with any meaning.

Are, o-yu-ga wai-{?? ta / teiru}.
?? 'Oh? The water has come to the boil.' / o.k. 'Oh? The water is on the boil.'

In this paper, I analyze this asymmetry and show how *ta* and *teiru* with the perfect meaning are different (Section 2). In this light, I elaborate on the semantics of *ta* and *teiru* with other meanings, illustrating how the proposed analysis of the perfect meaning fits into the scheme of *ta* and *teiru* (Sections 3 and 4). I defend the intuition that *ta* and *teiru* make respectively an eventive and a stative description of eventualities and illustrate my analysis in a formal dynamic semantics framework, DRT (Discourse Representation Theory: Kamp and Reyle (1993)). I also analyze *ta* (with the perfect and the simple past meanings) and *teiru* in a discourse and illustrate the differences (Section 5). Furthermore, in DRT terms, I will compare Japanese *ta* / *teiru* with Korean temporal markers *a nohta* / *a twuta* as analyzed by Lee (1996) (Section 6) and conclude my arguments (Section 7).

2 *Ta* and *teiru* with the perfect state meaning

2.1 Overview

As illustrated in examples (1a) - (1c) above, repeated here as (2a) - (2c), *ta* / *teiru* used with the perfect meaning have distinct semantic properties, even though both forms can be used under the same situation:

(2) a. [The water in the kettle comes to the boil while the speaker sees it.]
Yoshi, o-yu-ga wai-{ta / ?? teiru}.
All right, Hon-hot-water-Nom (come-to-the-)boil-{Past / State-Nonpast}
o.k. 'All right, the water has (just) come to the boil.' / ?? 'The water is on the boil.'

b. [The speaker put the kettle on the gas and left. Some time later he comes back and finds the water boiling.]
A, o-yu-ga wai-{ta / teiru}.
'Oh, the water has come to the boil.' / 'Oh, the water is on the boil.'

c. [The speaker comes to the kitchen and finds the water boiling. (He doesn't know who put the kettle on the gas.)]
Are, o-yu-ga wai-{?? ta / teiru}.
?? 'Oh? The water has come to the boil.' / o.k. 'Oh? The water is on the boil.'

The acceptability in sentence (2a) indicates that a description of a dynamic change requires *ta*. On the other hand, sentence (2c) indicates that a description of an already initiated state requires *teiru*. (2b) allows for both forms, yet there is a difference in their meanings. I analyze that the *ta* version in (2b) focuses on the change of states, just as in (2a), whereas that the *teiru* version focuses on the state at hand, just as in (2c), even though the speaker could refer to the triggering event. Inoue (2000) observes in the contrast between (2b) and (2c) that *ta* requires the speaker's having access to the triggering / initiating event (in this case, the event of water coming to the boil). This is a critical observation. My account is that if the speaker does not have access to the triggering event, only the state at issue can be referred to straightforwardly, hence the requirement of the *teiru* version. In contrast, in the situation mentioned in (2a), it is hard to focus on the resulting state only. However, in the situation mentioned in (2b), the speaker can either mention the change of state he observed in the two settings, or focus on the resulting state he observed in the latter setting (i.e. when he came back). These observations support the intuition that *ta* and *teiru* makes respectively an eventive and a stative description.

However, intuitively, the *ta* version of (2b) and (2c) do not simply refer to an event itself, as its simple past counterpart (3) does.

(5) DRS for (4) along the lines of (Kamp and Reyle, 1993)

$$\boxed{\begin{array}{c} n,\ t,\ s,\ x,\ e \\ t = n \\ s \circ t \\ \text{John}(x) \\ e \supset\subset s \\ e:\ x\ \text{leave} \end{array}}$$

(3) jup-pun-mae-ni o-yu-ga wai-*ta*.
　　ten-minutes-ago Hon-hot-water-Nom (come-to-the-)boil-Past
　　'The water came to the boil ten minutes ago.'

Therefore, it seems that the *ta* version of (2a) and (2b) concerns the resulting state. For example, the utterances could be continued with 'O.K. I can serve tea.'

