



that the two *hazime*'s 'start' in (1) are homonymous or polysemous between a control predicate and a non-control predicate. Rather, inheriting important assumptions from Distributed Morphology, I propose that (i) their similarity in meaning is attributed to the fact that they share the same root and (ii) their differences come from the properties of categorizing heads to which the root is combined, contributing to a growing body of literature that arrives at similar conclusions with respect to the division of labor between a root and categorizing heads (Marantz 1997, Embick and Marantz 2008, Embick 2010, Alexiadou 2001, Borer 2003, 2014). To articulate this analysis, detailed denotations of the relevant nodes are also provided; although the denotation of the root is the same, the semantics of the defective T triggers a presupposition which is never obtained under Type 2 construction.

## 2. Data

### 2.1 Observation 1: Prosody

This section presents four important contrasts between Type 1 and Type 2. Here, let us start with a phonological difference. In Japanese, each mora must be assigned either a low pitch accent or a high pitch accent. When a VV-compound is created, a %LH...HL% pitch contour is given to the sister node of T. Observe the sentences in (3), where the bracketed region is the sister node of the past tense suffix (T). As the bracketed region (= the complement of T) gets longer with additional verbal suffixes (such as *-rare* 'can' in (6)b and *-mas* 'HON<sub>A</sub>' in (6)c), the high-pitch region also extends so the entire bracketed region receives an %LH...HL% intonational contour (see Yamada 2018 for details).

- (3) a. L H HL L L    b. L H HH H L L L    c. L HH H H H L L L  
 [Ka.n.ga.e]-ta.-yo.    [Ka.n.ga.e.-ra.re.]-ta.-yo    [Ka.n.ga.e.-ra.re.-ma.si.]-ta.-yo  
 consier-PST-SFP    watch-can-PST-SFP    consider-can-HON<sub>A</sub>-PST-SFP  
 '(I) considered.'    '(I) could consider.'    '(I) could consider (polite).'

Aspectual markers in Type 2 construction show the same prosodic contour; the presence of *hazime* extends the high-pitch region as in (4). In contrast, in the Type 1 construction, there exist two %LH...HL% intonation contours as in (5), suggesting that a TP lies between *hazime* and *kangae*.

- (4) a. L H HH H H L L L    b. L HH L L L L L L  
 [Ka.n.ga.e.-ha.zi.me.]-ta.-yo.    \* [Ka.n.ga.e.-ha.zi.me.]-ta.-yo.  
 consider-begin-PST-SFP    consider-begin-PST-SFP  
 '(I) began considering.'    '(I) began considering (intended).'
- (5) a. L H H L L L L L L H H H L    b. L H HH H H H H H H H L L  
 [Ka.n.ga.e.-ru ko.to-o.] ha.zi.me-ta.-yo.    \* [Ka.n.ga.e.-ru ko.to-o.] ha.zi.me-ta.-yo.  
 consider-PRS C-ACC begin-PST-SFP    consider-PRS C-ACC begin-PST-SFP  
 '(I) began considering.'    '(I) began considering (intended).'

### 2.2 Observation 2: Adjacency

In Type 1 construction, but not in Type 2 construction, adverbial elements can intervene between the main verb and the aspectual marker. Though *kinoo* 'yesterday' intervenes between *osie* and *hazime* in (6)a, the sentence is licit, while the presence of an adverb makes the sentence in (6)b ungrammatical.

- (6) a. *Kanozyo-wa*    [*eigo-o*    *osie-ru*    *koto*]-o    *kinoo*    *hazime-ta.*    Type 1  
 she-TOP    English-ACC teach-PRS C-ACC yesterday    begin-PST  
 'Yesterday, she began teaching English.'

- b. \**Kanozyo-wa* [*eigo-o osie*] *kinoo hazime-ta.* Type 2  
 she-TOP English-ACC teach yesterday begin-PST  
 ‘Yesterday, she began teaching English (intended).’

The contrast shows that *hazime* is a word in Type 1 construction while it is a suffix in Type 2 construction. This is, perhaps, a rather surprising fact from point of view of English, because in English, aspectual markers such as *begin* and *start* are always a word irrespective of their complements, e.g., *he started* [*a company*], *he started* [*running*] and *he started* [*to run*]. In contrast, the data in (6) suggests that whether it is a suffix or not is correlated with the complement it is combined with.

