

LABELING AND PAIR-MERGE OF HEADS*

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1. Introduction

In the recent minimalist theory, Chomsky (2013, 2015b) argues that Merge applies freely and it does not encode a label as illustrated in (1).

(1) Merge (α , β) = $\{\alpha, \beta\}$

As in (1), Merge forms a two membered set $\{\alpha, \beta\}$ and there is no labeled categorial node above α and β . Labeling is, however, necessary for syntactic objects SO to be interpreted. Thus, Chomsky (2013) assumes that there is a fixed labeling algorithm LA that licenses SO. He argues that labeling is required at CI and for the process of externalization and therefore it must take place at the phase level, as part of the Transfer operation. The type of Merge in (1) can be called set-Merge. In addition to set-Merge, Chomsky (2015b) proposes another kind of Merge: pair-Merge that takes α and β and forms the ordered pair $\langle\alpha, \beta\rangle$ as illustrated in (2).

(2) Pair-Merge (α , β) = $\langle\alpha, \beta\rangle$

Chomsky (2015b) argues that pair-Merge of root (R) to v^* forms an amalgam [R- v^*] and that the host, which is v^* , should be affixed to the raised element R in head-raising with the assumption that v^* is rendered invisible to LA by pair-Merge and it loses its phase property. Now let us consider how a sentence like (3) can be accounted for. The derivation and the order of rules for (3) are given in (4).

(3) *They expected John to win*

(4) The derivation and the order of rules for (4):

- a. $[\beta R \ [\alpha DP_\varphi \ \dots]]$ Form R- α by EM
- b. $[\gamma DP_\varphi \ [\beta R \ [\alpha t_{DP} \ \dots]]]$ Form DP- β by IM:
- c. $[\delta \ v^*_{u\varphi} \ [\gamma DP_\varphi \ [\beta R \ [\alpha t_{DP} \ \dots]]]]$ Form v^* - γ by EM, reaching the phase level
- d. $[\delta \ v^* \ [\gamma DP_\varphi \ [\beta R_{u\varphi} \ [\alpha t_{DP} \ \dots]]]]$ Inheritance from v^* to R
- e. Labeling: γ is labeled $\langle\varphi, \varphi\rangle$,
 β is labeled R
- f. $[\delta \ \langle R, v^* \rangle \ [\gamma DP_\varphi \ [\beta t_R \ [\alpha t_{DP} \ \dots]]]]$ R raises to v^* forming R with v^* affixed
- g. Transfer of α

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In (4a), set-Merge externally forms $\{R, \alpha\}$, which is of the form $\{H, XP\}$ and in (4b) set-Merge internally merges DP to the Spec of R, forming $\{DP, \beta\}$, which is of the form $\{XP, YP\}$. In (4c), set-Merge externally form $\{v^*, \gamma\}$, reaching the phase level so that Inheritance of $u\phi$ from v^* to R takes place as in (4d) and then γ is labeled $\langle\phi, \phi\rangle$ under minimal search. By paired labeling, R is strengthened so that β is labeled R. Finally, in (4f), pair-Merge internally forms $\langle R, v^*\rangle$, yielding an amalgam with v^* adjoined to R and hence v^* becomes invisible so that it loses its phase property. Chomsky (2015b) assumes that phasehood is activated on the copy of R and thus its complement, which is α , is transferred. DP (which can be a wh-phrase) remains in situ at the Spec of R and is therefore accessible to extraction at the next phase.

Thus, under the system proposed by Chomsky (2015b), the core structure building operations will be as follows:

(5) The core structure building operations:

- a. (Set-)Merge $(\alpha, \beta) = \{\alpha, \beta\}$
- b. Pair-Merge $(\alpha, \beta) = \langle\alpha, \beta\rangle$

In this paper, I will attempt to pursue this proposed system and show that in addition to set-Merge, pair-Merge is in fact a necessary operation for structure building. I will first extend Chomsky's (2015b) form of argument to pair-Merge, then discuss Japanese complex predicate constructions, and argue that pair-Merge can give a straightforward account to differentiate three types of Japanese passives such as *ni yotte* passives, *ni* direct passives, and *ni* indirect passives. This analysis can also extend to causative constructions in Japanese. What is interesting is that although Japanese passive morphemes are morphologically the same in three types of passives, their argument structures are different. Therefore we need to investigate how we can derive these differences without simply saying that they are syntactically different but morphologically the same.