　Now a question arises. If the *ta* version concerns the resulting state, then how is it different from the *teiru* version? In other words, in what sense could we consider that the *ta* version in (2) makes an eventive description? The *ta* / *teiru* distinction with the perfect meaning is not trivial at all, and to my knowledge, no close analysis has been given so far.

　I give an analysis of *ta* versus *teiru* in a formal framework DRT. Also, I compare Japanese *ta* / *teiru* with Korean perfect-related temporal markers *a nohta* / *a twuta* in DRT terms.

2.2　Analysis of the English perfect by Kamp and Reyle (1993)

A DRT analysis of the perfect meaning is provided in Kamp and Reyle (1993). They analyze English perfect sentences such as (4) along the lines of (5).

(4) John has left.

　In (5), a resulting state is represented in terms of an abutting relation between an event *e* and a state *s* (i.e. "e $\supset\subset$ s"). However, this single model does not do justice to Japanese *ta* versus *teiru*, because it is not sensitive to the status of *e* and *s* in the statement. [3] For example, DRS (5) does not say anything about the restrictions on the usage of *ta* and *teiru*, as we observed them in (2); whether the statement focus on the event *e* or on the state *s*, and whether the speaker has access to the event *e* ot not. Therefore, we need a more sophisticated model for the analysis of *ta* and *teiru*.
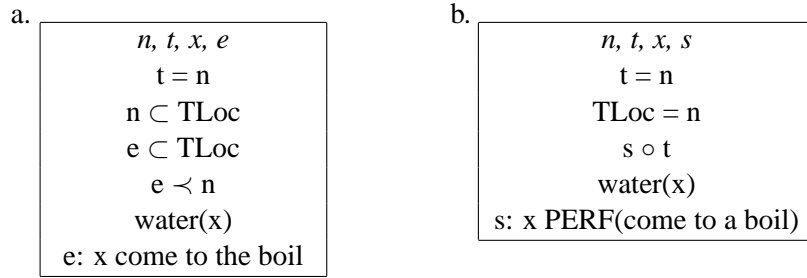
2.3　Proposed analysis

First, I employ a discourse-semantic notion TLoc (temporal location) as introduced in Mizuta (2002). TLoc (temporal location) is a modification of "temporal location" in Kamp and Ryle's sense. It represents the temporal interval in which eventualities are seen: It concerns the specific way the speaker frames eventualities at issue. For example, with an event of John leaving, the speaker may either focus on the event itself (regarding the time of departure, the destination, etc.) or on the resulting state (i.e. his not being available now). I analyze such difference in terms of TLoc: Roughly speaking, in the former case, TLoc is located around the event time, whereas in the latter case, it includes the speech time, at which the resulting state holds.

　Now I analyze the *ta* and the *teiru* versions of (2) respectively as (6a) and (6b).

　In (6a), discourse elements *n* (speech time), *t* (temporal perspective from which the eventuality is seen, in the sense of Kamp and Reyle (1993)), *x* (an object) and *e* (an event) are introduced. Discourse conditions are as follows. Temporal perspective is located on the speech time ("t=n"), temporal location

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[3] Here I set aside the problems which they seem to cause in the analysis of English perfect, as dicsussed in Mizuta (2004).

(6) DRS for the *ta* version (a) and the *teiru* version (b) of (2b).

a.

n, t, x, e
t = n
n ⊂ TLoc
e ⊂ TLoc
e ≺ n
water(x)
e: x come to the boil

b.

n, t, x, s
t = n
TLoc = n
s ∘ t
water(x)
s: x PERF(come to a boil)

is framed around the speech time ("n ⊂ TLoc"), the event occurs within the temporal location ("e ⊂ TLoc") and precedes the speech time ("e ≺ n"). The last line asserts that the event at issue is a water-coming-to-the-boil event. In essence, *ta* (perfect) is analyzed in terms of the water-coming-to-the-boil event *e*. The main points are: 1) that TLoc includes the speech time as well as the event time, and 2) that the event at issue is introduced straightforwardly into the main discourse. 1) indicates that the aspectual status of the event in the 'complete/ongoing/still-to-occur' paradigm is essential, and 2) indicates the speaker's committment to the event.