## 2.2 Observation 3: Volitionality

The subject of Type 1 construction must be a volitional entity, while this restriction does not apply to the Type 2 construction. First, consider the sentences in (7). The intended reading of (7)a is ‘the bell began ringing.’ The reading is illicit unless it is metaphorically interpreted (for example, in a folktale where a bell is described as an object with its own will which can volitionally start ringing). Note that an animate entity can occupy this subject position as we already saw in (1)a. In contrast, an inanimate subject is licit in Type 2 construction, as shown in (7)b.

- (7) a. \**Kane-wa* [*nar-u koto-o*] *hazime-ta.* Type 1  
 bell-TOP ring-PRS C-ACC begin-PST  
 ‘The bell began ringing (intended).’  
 b. *Kane-wa* [*nari*]-*hazime-ta.* Type 2  
 bell-TOP ring-begin-PST  
 ‘The bell began ringing.’

Second, Type 2 construction is indifferent to the active/passive distinction as in (8)b, while in Type 1 construction a passive sentence with an inanimate subject is unacceptable (= (8)a) despite the fact that its active counterpart (e.g., (1)a) is acceptable, supporting the above conclusion that the subject of Type 1 construction must be a volitional entity.

- (8) a. \**Eigo-ga* [*syoogakkoo-de osie-rare-ru koto*]-*o hazime-ta.* Type 1  
 English-NOM elementary school-at teach-PASS-PRS C-ACC begin-PST  
 ‘English began being taught in elementary schools (intended).’  
 b. *Eigo-ga* [*syoogakkoo-de osie-rare*]-*hazime-ta.* Type 2  
 English-NOM elementary school-at teach-PASS-begin-PST  
 ‘English began being taught in elementary schools.’

## 2.4 Observation 4: Habituality

Whereas both constructions have the habitual reading (*i.e.*, the habit of his teaching English had begun), Type 2 use has a reading not available for Type 1, namely, the single-event reading, in which there is a single seamless event of teaching. Consider the following two scenarios.

[Scenario A] *A graduate student of linguistics was visiting the high school where she graduated. She bumped into her old English teacher, who invited her to his class and asked her to take over the entire lecture for the day. She initially refused, but eventually she began teaching English to the students. She returned home the following day.*

In this scenario, it is obvious that this graduate student does not have a permanent job as an English teacher, so there is only one event of her teaching English. If the underlined sentence is translated into Japanese, (1)a is illicit whereas the sentence in (1)b is perfectly acceptable under the given context. In contrast, the following scenario is compatible with both sentences.<sup>1</sup>

[Scenario B] *A graduate student studying linguistics finished her PhD study. Though she had been studying in US, she had to go back and find a job in Japan. Luckily, she got a position at an English department. She began teaching English two weeks ago.*

Note that, in this Scenario B, she does not have to be currently engaged in the activity of teaching English. For example, suppose that the new semester started on April 8th and she taught her first class on the 9th. Now the reference time is set to be on the 10th, which is a holiday, so she stays in her house all day long. Despite the fact that she was not teaching at the very moment of the reference time, the sentences are licit in this Scenario B as long as an English teaching habit has been established.

### 3. Analysis

We have a dilemma. On one hand, the same aspectual marker *hazime* ‘start’ can be used in both constructions, so we want to capture this commonality. On the other hand, there are salient differences in morpho-syntax and semantics. Can we propose a unified semantics for *hazime* in both constructions while deriving the above differences in a systematic way? In this section, I give an affirmative answer by proposing that (i) the detailed morpho-syntactic and semantic characteristics are determined by categorizing heads and (ii), due to a particular categorizing head, *hazime* in Type 1 construction selects a *koto*-clause with a defective T whose semantics guarantees habituality of similar events.