The organization of this paper is as follows. In Section 2, I will extend Chomsky's (2015b) form of argument to pair-Merge, arguing that like set-Merge, pair-Merge can also internally/externally form $\langle X, Y\rangle$ and that operations ought to apply freely so that pair-Merge can take place at anytime in the derivation. Then I will argue that so-called external pair-Merge of heads explain the structure of unaccusative verbs while internal pair-Merge of heads prior to Inheritance works for the structure of bridge verbs and unergative verbs. In Section 3, following Hoshi (1999), I will assume that there are three kinds of passive constructions in Japanese and show that these constructions are succinctly generated under the proposed theory of pair-Merge of heads. In Section 4, I will discuss Case marking in Japanese causative constructions. Section 5 discusses remaining issues and Section 6 concludes the paper.

2. Pair-Merge of Heads

2.1. Extension of Chomsky's (2015b) Form of Argument to Pair-Merge

Chomsky (2015b) suggests that if the order of rules is optional, that may provide a way to explain bridge-verb constructions.

(6) What do you think that Ken read?

- a. [Ken read what]
- b. C [Ken read what]
- c. [_α what C [Ken read t_{what}]]
- d. [_β R [_α what C [Ken read t_{what}]]] Form R-α by EM
- e. [v*_{uφ} [_β R [_α what C [Ken read t_{what}]]]] Form v*-β by EM,
reaching the phase level
- f. [v* [_β R_{uφ} [_α what C [Ken read t_{what}]]]] Inheritance from v* to R
- g. Labeling
- h. [_<R_{uφ}, v*_> [_β t_R [_α what C [Ken read t_{what}]]]] R raises to v* forming R with v*
affixed
- i. Transfer of α

As we have seen in (4), the object of the verb should raise to SPEC of R, with R then raising to v*. Notice, however, that in (6), the object of *think* is *that*-clause complement so that if it raised, then the raised object would lack the relevant features; labeling failure. Chomsky argues that this problem would not arise if the object remains in situ. Suppose that α does not raise to SPEC of R and that when R raises to v*. In (6h), there is a copy of R in β. In order to avoid labeling failure, the copy of R must be invisible to LA. Thus, Chomsky assumes that the copy of R is invisible in β, which will be labeled by α.

Epstein, Kitahara, and Seely (2016) point out that there is a paradox in Chomsky's (2015b) analysis: "within Chomsky's (2015b) analysis, it is (implicitly) presumed that R left by internal pair-Merge both is and is not visible, specifically it is visible in [(4)], crucially to allow the copy of R to serve as the "derived" phrase head, and it is invisible in [(6)] crucially to avoid label failure."

In order to resolve this paradox, Epstein, Kitahara, and Seely (2016) keep Chomsky's (2015b) analysis of (4) and provide an alternative analysis of bridge verb constructions. They claim that like set-Merge, pair-Merge can form <X, Y> internally/externally:

(7) External pair-Merge of R to v* (Epstein, Kitahara, and Seely 2016)

R and v* can be each taken directly from the lexicon and externally pair-Merged together.

Assuming that Merge applies freely, Epstein, Kitahara, and Seely (2016) claim that pair-Merge of R to v* can take place even when v* bears its uφ so that the phase-head status of v* is cancelled because pair-Merge of R to v* makes v* (including its uφ) invisible. External pair-Merge of R to v* is such a case. They propose that phase-cancellation by pair-Merge of

heads is possible only when there is no need to transmit $u\phi$ to the head of the phase-head-complement for purposes of subsequent Case-valuation. Given this, they assume that the bridge verb constructions should have the following structure:

(8) [EA [α <R, v* ϕ > [β C...]]] (*John thinks that he will win*)

In (8), R and v* are taken directly from the lexicon and externally pair-Merged together and the amalgam [R-v*] takes β as its complement. Assuming with Chomsky (2015b) that “although R cannot label, the amalgam [R-v*] can” and given that v* is rendered invisible to LA by pair-Merge of R to v*, (8) will not be faced with neither labeling failure nor valuation failure.