Why can I analyze *ta* (perfect) meaning in terms of an event, having said that it concerns the resulting state? It is for the following reasons. *Ta* (perfect) describes the change of state attributed to some event, rather than the event itself. And the assertion of a change of state is equivalent to that of the existence of the triggering event. The difference between the two cases can be analyzed in terms of the foreground / background status of the event in the speaker's conceptualization of the state of affairs. Also, Japanese makes an eventive description when the state to refer to required (/ requires) some change, as Kageyama (2002), pp. 26-30, points out. Therefore I analyze *ta* (perfect) in terms of a triggering event.

Next, the *teiru* version is analyzed as (6b). A state *s*, instead of an event *e*, is introduced into the main DRS. In fact, in my analysis, the triggering event *e* is not introduced to the discourse. I analyze that the water (*x*) is in a after-coming-to-the-boil state ("s: x PERF(come to a boil)"). That is, the perfectivizer "PERF" operates at the predicate level. Thus, DRS (6b) does not involve an assertion of an event. [4] I will mention cases which I analyze introduce a triggering event *e* in an embedded DRS. In any case, *teiru* does not introduce a triggering event to the main DRS. This is the main point of my analysis of *teiru*.

In essence, the difference between *ta* and *teiru* is whether it is a triggering event or a state that is introduced into the main DRS. This corresponds to whether a triggering event is asserted or not. This model explains the asymmetry between *ta* for an eventive description and *teiru* for a stative description, as exhibited in (2a) and (2c). [5]

3 Feedback to *ta*

I now discuss how the above-proposed analysis of *ta* in terms of an event description fits into the semantics of *ta* from a wider perspective.

3.1 Simple past meaning

Sentence (3) (simple past), repeated here as (7), is analized as (8).

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[4]This line of analysis sheds new light on the classical issue regarding the treatment of so called Class IV verbs (e.g. *sobieteiru* 'to tower up', *sugureteiru* 'to be superior'). Traditionally, these verbs have received a seperate treatement on the ground that no triggering event *e* is assumed. In other words, the resulting state of all other verbs have been analyzed in terms of a triggering event. However, this approach does not work well for analyzing those cases which underwent lexicalization (e.g. *magat-teiru*, "to be bent/bending").

[5]Thus, Kamp and Reyle's DRT analysis in line with (5) seems to congenial to the *ta* version in Japanese, but not the *teiru* version. See Mizuta (2004) for relevant discussions.

(8) DRS for (3) (simple past)

$$
\begin{array}{c}
n,\ t,\ x,\ e,\ r \\
t \prec n \\
\text{TLoc} = n - \text{'10 min.'} \\
e \subset \text{TLoc} \\
\text{water}(x) \\
r := e \\
\hline
e:\ x \text{ come to the boil}
\end{array}
$$

(7) jup-pun-mae-ni o-yu-ga wai-*ta*.
    ten-minutes-ago Hon-hot-water-Nom (come-to-the-)boil-Past
    'The water came to the boil ten minutes ago.'

The same elements as in (6a) are introduced into the discourse. Discourse conditions are as follows. Temporal perspective *t* precedes the speech time *n* ("t ≺ n"). Temporal location is located at ten minutes before the speech time ("TLoc = n - '10 min.'"). The event occurs within TLoc. Reference point *r* in Kamp and Ryle's sense is located at the event ("r := e"). The last line asserts that the event *e* is a coming-to-the-boil event of the water *x*.

Compare this with (6a) for the analysis of *ta* (perfect). The main differences lie in the location of TLoc and in the involvement of reference point *r*. In the case of *ta* (simple past), the speaker refers to the event in the past. In the case of *ta* (perfect), the speaker does not refer to the event but cocerns the change of state observed in TLoc.

There is a similatiry as well: DRSs (8) and (6a) both introduce an event *e* into the main DRS. This indicates that the two meanings of *ta* both make an eventive description within a temporal interval preceding the speech time and that the speaker is committed to an assertion of an event.

As I mentioned earlier, the difference between the two meanings is whether the focus is on the event itself or on the change of state triggered by the event. *Ta* (simple past) asserts and refers to an event *e*, whereas *ta* (perfect) asserts an event *e* and refers to the change triggered by *e*.

