C-1 Variable telicity of nonculminating accomplishments in Japanese

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1 Introduction

In English, a sentence with a lexical causative entails the sentence with the corresponding inchoative. For example, *John opened the door* entails *the door opened*. But, as Ikegami (1981), Tsujimura (2003), and others point out, this is not the case for Japanese as the following example indicates:

(1) Mado-o ake-ta kedo (sabitui-tei-te) ak-anak-at-ta.
window-ACC $open_{tr}$-PAST but (rust-PERFECT-and) $open_{intr}$-not-be-PAST
'I opened the window, but it didn't open (because it was rusty).'
(Tsujimura's (2003) (17), adapted)

A construction that fails to entail the corresponding inchoative like this is called a nonculminating accomplishment (NA), and found in many languages (see Demirdache and Martin 2015 and references therein). Recently this type of construction has attracted growing attention and various analyses have been proposed (Koenig and Muansuwan 2000, Bar-El et al. 2005, Tatevosov 2008, Altshuler 2013, Martin 2015, Copley and Harley 2015, among others).

A characteristic of NAs is that they exhibit variable telicity. As can be seen from the following example, Japanese lexical causatives can be telic as generally assumed:

(2) Taroo-wa doa-o go-hun-de ake-ta.
Taro-NOM door-ACC five-minute-in $open_{tr}$-PAST
'Taro opened the door in five minutes.'

But when they receive the nonculminating interpretation, they are atelic as can be seen from the following example:

(3) Taroo-wa doa-o go-hun-{*de/kan} ake-ta kedo ak-anak-at-ta.
Taro-NOM door-ACC five-minute-in/for $open_{tr}$-PAST but $open_{intr}$-not-be-PAST.
'Taro opened the door in/for five minutes, but it did not open.'

An important observation this example indicates is that when a lexical causative receives the nonculminating interpretation, a temporal adverbial with 'in' cannot be used. This means that in (2), only the culminating interpretation is possible. In this paper I present an analysis that predicts this variable telicity of NAs.

2 The event structure of Japanese lexical causatives

I argue that the atelic reading of NAs arises because lexical causatives in Japanese are associated with the activity event structure. In the case of English, I assume that lexical causatives are associated with the causative event structure following the usual assumption (e.g. Dowty 1979, Parsons 1990, Levin and Rappaport Hovav 1995). In particular I assume the causative event structure proposed by Rappaport Hovav and Levin 1998, which is based on the following event template:

(4) [[x ACT] CAUSE [[BECOME [y <*STATE*>]]]

The position indicated by the angle brackets is the position to which roots (which Rappaport Havav and Levin call constants) like <*OPEN*> is inserted. The italicized material in the angled bracekts represents the ontological type of the root that is inserted there. Thus by replacing "<*STATE*>" by the stative root <*OPEN*>, we obtain the event structure of $open_{tr}$. This is one of decompositional analyses of lexical causatives usually assumed.

But I suggest that in Japanese, lexical caustives are associated with a special type of the activity event structure. The activity event structure adopted by Rappaport Hovav and Levin (1998) is based one the following event template:

(5) [x $ACT_{<MANNER>}$]

In this case, for example, the event structure of *walk* is obtained by replacing "<*MANNER*>" by the

manner root <*WALK*>. The subscript to a predicate is its modifier, and thus if <*WALK*> is inserted, the whole structure represents an event of x's walking. I suggest that Japanese lexical casuatives are associated with a special type of the activity event structure like this. That is, I assume that the following is the event template of Japanese lexical casuatives:

(6) $[x\ ACT_{A\text{-}CAUSE}\ [[BECOME\ [y <\textit{STATE}>]]$

A(ctivity)-CAUSE is the predicate that yields an activity predicate that describes an event in which, roughly saying, the agent does an action that will cause an event described by the input predicate. More specifically, I assume the following meaning (s is the type of events):

(7) $[\![A\text{-}CAUSE]\!] = \lambda P_{<s,\,t>}\lambda e\exists x[$e causes a P-event in the inertia worlds w.r.t. the actual world and the running time of e$]$

This meaning is based on the analysis of NAs proposed by Bar-El et al. (2005). (Here I do not discuss why I choose their analysis as the base of (7) due to lack of space.) Then by inserting the root <*AK*> to (6) (*ak-* is the root representing the opening state, i.e., the shared part of *ake-* 'open$_{tr}$ and *ak-* 'open$_{intr}$'), we essentially obtain the following meaning of *ake-* (assuming that affixation of the causative morpheme *-e-* is the reflection of having this event structure):