#### 3.1 Syntax

Adopting assumptions from Distributed Morphology (Marantz 1997, Embick and Marantz 2008, Embick 2010), I assume that there are two distinct types of morphemes, namely roots and functional morphemes. Though the detailed characterization of roots is still under debate, this study takes it to be the case that (i) roots are devoid of syntactic category as well as of any discernible morpho-phonological complexity and (ii) they are combined with a categorizing head to acquire/specify detailed morpho-syntactic properties, e.g., an ability to take a complement (Alexiadou 2001; Borer 2003, 2014; but for a different view, see Harley 2014). In order to analyze the aspectual constructions, I put forward this baseline framework about the division of labor between a root and a categorizing head by proposing the following three roles as important properties of categorizing heads:

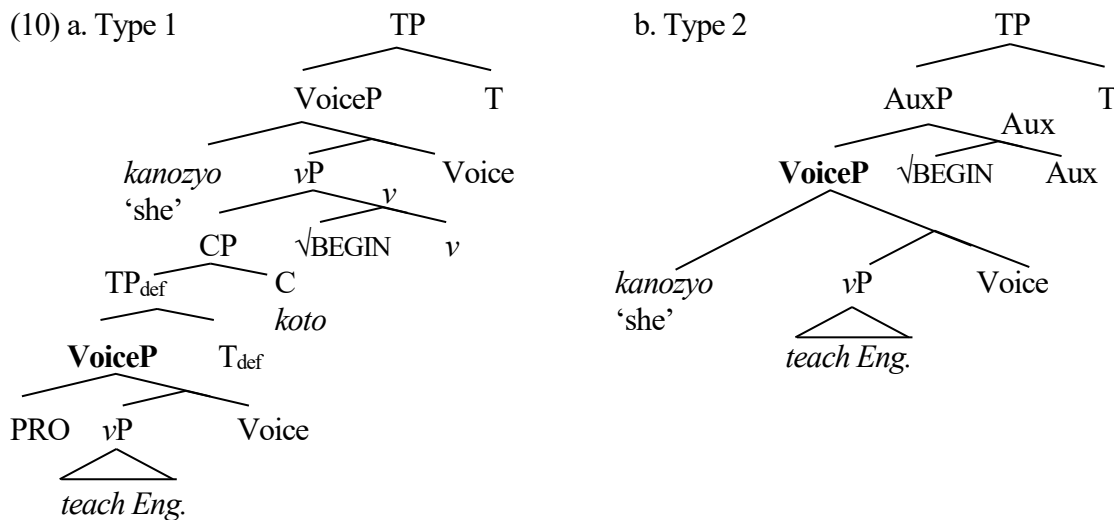
- (9) Categorizing heads
- a. Suffix/word distinction is determined by a categorizing head.
  - b. c-selection is determined by a categorizing head.
  - c. AGENT theta-role assignment is determined by a categorizing head.

<sup>1</sup> **Acceptability judgment:** Hiroshi Aoyagi (p.c.) points out that the acceptability of the sentence in (1)a gets ameliorated with an adverbial modification; e.g., *sibusibu* ‘reluctantly’ as in (i). Since it remains true that without an adverb the sentence in (1)a is unacceptable, this paper takes the contrast in (1) for granted and leaves this adverbial puzzle to future studies.

(i)? *Kanozyo-wa* [*eigo-o*            *osie-ru*    *koto*]-*o*    *sibusibu*    *hazime-ta*.  
 she-TOP    English-ACC    teach-PRS    C-ACC    reluctantly    begin-PST  
 ‘She reluctantly/eventually began teaching English.’

First, the statement in (9)a is important when we explain Obs. 2. I consider that (i) there is a category-neutral  $\sqrt{\text{BEGIN}}$  ready to be merged with a categorizing head and (ii) the word/affix distinction is introduced by this categorizing head.<sup>2</sup> When Vocabulary Insertion recognizes a  $v$  in the structure (e.g., [ $v + \sqrt{\text{BEGIN}}$ ]), the node is realized as a word; and, when it finds Aux (e.g., [ $\text{Aux} + \sqrt{\text{BEGIN}}$ ]), it gets realized as an affix.<sup>3</sup> If the affix/word distinction was already prespecified as (or determined by) an intrinsic property of a root, the derived items would be either ‘all words’ or ‘all affixes,’ which is not compatible with the presented data.