3.2 Modality meaning: finding

Ta is used with modality meanings too. A comprehensive analysis of such usage is beyond the scope of the present paper. But I illustrate the continuity between the modality and the tense-aspect use of *ta*.
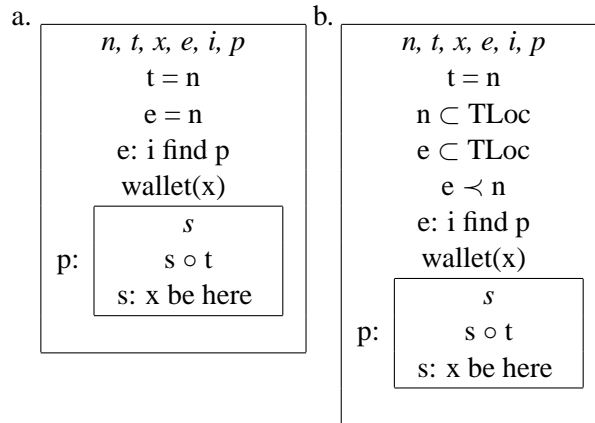
The use of *ta* as in sentence (9) is known as *ta* expressing discovery, surprise and the like (e.g. Kudo (1995), Inoue (2000), Nishiguchi (2004)). To be noted, the English counterpart takes the present tense. In both cases, the state mentioned (e.g. the wallet being on the desk) holds at the moment of speech.

(9) Koko-ni at-*ta*!
    here-Loc be-
    'Here it is!'

I analyze the English and the Japanese versions respectively as (10a) and (10b). (*i* and *p* indicate the speaker and a proposition, respectively. In both English and Japanse versions, the sentence (to be precise, the utterance) involves the speaker's finding event. In DRT, the finding event is introduced into the main DRS, and what the speaker finds is the proposition that the wallet is there at hand.

DRS (10a) for the English version represents the state of affairs in such a way that the speaker recognizes the proposition *p* as he utters. The surface form of the sentence focuses on the propositional content, and the finding event is encoded only in the exclamation mark in the transcription (or in the

(10) DRSs for the English (a) and the Japanese (b) versions of (9)

a.

$$
\begin{array}{|c|}
\hline
n,\ t,\ x,\ e,\ i,\ p \\
t = n \\
e = n \\
e:\ i \text{ find } p \\
wallet(x) \\
p: \boxed{\begin{array}{c} s \\ s \circ t \\ s:\ x \text{ be here} \end{array}} \\
\hline
\end{array}
$$

b.

$$
\begin{array}{|c|}
\hline
n,\ t,\ x,\ e,\ i,\ p \\
t = n \\
n \subset TLoc \\
e \subset TLoc \\
e \prec n \\
e:\ i \text{ find } p \\
wallet(x) \\
p: \boxed{\begin{array}{c} s \\ s \circ t \\ s:\ x \text{ be here} \end{array}} \\
\hline
\end{array}
$$

accent, in the case of an oral speech). The last part represents the condition on the predicate *p* being recognized, that is, the state of the wallet being here ("s: x be here") overlaps with the temporal perspective *t*, which is located at the speech time *n*. In informal terms, the proposition is that the wallet is at hand. [6]

DRS (10b) for the Japanese version represents the state of affairs in such as way that the finding event precedes the utterance. The *ta* form is used by virtue of the finding event preceding the utterance. [7] Sentence (9) has in common with the *ta* version of (2a), in that they express a change of state. In the case of (9), the change occurs in the speaker's cognitive state, rather than in the state of affairs in the real world (e.g. the water coming to the boil). The peculiatiry with the modality-related use of *ta* is that *ta* is attached to the embedded proposition (i.e. the wallet being there) instead of the predicate expressing the finding event. A possible account is that *ta* used in sentence (9) underwent grammaticalization merging the expression of the proposition and the tense / aspect information on the finding event.

Sentence (11) explicitly encodes the finding event (*mitsukeru*, "to find"), but neither the propositional content nor the object found:

(11) *mitsuke-ta*!
    to-find-ta
    'I (have) found (it)!'