(8) $[\![ake\text{-}]\!] = \lambda x\lambda y\lambda e[$y is the agent of e & e causes an event of x's opening in the inertia worlds w.r.t. the actual world and the running time of e$]$

3 Atelicity

If we input an object and a subject to (8), we obtain the following event predicate:

(9) $[\![$Taroo doa ake$]\!] = \lambda e[$Taro is the agent of e & e causes an event of the door's opening in the inertia worlds w.r.t. the actual world and the running time of e$]$

Is this telic? According to the usual definition of telicity (e.g. Krifka 1998), a necessary condition of a predicate's being telic is that if the predicate describes an event, that predicate cannot describe a temporal part of it with a different endpoint. Thus, for example, because a walking event can contain another walking event with a different endpoint, *walk* is atelic. Similarly, since a nonculminating event can contain another nonculminating event of the same type with a different endpoint, NAs seem to be atelic.

However, notice that (9), if existentially closed, asserts the existence of the causing event, which means that (9) implies that Taro *completely* carries out the action that will cause the caused event. Then, since a complete event cannot properly contain another complete event of the same type, (9) seems to be telic.

Still there is a reason to consider that (9) is treated as an atelic predicate. There are other cases in which a predicate that describes complete events is atelic. Cases in point are activities. As Dowty (1979) points out, activities describe repetition of a certain minimal event. For example, *waltz* describes repetition of the minimal event consisting of the certain kind of three steps. Importantly, if one only took the two of those steps, we cannot say that that person waltzed. Thus events described by activities must contain a complete event, yet the fact is that they are atelic. Similarly, it is obvious that semelfactives like *jump* and *cough* also need to describe at least a complete event, but they can be atelic as the acceptability of *John jumped for an hour* indicates.

On the other hand, accomplishments like *build a house* and achievements like *arrive at the station* also describe complete events, and it is usually considered that precisely because of this completeness they are telic. Then a question that naturally arises is why sometimes a predicate describing complete events is telic and sometimes not. The answer presented by Rothstein (2004) is that this depends on whether the minimal events can be adjacent. Accomplishments and achievements describe events where the initial and final states are necessarily different. For example, in the final state of building a house, there is a house, and thus that state cannot be the same as the initial state of building a house, where there is no house. Similarly, the final state of arriving at the station cannot be the same state as its beginning state because in the former state the subject is at the station, and in the latter state that person is not at the station. Thus there must be at least a change between two accomplishment or achievement events of the same type, which prevents two such events from being adjacent. On the other hand, in

activity and semelfactives events, it is not necessary that the initial and final events of the same type are different. For example, both in jumping and walking events, the final state of an event can be the same state as the beginning state of another event of the same type. Therefore two activity and semelfactives events can be adjacent. Then Rothstein's idea is to assume that the following principle holds (she does not formulate her idea in this way, but this is what she means in my understanding):

(10) If there are two P-events that are adjacent, then their sum is also P.

This, for example, ensures that the sum of two minimal walking events is also a walking event, and, recursively applying the principle, any number of walking events can be summed to a walking event. Then it follows that a walking event can contain another walking event with a different endpoint, which makes the predicate atelic. For the same reason *jump* is predicted to be atelic. On the other hand, because two events of the same type described by accomplishment and achievement events cannot be adjacent, (10) does not make them atelic. In this way the possibility of adjacency, which boils down to whether the predicate involves change, is responsible for (a)telicity.

Then the question is whether two events described by (9) can be adjacent. If it were a usual causative (i.e. culminating) predicate, events described by it could not for the same reason that accomplishment events cannot. But since (9) is a nonculminating predicate, it is possible that the final state of an event described by it is the same as the initial state of another event of the same type, which means that two events described by (9) can be adjacent. Then the same reasoning as above leads to the conclusion that it is atelic. In this way precisely because NAs are nonculminating, they are grouped with activities and semelfactives in contrast with accomplishments and achievements in terms of telicity, even though NAs appear to be accomplishments.

Note that, as assumed by Rothstein, we can regard (10) as a freely applicable operation rather than generalization. That is, we can consider that activities and semelfactives by themselves describe minimal events, and that by that operation they come to describe repetitive events (i.e. have the meaning that we usually consider activities to have). We adopt this idea, and therefore we did not need to modify the meaning (7) in order to capture our claim that NAs can describe a repetitive event, for this is made possible by the freely applicable operation (10).

4 Telicity

One may consider that variable telicity of NAs arises because of the freely applicable operation (10), assuming that when it is applied NAs are atelic, and that otherwise they are telic. However, this is incorrect because it wrongly predicts that the telic reading can be nonculminating (i.e. (3) with *de* 'for' is acceptable). Note that in that analysis the telic reading has the meaning (9), which can be nonculminating. The correct theory then must capture the fact that when NAs are telic, they are culminating.