Nomura (2014, 2015, 2017) points out another problem under Chomsky’s (2015b) analysis; $u\phi$ of R will remain unvalued. When Inheritance from v* to R takes place, $u\phi$ will be on R. Then when pair-Merge of R to v* takes place, v* becomes invisible but R (including its $u\phi$) is visible.

Assuming that the order of the rules is optional, Nomura (2014, 2015, 2017) argues that internal pair-Merge can take place prior to Inheritance so that pair-Merge of R to v* makes v* (including its $u\phi$) invisible:

(9) Internal pair-Merge of R to v* prior to Inheritance (Nomura 2014, 2015, 2017)
 Internal pair-Merge of R to v* can take place prior to Inheritance of $u\phi$ from v* to R.

Nomura (2014, 2015, 2017) claims that internal pair-Merge of R to v* prior to Inheritance is the solution to the problems under Chomsky’s (2015b) analysis. Let us consider (10).

(10) What do you think that Ken read?
 a. [Ken read what]
 b. C [Ken read what]
 c. [α what C [Ken read t_{what}]]
 d. [β R [α what C [Ken read t_{what}]]] Form R- α by EM
 e. [v* $_{u\phi}$ [β R [α what C [Ken read t_{what}]]]] Form v*- β by EM,
 reaching the phase level
 f. [<R, v* $_{u\phi}$ > [β t_R [α what C [Ken read t_{what}]]]] R raises to v* forming R with v*
 affixed
 g. Labeling
 h. Transfer of α

If raising-to-object is optional, α remains in situ. As we have seen in (6), the object (*that*-clause complement) lacks the relevant features. If the order of the rules is optional, then it is not surprising that internal pair-Merge of R to v* takes place prior to Inheritance. Suppose this is the case. As in (10), when Internal pair-Merge of R to v* takes place prior to Inheritance, it makes v* (together with $u\phi$) invisible. Thus, we do not encounter the valuation

failure problem. Now we need to solve the paradox in Chomsky's (2015b) analysis. Chomsky (2015b:14) assumes that Inheritance precedes labeling, which, in turn, precedes pair-Merge of R to v^* , as in (4). Therefore, in (4) when labeling takes place, R has not raised to v^* yet so that it should be R that phasehood is activated on. In other words, phasehood is activated on R via Inheritance but not because v^* loses its phase property with pair-Merge making v^* invisible. In (10), on the other hand, when Labeling takes place, there is a copy of R in β but as Chomsky assumes, it must be invisible to LA. Thus, there is no paradox with respect to the copy of R in Chomsky's analysis. *Cotra* Epstein, Kitahara, and Seely (2016), we conclude that copies are invisible to LA and internal pair-Merge of R to v^* prior to Inheritance explains bridge-verb constructions.

In the following subsections, I argue that external pair-Merge proposed by Epstein, Kitahara, and Seely (2016) takes place in verbal phrases with unaccusative verbs, while internal pair-Merge prior to Inheritance does in verbal phrases with unergative verbs.

2.2. Unaccusative Verbs by External Pair-Merge

Epstein, Kitahara, and Seely (2016) assume that the theta relation between v^* and an external argument (EA) is met in (8). Notice however that if external pair-Merge of R to v^* applies, v^* is rendered invisible to LA from the very beginning. Thus, the amalgam [R- v^*] in (8) is very much like R rather than v^* . I assume that in order for v^* to be in a theta relation with EA, it must be introduced on its own even if it becomes the amalgam [R- v^*] in the subsequent derivation. Therefore, for the bridge verb constructions, I adopt Nomura's (2014, 2015, 2017) analysis; internal pair-Merge prior to Inheritance.