I analyze that (9) and (11) are surface variations with roughly the same semantic content.

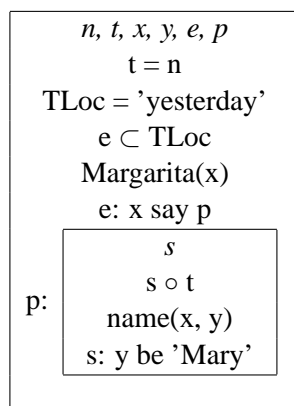### 3.3   Modality meaning: reaffirmation

Sentence (12) expresses "reaffirmation of a fact" (Yoshimoto (1998)). The analysis goes along the same line, as illustrated in (13).

(12) [The speaker met Margarita at yesterday's party and asked her name. Today he sees her and wants to make sure of her name.]
    Eeto, o-namae-wa marugariita-san-deshi-*ta*-ne.
    Well, Hon-name-Top Margarita-Hon-be-Past-Modality(confirmation)
    'Well, your name is (lit. was) Margarita, right?'

---

[6]For DRT analysis of propositions and propositional attitudes, see for example Asher (1986), Kamp (1990), and Landeweerd (1997).

[7]Nishiguchi (2004) argues that this kind of *ta* expresses that the speaker assumed the negation of the fact just revealed ('counterfactuality'). But this claim seems to be too strong. I analyze in purely temporal terms, considering that the speaker was just ignorant and was neutral as to the fact to be revealed.

(13) DRSs for (12)

$$
\boxed{
\begin{array}{c}
\textit{n, t, x, y, e, p} \\
t = n \\
\text{TLoc} = \text{'yesterday'} \\
e \subset \text{TLoc} \\
\text{Margarita}(x) \\
e: x \text{ say } p \\
p: \boxed{
\begin{array}{c}
s \\
s \circ t \\
\text{name}(x, y) \\
s: y \text{ be 'Mary'}
\end{array}
}
\end{array}
}
$$

As in (9), *ta* is used by virtue of the event preceding the speech time: Yesterday, Margarita told the speaker her name (to be precise, the proposition *p* that her name is Margarita). Of course, the proposition (i.e. her name being Margarita) holds also at the speech time *n*, as represented in the condition "s ∘ t" (, where *t* is located at *n*). My analysis follows the same line with the one provided for (9). Sentence (12) combines the propositional content in question with the tense information about the relevant preceding event. This is the peculiarity of the modality use. I observe more straightforward manifestations of similar content such as (12):

(14) o-namae-wa marugariita-san to osshai-mashi-*ta*-ne.
     Hon-name-Top Margarita-Hon Postp. say(Hon)-Hon-Past-Modality(confirmation)
     'Your name is Margarita, right?' (lit. "You said that your name is Margarita, right?"

In (12), *ta* is attached to the predicate expressing Margarita's saying event (*osshai-mashi*, "to say (Hon)"). However, intuitively, (12) does not simply refer to the event. Even though the predicate in question is retained, its meaning is more or less bleached.

The literature mentions more examples of *ta* with the modality meaning, and it does not seem to be possible to explain them all in relation to tense / aspect (e.g. Onoe (1982), Yoshimoto (1998)).

However, the examples which I discussed above illustrate the continuity between modality meanings and tense / aspect meanings. They are commonly committed to an event description, mentioning either a preceding event or a change of state.
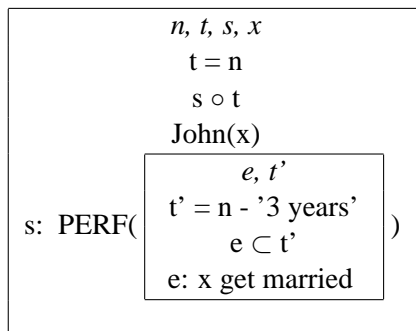
3.4 Summary

I analyze that different meanings of *ta* have in common the property that they are committed to an assertion of an event preceding the utterance. The differences are the following. In the case of simple past, the event is referred to straightforwardly. In the case of the perfect state meaning, the event is in the background and is not referred to by itself: The change of state is in the foreground. In the case of modality meanings I analyzed here (i.e. finding and reaffirmation), the event is only encoded regarding its tense / aspect status (i.e. precedence to the utterance).