This fact is also not captured by the explanation of telicity of NAs presented by Tsujimura (2003) and Bar-El et al. (2005), according to whom the telicity arises because the endpoint is set by the implicature. In particular, Tsujimura suggests that telicity of NAs arises for the same mechanism that makes the following example possible:

(11) John walked in ten minutes.

This sentence is acceptable in a certain context; for example, if what has been talked about is John's everyday routine walking, (11) is a natural utterance. Here the endpoint is contextually determined, and Tsujimura suggests that in NAs it is determined in the same way. A problem of this idea is, however, that the effect of implicature is too unrestrictive, and it can set any point as the endpoint of the telic reading. Thus it does not predict that the endpoint of the telic reading in NAs must coincide with the culminating point.

Even so I agree with Tsujimura and Bar-El et al. in that the endpoint of NAs is determined by implicature. The problem then is that the condition of determining the endpoint is too weak, and there seems to be another constraint that restricts the endpoint to the culminating point. As such a constraint, I argue that the following principle, which is proposed by Kennedy and Levin (2008), is at work:

(12) **Interpretive Economy**
Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions.

This was originally proposed to explain lack of the reading employing the contextually determined standard degree in degree achievements like *widen* and *cool*. Consider the following examples:

(13) a. The gap widened.
b. The gap became wide.

(13b) means that the width of the gap reaches the certain degree that is contextually determined; that degree varies depending on the context. (13a), however, does not have the reading in which the width of the gap reaches the contextually determined degree, but only has the reading in which the gap became wider. Thus *wide* employs the contextually determined degree, but *widen* does not. Kennedy and Levin attribute this difference to the fact that only *widen* has the lexically determined degree. They assume that *widen* basically means that the degree of the theme's width becomes higher than that holding at the beginning of the event. Thus that degree is the lexically encoded degree. The idea is that even if the contextually determined degree exists, it is suppressed in favor of the lexically (i.e. conventionally) determined degree because of the Interpretive Economy, which is why the contextually determined degree is not employed in (13a). On the other hand, in the case of *wide*, there is no lexically determined degree that determines whether the subject is wide or not. Then the Interpretive Economy plays no role, and the contextually determined degree is employed as a last resort. Thus the Interpretive Economy explains why only in (13b) the contextually determined degree is employed.

Although Kennedy and Levin use the Interpretive Economy only to explain the behavior of degree achievements, I suggest that its scope is wider. For example, I consider that it is employed in determining the meaning of verb phrases with an incremental theme like the following:

(14) John read *War and Peace.*

Usually the endpoint of the verb phrase like this is considered to be strictly determined by the physical extent of the theme (e.g. Krifka 1998). According to this idea, the event described by this verb phrase ends when the whole of *War and Peace* has been read. However, this way of determining the endpoint cannot be applicable to all accomplishments. For example, in the case of *repair the computer* and *wash the clothes*, the endpoint is not determined by the physical extent of the theme. For this and other reasons, Rothstein (2004) suggests that the endpoint of accomplishments is the endpoint of the "incremental process" associated with the verb phrase. We do not explain what it is, but what is important here is that in her analysis there is no constraint requiring the whole of the theme to be "used up" in determining the endpoint of the incremental process. Similarly, Hay et al. (1999) present the analysis in which telicity of accomplishments is determined by the gradable property of the verb phrase and implicature without assuming the constraint that the whole incremental theme must be used up. Both analyses explain how the endpoint is determined in wide variation of accomplishments. However, the cost of this advantage is that the analysis loses strictness in determining the endpoint, which is a characteristic of analyses like Krifka's (1998). Now consider the following example:

(15) Context: I am in a habit of reading a chapter of *War and Peace* every day. I describe yesterday's reading by saying:
#I read *War and Peace* in thirty minutes.

The context demands that the endpoint of the verb phrase be the end of a chapter. Thus if the endpoint is determined contextually, and there is no strict mechanism that associates the endpoint of the event with the point at which the whole of the theme is used up, then the reading where the endpoint is the end of a chapter is wrongly predicted to be acceptable. However, if we consider that the Interpretive Economy is at work, the situation is different. In (15), we have the endpoint determined by the context and the endpoint determined by the physical extent of the theme, a lexical element. In such cases the Interpretive Economy requires that the lexically determined meaning be employed, and thus it is correctly predicted that the endpoint determined by the physical extent of the theme is employed. Thus the observed requirement that the incremental theme, if any, must be used up can be considered to be the result of the Interpretive Economy.