As Epstein, Kitahara, and Seely (2016) predict, however, I claim that external pair-Merge of R to v^* should take place in verbal phrases with unaccusative verbs. Let us consider the sentence in (11).

(11) The tree fell.

- a. $[\alpha \langle R, v^*_{u\phi} \rangle \quad]$
- b. $[\alpha \langle R, v^*_{u\phi} \rangle DP_{\phi}]$
- c. $[\beta DP_{\phi} \quad [\alpha \langle R, v^*_{u\phi} \rangle t_{DP} \quad]]$
- d. $[\gamma T \quad [\beta DP_{\phi} \quad [\alpha \langle R, v^*_{u\phi} \rangle t_{DP} \quad]]]$
- e. $[\delta DP_{\phi} \quad [\gamma T \quad [\beta t_{DP} \quad [\alpha \langle R, v^*_{u\phi} \rangle t_{DP} \quad]]]]$
- f. $[C_{u\phi} \quad [\delta DP_{\phi} \quad [\gamma T \quad [\beta t_{DP} \quad [\alpha \langle R, v^*_{u\phi} \rangle t_{DP} \quad]]]]]]$
- g. $[C \quad [\delta DP_{\phi} \quad [\gamma T_{u\phi} \quad [\beta t_{DP} \quad [\alpha \langle R, v^*_{u\phi} \rangle t_{DP} \quad]]]]]]$

In (11a), pair-Merge externally forms $\langle R, v^* \rangle$, losing the phase property of v^* and $u\phi$ of v^* is invisible from the beginning. In (11b), set-Merge externally forms $\{\langle R, v^* \rangle, DP\}$. I assume that an argument which is set-Merged with R or $\langle R, v^* \rangle$ is considered as an internal argument IA. Then set-Merge internally forms $\{DP, \alpha\}$ as in (11c). In (11d), set-Merge externally forms $\{T, \beta\}$ and then in (11e) set-Merge internally forms $\{DP, \gamma\}$. Finally, in

(11f-g), set-Merge externally form $\{C, \delta\}$, reaching the phase level and Inheritance from C to T takes place. δ is labeled $\langle \varphi, \varphi \rangle$ and α is labeled $\langle R, v^* \rangle$ by assumption. Thus, if we adopt external pair-Merge, then we can successfully generate a sentence with an unaccusative verb.

2.3. Unergative Verbs by Internal Pair-Merge

It is well-known in the literature that unergative verbs do not normally take a direct object but sometimes can when the object is a cognate object, as shown in (12) and (13).

- (12) a. The boy smiled (at the girl).
 b. *The boy smiled the girl.
 c. The boy smiled a rueful smile. (*cognate objects*)
- (13) a. We laughed (at his jokes).
 b. *We laughed his jokes.
 c. We laughed a loud laugh. (*cognate objects*)

This means that unergative verb constructions can license an object when certain conditions are met. Thus, it is standardly assumed that unergatives contain v^* , which takes an external argument and bears $u\varphi$ that license an object. The question is how they discharge $u\varphi$ when they do not take a direct object as in (12a) and (13a). Let us now consider the derivation of (12a) and (13a). It is illustrated in (14).

- (14) a. $[\gamma v^*_{u\varphi} [\beta R(\alpha)]]$ Form $v^*-\beta$ by EM: γ is of the form $\{H, XP\}$
 b. $[\delta DP [\gamma v^*_{u\varphi} [\beta R(\alpha)]]]$ Form $DP-\gamma$ by EM: δ is of the form $\{XP, YP\}$
 c. $[\delta DP [\gamma R-v^*_{u\varphi} [\beta t_R(\alpha)]]]$ R raises to v^* forming R with v^* affixed

(14a) forms $\{v^*, \beta\}$ by EM. If inheritance took place, R would inherit uninterpretable φ -features from v^* . β , however, contains no matching syntactic object (SO). This is exactly the same situation as bridge verb constructions. In (14b), DP, which is EA, is externally set-Merged with γ . Then, as in (14c), pair-Merge of R to v^* prior to Inheritance takes place, making v^* invisible (together with $u\varphi$). Thus we can avoid valuation failure.