Second, the statement in (9)b is necessary because we want to capture the fact that the word *hazime* (Type 1 construction) cannot be used with a bare verb (i.e., it must take a CP), while the suffix *-hazime* (Type 2 construction) does not select a CP (i.e., it must take a bare verb). This suggests that the c-selection is correlated with a categorizing head. By assuming that Aux and  $v$  decide what their complement should be, this correlation is easily explained. Aux +  $\sqrt{\text{BEGIN}}$  takes a VoiceP, whereas  $v + \sqrt{\text{BEGIN}}$  c-selects a CP-TP<sub>def</sub> in the sense of Chomsky (2000, 2001). Based on this reasoning, I propose the following structures for the two constructions (for a similar view, see Fukuda 2012; Kishimoto 2014). The defectiveness of T results in a PRO in the embedded clause subject.

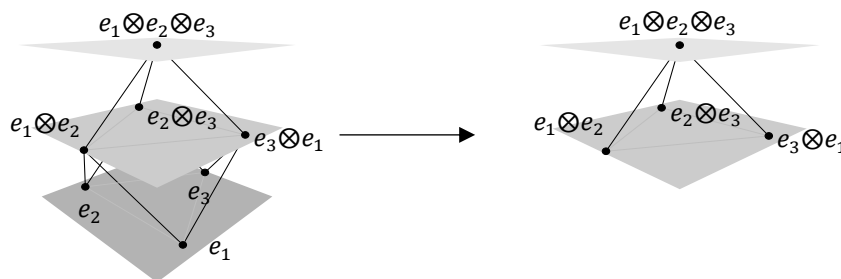


The primary reason for assuming a CP-TP<sub>def</sub> (rather than a canonical CP-TP) for Type 1 construction comes from the fact that the complement clause of aspectual markers lacks a tense distinction. Consider the example in (11). Even though the *teaching event* and the *beginning event* did happen in the past, a past tense morpheme is never allowed in the embedded clause.

- (11) *Kanozyo-wa* [*eigo-o*            *osie-{\ru/\*ta}*    *koto*]-*o*    *hazime-ta*.            Type 1  
 she-TOP    English-ACC    teach-PRS/\*PST    C-ACC    begin-PST  
 ‘She began teaching English.’

<sup>2</sup> **Notation:** It would be better to use an index notation but, for the sake of readability, I use capitalized BEGIN to refer to the relevant root.

<sup>3</sup> **Status of Aux:** In current DM, categorial heads specifically refer to heads relating to traditional notions of lexical category (i.e.,  $v$ ,  $n$ , maybe  $a$ ), which are considered as phase heads. Some might take issue with the analysis in this section criticizing that Aux is analyzed as a categorizing head. For such readers, I propose to reinterpret Aux as another  $v$  (let us call it  $v^+$ ) with a different feature specification so (i) it acts as a phase head but (ii) has a c-selection, theta-role and word/affix status different from  $v$ ; an auxiliary ‘verb’ is still a verb but is a special type of verb. I thank Alison Biggs for pointing out this issue.



**Figure 1** Lattice structure and a domain reduction

These structures easily explain the contrast in pitch-accent assignment (Obs. 1). The high-pitch region is sensitive to the sister node of T. There are two T's in (10)a. This is why there are two pitch accent contours in (5)a and one prosodic unit in (4)a.

Third, the statement in (9)c explains the puzzle about the theta-role assignment. Under a common view that  $v$ /Voice is the source for AGENT introducing an external argument (Kratzer 1996), a conclusion is naturally drawn that the referent of the main clause subject in (10)a must be assigned an AGENT (who volitionally initiates the event) from Voice (or, more precisely, the combination of Voice and  $v + \sqrt{begin}$ ) whereas *she* in Type 2 has no such requirement (Obs. 3). In addition, being defective,  $TP_{def}$  has no ability to assign a nominative to the Spec, VoiceP, necessitating that a PRO exist in this Spec, VoiceP. As this PRO in the embedded clause gets its own theta-role (AGENT; the person who teaches English) from the lower Voice (or rather, from the combination of Voice and  $v + \sqrt{teach}$ ), the referent of the subject must be associated with two different theta-roles, one of which is an AGENT.