The lesson we have learned so far is that because of the Interpretive Economy, when a verb phrase has the contextually determined meaning and lexically determined meaning, the latter is employed as the entailed meaning. Now let us consider the case of NAs. According to our analysis so far, NAs have

the meaning (9), which can have as the endpoint either a nonculminating instant or the culminating instant. The latter instant is the lexically determined endpoint because it is decided by the state explicitly encoded in the meaning, while the former instant can only be determined contextually because the lexical meaning does not specify any salient instant among the nonculminating instants. Then because of the Interpretive Economy, the culminating instant is employed as the endpoint of the event described by the verb phrase. In this way NAs have the culminating, telic reading. As a result Japanese causatives have the same meaning as English ones, because when the culmination point is chosen as the endpoint in (9), the resulted meaning is the meaning in which causation is successful.

The analysis predicts that when there is no lexically determined endpoint, the contextually determined endpoint is employed, as is the case for *wide*. This is what happens in (11): The linguistic environment demands the telic reading, but there is no lexically determined endpoint for the telic reading. Then the contextually determined endpoint is employed as a last resort.

5 Atelicity again

We have assumed that the Interpretive Economy is automatically applied, and therefore the meaning (9) is not predicted to appear by itself. This assumption is required because if it were not for it, examples like (15) would be acceptable. This means that in our analysis so far NAs are predicted to only have the telic reading. I propose that the telic reading of NAs is derived from that reading, and in this section I show how.

Verb phrases with an incremental theme can have the atelic reading even if the theme represents a bounded entity as exemplified in the following:

(16) a. John read the book for several hours before deciding he was stopping.
(Rothstein's (2012) (3.42a))
b. She ate the sandwich for 5 minutes. (Hay et al.'s (1999) (37b))

Rothstein (2004, 2012) suggests that the atelic reading in these cases is derived by applying the operation that she calls SHIFT. She decomposes accomplishments into the ACTIVITY event and the BECOME event, and SHIFT is the operation that, roughly saying, removes the BECOME event. The result is the atelic reading as observed in (16). Since it is not the case that all accomplishments can be converted to the atelic reading, Rothstein (2012) puts a constraint on the application of SHIFT. That constraint restricts the application of SHIFT to cases where the content of the ACTIVITY event is specified. Since her ACTIVITY event and Rappaport Hovav and Levin's ACT event are equivalent in my understanding (though BECOME events in the two decompositions are different), we can state the constraint as in the following:

(17) SHIFT can be applied to an accomplishment (i.e. the atelic reading can be derived) only when ACT is modified.

This explains why the following examples are unacceptable:

(18) a. #John built the house for several weeks before deciding he was stopping.
(Rothstein's (2012) (3.42b))
b. #John repaired the computer for several hours before deciding he was stopping.
(Rothstein's (2012) (3.42c))

Both of these have the causative event structure, and in Rappaport Hovav and Levin's decomposition, in such cases ACT is not modified. Then because of (17) SHIFT cannot be applied to accomplishments in these examples, and thus their unacceptability is predicted.

In the case of NAs, according to our analysis ACT is modified as can be seen in (6). This means that SHIFT can be applied to NAs, and therefore it is correctly predicted that in Japanese, lexical causatives can have the atelic reading as well as the telic one. On the other hand, in the event structure of English lexical causatives ACT is not modified as can be seen in (4), which means that SHIFT is not applicable and that therefore the atelic reading cannot be obtained. In this way the fact that while Japanese lexical causatives have the nonculminating reading, English ones do not boils down to whether the causative morphology is associated with the usual causative event structure based on (4) or the event structure with A-CAUSE based on (6).

6 Conclusion

Our basic assumption is that causative morphology in Japanese is associated with a special type of the activity event structure. The meaning of that event structure is atelic because of the lack of the culmination entailment. But, since we assume that the Interpretive Economy is automatically applied, that atelic reading is automatically converted to the telic reading. Then that atelic reading is optionally converted to the atelic reading due to the operation SHIFT. In this way our analysis predicts variable telicity by assuming the existence of two derivationally related meaning for NAs. Our analysis is better than analyses that assume only one meaning for NAs (e.g. Koenig and Muansuwan 2000, Bar-El et al.2005, Tatevosov 2008; Altshuler 2013) because they cannot explain variable telicity. As mentioned above, explaining variable telicity only by implicature (Tsujimura 2003, Bar-El et al. 2005) fails to predict the fact that the endpoint of NAs must coincide with the culmination point.

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