The essential point I identify in *ta* (perfect), that is, a committment to an assertion of an event, works out for contrasting it with *teiru* (perfect) on the one hand, and on the other hand, fits into the semantics of *ta* in a wider range of usage.

4 Feedback to *teiru*

I now turn to *teiru* to see how my analysis of *teiru* (perfect) fits into the semantics of *teiru* in a wider range of meanings.

(16) DRS for the experiential reading

$$
\boxed{\begin{array}{c}
\textit{n, t, s, x} \\
t = n \\
s \circ t \\
\text{John(x)} \\
\text{s:}\ \ \text{PERF}\left(\boxed{\begin{array}{c}
\textit{e, t'} \\
t' = n - \text{'3 years'} \\
e \subset t' \\
\text{e: x get married}
\end{array}}\right)
\end{array}}
$$

(17) DRS for the experiential reading proposed by Yoshimoto (1998) (main points only)

$$
\boxed{\begin{array}{c}
...... \\
e \supset\subset s \\
\text{e: x write y} \\
\text{s: x Exper(write) y}
\end{array}}
$$
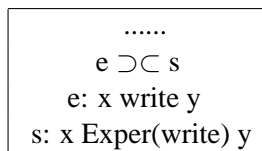
4.1 Experiential meaning

Sentence (15) yields so-called experiential meaning. It expresses John's profile rather than the event of John getting married. I analyze (15) as (16).

(15) John-wa san-nen-mae-ni kekkonshi-teiru.
    -Top three-year(s)-ago get-married-State-Nonpast
    'John got married three years ago(, as a matter of fact).'

My analysis is that the main DRS introduces the current state *s* as a perfect state of the marriage event *e*. Importantly, event *e* is introduced in the embedded DRS, therefore it is not asserted but is only entailed from the top-level statement. Also to be noted, the temporal adverbial 'three years ago' specifying the event time in the past is introduced within the embedded DRS. This conforms to its compatibility with the *teiru* form, which marks the nonpast.
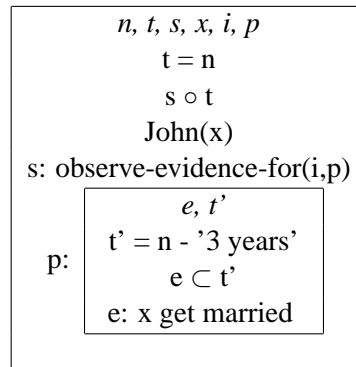
Yoshimoto (1998) analyzes the experiential meaning as in (17), in terms of an abutting relation between the triggering event *e* and the current state *s*. In this analysis, however, the role played by the operator 'Exper' (an abbreviation of 'Experiential') is not clear: It is more intuitive to consider its scope to operate on the whole predicate ('write y') or on the sentence, instead of the verb by itself. Also, the last statement about *s* seems redundant, given the abutting relation ("e ⊃⊂ s"). Also, this analysis, just as (5), does not specify whether the statement focuses on the event or on the state.

4.2 Record meaning

Sentence (18) yields so-called the record / fact meaning (Kudo (1995), Inoue (2000), among others). (18) is uttered as the speaker observes an evidence for a certain event. I analyze (18) as (19).

(18) [Looking at a journal of the office]
    A, John-wa san-nen-mae-ni kekkonshi-*teiru*.
    Oh, John-Top three-year(s)-ago get-married-State-Nonpast
    'Oh, (according to the journal,) John got married three years ago.'

(19) DRSs for the 'record' reading

$$
\boxed{
\begin{array}{c}
n,\ t,\ s,\ x,\ i,\ p \\
t = n \\
s \circ t \\
\text{John}(x) \\
s:\ \text{observe-evidence-for}(i,p) \\
p: \boxed{
\begin{array}{c}
e,\ t' \\
t' = n - \text{'3 years'} \\
e \subset t' \\
e:\ x\ \text{get married}
\end{array}
}
\end{array}
}
$$

I analyze that the use of *teiru* is attributed to the state of the speaker's observation. The event at issue, and the information provided by the temporal adverbial (*san-nen-mae-ni*, 'three years ago'), are introduced in an embedded DRS.