In this way, the proposals in (9) successfully explain important contrasts regarding the two aspectual constructions (Obs. 1 to 3). What remains unaddressed is the semantic contrast in Obs. 4, namely the difference in habituality. But this last puzzle is not a difficult hurdle to overcome under our current analysis. As we saw above, the *koto*-clause selected in Type 1 construction is involved with a defective T. Being defective means being tenseless, and being a tenseless means that it refers to no single time. By assuming that the defective T is the source of genericity in the verbal domain, as convincingly argued by previous studies (Krifka's 1987 I-genericity; Carlson 2011), we can explain why the Type 1 construction is not used in Scenario A, where there exists a particular, single event. In the next subsection, let us flesh out this intuition by giving denotations to the relevant nodes.

### 3.2 Semantics

#### 3.2.1 Backgrounds

To formally discuss the issue of habituality, let us adopt a version of event semantics proposed by Kratzer (2007) (see also Krifka 1992; Landman 1996; Ferreira 2016), which assumes the set in (12)a is the domain for the eventualities ( $= D_s$ ), rather than the classic assumption in (12)b.

- (12) a.  $D_s = \{e_1, \dots, e_n, e_1 \otimes e_2, e_1 \otimes e_3, \dots, e_1 \otimes e_2 \otimes e_3, \dots\}$   
 b.  $D_s^{SG} = \{e_1, \dots, e_n\}$

To explain this, consider the left panel in Figure 1, which illustrates how we create a lattice structure based on the set of events in (12)b. Here, for simplicity's sake, our original set of singular events is set to  $\{e_1, e_2, e_3\}$ ; they are the objects on the 'first floor' of this lattice building. By taking two of these elements, we can get elements on the 'second floor,' namely  $\{e_1 \otimes e_2, e_2 \otimes e_3, e_3 \otimes e_1\}$ . Finally, by taking three elements from the original set, we get the 'third floor' element, *i.e.*,  $\{e_1 \otimes e_2 \otimes e_3\}$ . The set  $D_s$  in (10)a is a generalized lattice structure with  $n$  events for the baseline set  $D_s (= (10)b)$ .

### 3.2.2 Denotations

Having laid out the ontological background, now let us turn to the denotations. First, following Kratzer (2007), I assume that verbs are born as plurals, where singularities are special cases of pluralities (= (12)b) (i.e.,  $D_s^{SG} \subset D_s$ ) and that the boldfaced VoicePs in (10)a and (10)b both denote a characteristic function on the set  $D_s$ ; that is, a set of both singular and plural events.

$$(13) \llbracket \text{VoiceP} \rrbracket = \lambda e \in D_s. * \text{teach}(e) \wedge * \text{AG}(e, \text{she}) \wedge * \text{PAT}(e, \text{Eng}).$$

(she/PRO teach English)

Second, reflecting our intuition that presence of a defective T is associated with multiplicity of events, I propose the job of the defective T is a domain restriction to  $D_s \setminus D_s^{SG}$  as given in (14).

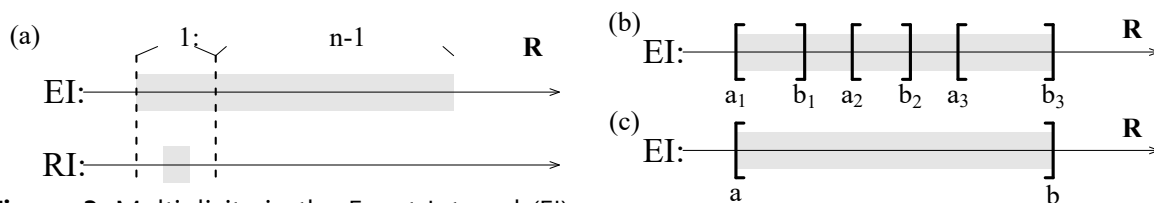
$$(14) \llbracket \text{T}_{\text{def}} \rrbracket = \lambda P_{\langle s, t \rangle}. \lambda e \in D_s \setminus D_s^{SG}. P(e).$$

Visually, this domain restriction is interpreted from the set in the left panel to the right panel in Figure 1. Metaphorically speaking, in Type 1,  $\text{T}_{\text{def}}$  subtracts the objects on the ‘first floor’ (= singular events; (12)b) from the entire set (= (12)a), resulting in the set of the non-singular events (=  $D_s \setminus D_s^{SG}$ ). In Type 2, no such domain restriction is applied, hence compatible with both singular and plural events.