In this section, we have extended Chomsky's (2015b) form of argument to pair-Merge. Pair-Merge that Chomsky (2015b) proposes is the internal one that takes place after Labeling. Epstein, Kitahara, and Seely (2016) proposes that pair-Merge can also take place directly from the lexicon. Here, we propose that pair-Merge applies freely. Thus, there is no need to specify when it applies internally/externally. Different type of verbs is generated, depending on when pair-Merge applies in the syntax. Here is the summary of verbal structures based on our proposal.

- (15) a. Transitives: select an external argument and license accusative Case
when pair-Merge takes place after labeling

- b. Unaccusatives: neither select an external argument nor license accusative Case when pair-Merge takes place directly from the lexicon
- c. Unergatives: select an external argument and license accusative Case only when certain conditions are met when pair-Merge takes place prior to Inheritance
- d. Bridge verbs: select an external argument and license accusative Case only when certain conditions are met when pair-Merge takes place prior to Inheritance

In the next section, I will show that the proposed theory of pair-Merge of heads neatly explains how the morphologically same passive morpheme *rare* generates syntactically different kinds of passive constructions in Japanese.

3. Passives in Japanese

3.1. Three Kinds of Passives

It has been controversial in the literature on Japanese how many types of passives exist and what kind of structure each type of passive construction has (Kuno 1973, Inoue 1976, Kuroda 1979, Kitagawa and Kuroda 1992, Miyagawa 1989, Hoshi 1994, 1999, Goro 2006, Ishizuka 2012; among others). Hoshi (1999) shows that there are three kinds of passive constructions in Japanese: *ni yotte* passive, *ni* direct passive, and *ni* indirect passive, as given in (16), (17), and (18) respectively.

(16) *ni yotte* passive

Sora-ga (Haru-ni yotte) nagur-are-ta
 S.-nom (H.-to owing) hit-pass-pst¹

‘Sora was hit (by Haru).’

Cf. Haru-ga Sora-o nagur-ta
 H.-nom S.-acc hit-pst

‘Haru hit Sora.’

(17) *ni* direct passive

Sora-ga (Haru-ni) nagur-are-ta
 S.-nom (H.-by) hit-pass-pst

‘Sora_i was affected by Haru’s hitting him_i.’

¹ Abbreviations: acc = accusative, caus = causative, dat = dative, dec = declarative, gen = genitive, nom = nominative, pass = passive, pst = past.

(18) *ni* indirect passive

a. Transitive

Tomo-ga Haru-ni Sora-o nagur-are-ta
T.-nom H.-dat S.-acc hit-pass-pst

‘Tomo was affected by Haru’s hitting Sora.’

b. Intransitive (unergative)

Uehara-ga Ichiro-ni hasir-are-ta
U.-nom I.-dat run-pass-pst

‘Uehara was affected by Ichiro’s running.’

c. Intransitive (unaccusative)

Mai-ga (Tokyo-de) ame-ni fur-are-ta
M.-nom Tokyo-in rain.-dat fall-pass-pst

‘Mai was affected by raining (in Tokyo).’/‘Mai was caught in the rain (in Tokyo).’

Following Hoshi (1999), I assume that there are three types of passive constructions in Japanese and show that his findings can be recaptured under the current minimalist approach with the proposed theory of pair-Merge of heads. Now let us first examine the properties of these three types of passives.

Inoue (1976) and Kuroda (1979) observes the following contrast between *ni* direct passive and *ni yotte* passive:

(19) a. *Kaikai-ga gityoo-ni sengens-are-ta.

Opening-nom chairperson-by announce-pass-pst

‘The opening of the meeting_i was affected by the chairperson’s announcing it_i.’

b. Kaikai-ga gityoo-ni yotte sengens-are-ta.

Opening-nom chairperson-to owing announce-pass-pst

‘The opening of the meeting was announced by the chairperson.’