It is worth comparing (19) with (10b), for example. There are a 'mirror image' of each other from the following perspective. In (10b), an event is asserted into the main DRS, and a state is introduced in the proposition. The sentence takes the *ta* form in favor of the event preceding the speech time. In (19), in contrast, a state is asserted into the main DRS, and an event is introduced in the proposition. The sentence takes the *teiru* form in favor of the state holding the speech time.

Now why is the 'record reading' incompatible with the *ta* version? Because the speaker does not have direct access to the event in question, as in an indirect speech.

4.3 Summary

I proposed an analysis that *teiru* (perfect) asserts a state, not a triggering event, into the main DRS (Section 2). And I analyzed *teiru* with other meanings along the same line. Although detailed analysis of various meanings of *ta* and *teiru* is beyond the scope of the present paper, I illustrated that my analysis of *ta* and *teiru* with the perfect meaning in terms of an event/state description works more generally for the characterization of *ta* and *teiru*.

5   Complex eventualities in the discourse

I now analyze *ta* / *teiru* in a discourse. (20a) with the simple past meaning is analyzed as (21). Sentences (20b) and (20c) showing the contrast between *ta* and *teiru* (perfect) are analyzed respectively as (22a) and (22b).

(20) a. juppun-mae-ni o-yu-ga wai-*ta*. Pan-mo yake-*ta*.
      ten-minutes-ago Hon-hot-water-Nom boil-Past. bread-Nom toast-Past
      'Ten minutes ago, the water came to the boil. And the bread was toasted.'

   b. [The speaker himself prepared the breakfast.]
      o-yu-ga wai-*ta*. Pan-mo yake-*ta*.
      'The water is now on the boil. And the bread is now toasted.'

   c. [The speaker finds the breakfast which somebody else has prepared.]
      A, o-yu-mo wai-*teiru*. Pan-mo yake-*teiru*.
      'Oh, the water is (already) on the boil. And the bread is also toasted.'

(21) DRSs for (20a) with *ta* (simple past)

$$\boxed{\begin{array}{c} n,\ r1,\ r2,\ e1,\ e2,\ x,y \\ r1 \prec n \\ e2 \subset r1 \\ \text{water}(x) \\ e1:\ x\ \text{come to the boil} \\ r1 \prec r2 \prec n \\ e2 \subset r2 \\ \text{bread}(x) \\ e2:\ y\ \text{toast} \end{array}}$$

(22) DRSs for (20b) with *ta* and for (20c) with *teiru*, both with the perfect state meaning

a.
$$\boxed{\begin{array}{c} n,\ t,\ e1,\ e2,\ x,\ y \\ t = n \\ e1 \prec t \\ \text{water}(x) \\ e1:\ x\ \text{come to the boil} \\ e2 \prec t \\ \text{bread}(x) \\ e2:\ y\ \text{toast} \end{array}}$$

b.
$$\boxed{\begin{array}{c} n,\ t,\ s1,\ s2,\ x,\ y \\ t = n \\ n \subset \text{TLoc} \\ e1 \subset \text{TLloc} \\ s1 \circ t \\ \text{water}(x) \\ s1:\ x\ \text{PERF(come to the boil)} \\ \text{bread}(y) \\ s2:\ y\ \text{PERF(toast)} \end{array}}$$

Compare first DRSs (21) and (22a). In both DRSs, events *e1* and *e2* are introduced in the discourse. The main difference is the following. In (22), reference points *r1* and *r2* are introduced and events *e1* and *e2* occur within the corresponding reference point. The location of the reference point is updated forward for each event. In contrast, in (22b), there is no such involvement of a reference point, In (20c), the perfect state is introduced straightforwardly into the main DRS, and the triggering events are not introduced into the main DRS. This conforms to our observation: In the case of simple past, events are referred to and they are considered to occur in the order of description. In the case of perfect state, events are not referred to and the ordering of events is arbitrary.