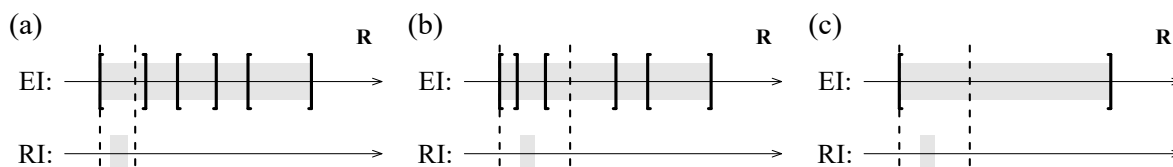
Third, we need to articulate the relation between two time-intervals. Whether it is merged with  $v$  or Aux, the chief function of  $\sqrt{\text{BEGIN}}$  is to specify the relation between two intervals (= (15)); for the sake of simplicity, I assume that  $v$  and Aux serve as identity functions. For all the best worlds, there is a relevant period in which an event/state holds (the event interval, EI), such that (i) the reference interval (RI), i.e.,  $\text{INT}(e)$ , is situated within this EI and (ii) the end point of the RI needs to precede the contextually-given threshold, which determines the end point of the ‘beginning’ part of this interval; for the idea that aspectual expressions are involved with modal ingredients, see Dowty (1977), Landman (1992, 1996), Portner (1998) and Ferreira (2016). In the semantics in (7)c,  $\text{MIN}(P(e_0))$  and  $\text{MAX}(P(e_0))$  refer to the initiating/terminating point of the EI and the threshold is the point that divides this EI into 1: ( $n - 1$ ) (where  $n$  is the contextually given parameter). When there are multiple events, this EI refers to the period where the habit exists and, thus,  $\text{MIN}(P(e_0))$  is set to the beginning time of the first event and  $\text{MAX}(P(e_0))$  is the terminating time of the last event.

$$(15) \llbracket \sqrt{\text{BEGIN}} \rrbracket = \lambda P. \lambda e. \lambda w. \forall w' \in \text{BEST}(w). \exists e'. \\ \text{INT}(e) \subseteq \left[ \text{MIN}(P(e')), \frac{\text{MAX}(P(e')) + (n - 1)\text{MIN}(P(e'))}{n} \right] \text{ in } w'.$$

Intervals are considered as a convex set of real numbers, so the proposal in (15) can be paraphrased as a statement about the relation between two grey areas in Figure 3. First, the beginning part is represented as the region between the two dashed lines in Figure 3a. This is a set of real numbers that lie in the interval of  $\{r: r \in [\text{MIN}(P(e')), \text{MAX}(P(e'))/n + (n - 1)\text{MIN}(P(e'))/n]\}$ . Second, the RI is required to be inside this beginning part of the EI. This is what is shown in Figure 3a. So far, there is no difference between Type 1 and Type 2 constructions. Third, in Type 1,  $\text{T}_{\text{def}}$  requires us to have multiple time intervals in EI corresponding to multiple subintervals in which she teaches English as shown in Figure 3b; the beginning and the terminating point of each interval is referred to by  $a_i$  and  $b_i$  ( $i \in \mathbb{N}$ ). In this case, three events, e.g.,  $e_1 \otimes e_2 \otimes e_3$ , are identified. In contrast, Type 2 construction



**Figure 3.** Multiplicity in the Event Interval (EI).



**Figure 2.** Relation between the Event Interval (EI) and the Reference Interval (RI).

allows the configuration in Figure 3c, where the EI is constituted by a singular event of her teaching.

Notice the above denotation says nothing about the relation between RI and each subevent in EI, so it is predicted that not only the configuration in Figure 2a but also the one in Figure 2b is equally accepted. As pointed out in Section 2.4, this prediction is borne out. The sentences in (1) can be used in a situation when the reference time is set to be on a holiday (as long as the referent of *she* regularly repeats similar teaching events in the best worlds); in contrast, when there is only one single event, the referent of *she* must be teaching during the reference time as illustrated in Figure 2c.

#### 4. Conclusion and future directions

In this way, the defective T analysis has provided reasonable accounts both to the syntax and the semantics; (i)  $T_{def}$  yields a control construction (syntax; Obs. 1-3), and (ii) it also provides the I-genericity (semantics; Obs. 4). The conclusion is summarized in Table 1. First, the assumption that there exists a CP-TP layer in Type 1 construction also explains why there exists a prosodic contrast. Since a pitch-accent contour is determined phase-by-phase (Ishihara 2003; Yamada 2018) and the sister node of T is the relevant prosodic domain, Type 1 construction is equipped with two pitch accent contours while Type 2 only receives a single pitch accent contour. Second, the data concerning the adverbial intervention is explained by the difference between a word and a suffix, which is attributed to the property of categorizing head, a property external to the root. Third, the defective TP requires there to be a PRO in the embedded clause. In addition to this PRO, the subject of the main clause must receive a theta-role from the Voice (or its combination with *hazime* and *v*), namely AGENT; hence, the subject of the Type 1 construction has to be a volitional entity. Finally, the semantics of the defective TP is the source for the habitual reading. Type 1 construction has this defective embedded tense, and thus it disallows the non-habitual reading.

**Implications.** Not only does this analysis give a full explanation to the four empirical desiderata presented in Section 2 but it has several important implications for future studies. First, this study also contributes to a growing number of studies on the Japanese complementizer system (Kuno 1983; Yamada and Kubota 2018; Yamada 2019, to appear). It is known that embedding predicates taking a *koto*-clause form a rather heterogeneous group, consisting of predicates with and without a tense distinction, those with and without a *de-se* reading, and those with and without an overt non-PRO subject. It is therefore wrong to assume that all *koto*-clauses are equipped with a defective T. By interpreting the conclusion of this paper as a case study that analyzes a subset of *koto*-taking predicates, future studies are expected to discuss (i) why a *koto*-clause is used with a variety of embedding



|           | Observation 1                                                                     | Observation 2                  | Observation 3                  | Observation 4                                                                                                           |
|-----------|-----------------------------------------------------------------------------------|--------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|           | Prosody                                                                           | Adjacency                      | Theta-roles                    | Habituality                                                                                                             |
| syntax    | Type 1: two TP's<br>(two pitch contours)<br>Type 2: one TP<br>(one pitch contour) | Type 1: word<br>Type 2: suffix | Type 1: NP + PRO<br>Type 2: NP | Type 1: $\sqrt{T_{\text{def}}}$<br>Type 2: $*T_{\text{def}}$                                                            |
| semantics |                                                                                   |                                | Type 1: Two<br>Type 2: One     | Type 1: $T_{\text{def}}$ disallows<br>singular events<br>Type 2: compatible<br>with singular and<br>non-singular events |

**Table 1.** Summary of the analysis.

predicates and (ii) when a defective T is used with a *koto*-clause to propose a theory about the c-selection mechanism and Japanese complementation system. Second, this paper has developed an idea that treats categorizing heads as independent ingredients in grammar distinguished from roots and characterized their functions from both morphosyntactic and semantic perspectives. However, as discussed in Alexiadou and Lohndal (2017), the division of labor between roots and categorizing heads may exhibit crosslinguistic variation. For example, as mentioned above, English *begin* and *start* cannot be used as affixes, which is a difference from Japanese. If the present analysis is on the right track, the next important question would be to ask whether such characteristics of categorizing heads are attributed to more general properties from which we can predict the way languages differ. Finally, the analysis of this paper can also extend to a general discussion on grammaticalization. Affixation is regarded as an important property of grammaticalization in general (Leheman 1995; Hopper and Traugott 2003) and the suffix use (*-hazime* in Type 2) is also considered as a grammaticalized use developed from the word *hazime* in Type 1 construction. Under the presented analysis, grammaticalization is interpreted as a change in categorizing head; *i.e.*, a change as to what categorizing head a root is combined with. As long as it is combined with a *v*, it is considered as a verb (a word), which is merely a contentful element. But, when a language system allows it to take a different categorizing head (in our case, it is an Aux), it is analyzed as a suffix with a more abstract function.

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