The *ta* and the *teiru* forms can be used in combination, as in (23), depending on the situation. There is no ordering restriction between the events at issue.

(23) [The speaker finds the water already on the boil. The bread gets toasted while he is looking at it.]
   o-yu-wa wai-teiru. pan-mo yake-ta.
   Hon-hot-water-Top come-to-the-boil-State. bread-also be-toasted-Past
   'The water is on the boil. And the bread has just got toasted.'

6   Comparison with Korean temporal markers *a nohta* and *a twuta*

Lee (1996), Chapter 6, analyzes Korean perfect-related temporal markers *a nohta* and *a twuta* in the DRT framework. I compare these markers with Japanese *ta* / *teiru*.

(24) a. John-i cip-ul cie-e *nohass*-ta
   b. John-i cip-ul cie-e *twuess*-ta
   John-Nom house-Acc build-T-S
   'John built a house.'

Table 1: Japanese *ta* / *teiru* and Korean *a nohta* / *a twuta*

	ta past	*ta* perfect	*teiru* perfect	*a nohta*	*a twuta*
introduced into the main DRS	event	event	state	event	state
ref. point updated	yes	no	no	yes	no

As she mentions, these Korean markers have been commonly analyzed in the literature to be synonymous, both expressing the perfect. The two versions in (24) taken from Lee (1996) (with the identical gloss and translation) seem to support it.

However, based on the analysis in the discourse with sentences (25a) and (25b), she argues the dictinction between these markers.

(25) a. John-i pang chengso-lul hays-ta. Ku-num changmwun-ul yel-*e nohass*-ta.
     John-Nom room cleaning-Acc do-T-S he-Top window-Acc open-T-S
     'John cleaned the room. He opened the window.' (two sequential events)

  b. John-i pang chengso-lul hays-ta. Ku-num changmwun-ul yel-*e twuess*-ta.
     John-Nom room cleaning-Acc do-T-S he-Top window-Acc open-T-S
     'John cleaned the room. He kept the window open.'

She argues that *a nohta* and *a twuta* make respectively a "dynamic" and a "stative" description of eventualities and concluds that the former is a past tense marker whereas the latter is a perfect state marker. Her analysis is highly relevant to our analysis. Lee (1996) (p.101) argues that *a nohta* describes a dynamic change from *-p* to *p* (*p* stands for a proposition), whereas *a twuta* expresses a state presupposing the occurrence of the triggering event. This indicates the parallelism to the *ta* / *teiru* contrast with the perfect state meanings.

However, a further critical point she makes is that *A nohta* requires that a following sentence must describe a distinct later event, whereas that *a twuta* describe a state overlapping with the event described in the previous sentence. In DRT terms, *a nohta* sets up a new reference point, whereas *a twuta* does not. and it forces subsequent sentences to be interpreted as describing later events. This suggests that *a nohta* is a counterpart of *ta* (simple past), instead of *ta* (perfect). *A twuta* correspond to *teiru* (perfect).

The semantic properties of Japanese *ta* / *teiru* and Korean *a nohta* / *a twuta* are summarized in Table 1.

7 Conclusion

Ta and *teiru* introduce respectively an event and a state into the main DRS. With the *teiru* version, an event may be entailed (as a condition in an embedded DRS) but not asserted. The distinction between an eventive and a stative description is critical in the Japanese tense / aspect system. Therefore the correct analysis of Japanese sentences regarding tense and aspect needs to be sensitive to the level at which the event or the state is introduced. It is not sufficient just to describe the cause-effect relation between a triggering event and its resulting state and so on. My analysis in the DRT framework is intended to do justice to this point.

I also made a comparison between Japanese *ta* / *teiru* and Korean *a nohta* / *a twuta*. I identified a parallelism between *ta* (simple past) and *a nohta*, and between *teiru* (perfect) and *a twuta*. The former pair is committed to an event description involving the update of the reference point, whereas the latter pair is committed to a stative description keeping the current reference point.

More comprehensive analysis of Japanese *ta* / *teiru*, including the modalityity-related uses of *ta*, in relation to other Korean tense / aspect markers should provide a better picture of the tense / aspect systems of the two languages. This is an issue for future work.

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