(20) a. *Fermat-no teiri-ga John-ni syoomeis-are-ta.

Fermat-gen theorem-nom John-by prove-pass-pst

‘Fermat’s theorem_i was affected by John’s proving it_i.’

b. Fermat-no teiri-ga John-ni yotte syoomeis-are-ta.

Fermat-gen theorem-nom John-to owing prove-pass-pst

‘Fermat’s theorem was proved by John.’

Kuroda (1979) argues that the subject of the *ni* direct passive is required to be an affectee by

the passive voice *rare*, while the subject of the *ni yotte* passive cannot be an affectee. An abstract NP *kaikai* ‘opening’ in (19) and an immutable NP *Fermat-no teiri* ‘Fermat’s theorem’ in (20) cannot be interpreted as affectees so that they cannot be a subject of *ni* direct passive.

Now let us consider the examples in (21).

(21) a. *ni* direct passive

John_i-ga Mary_j-ni zibun_{i/*j}-no uti-de koros-are-ta.
John-nom Mary-by self-gen house-in kill-pass-pst

‘John_i was affected by Mary_j’s killing him in self_{i/*j}’s house.’ (Kuno 1973:299)

b. *ni yotte* passive

John_i-ga Mary_j-ni yotte zibun_{i/*j}-no uti-de koros-are-ta.
John-nom Mary-to owing self-gen house-in kill-pass-pst

‘John_i was killed by Mary_j in self_{i/*j}’s house.’ (Hoshi 1999:208)

c. *ni* indirect passive

John_i-ga Mary_j-ni zibun_{i/j}-no koto-o zimans-are-ta.
John-nom Mary-dat self-gen matter-acc boast-pass-pst

‘John_i was affected by Mary_j’s bragging about self_{i/j}’s matter.’ (Kuno 1973:304)

In the *ni* direct passive and the *ni yotte* passive, *John* can be the antecedent of a subject-oriented long-distance anaphor, *zibun* ‘self’, but *Mary* cannot, while in the *ni* indirect passive, both *John* and *Mary* can be the antecedent of *zibun*. These observations indicate that *Mary* in the *ni* indirect passive is considered as the subject of the complement clause, while *Mary* in (21a-b) is not.

Here is the summary of the properties of *ni yotte* passive, *ni* direct passive, and *ni* indirect passive:

(22) The properties of *ni yotte* passive, *ni* direct passive, and *ni* indirect passive

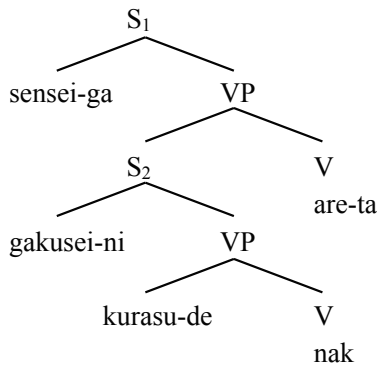
	<i>ni yotte</i> passive	<i>ni</i> direct passive	<i>ni</i> indirect passive
theta subject	no	yes	Yes
subject of the complement clause	no	no	Yes

Structures of the three kinds of passives that Hoshi (1999) proposes are illustrated in (23):

(23) a. *ni* indirect passive:

sensei-ga gakusei-ni kurasu-de nak-are-ta
teacher-nom student-dat classroom-in cry-pass-pst

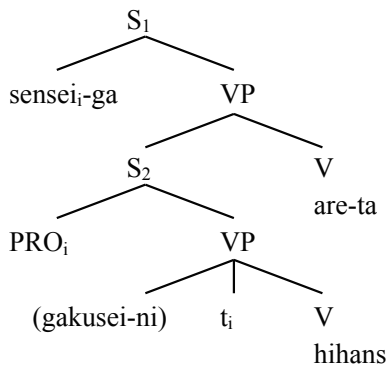
‘The teacher was affected by his student’s crying in the classroom.’



b. *ni* direct passive:

sensei-ga (gakusei-ni) hihans-are-ta
 teacher-nom (student-by) criticize-pass-pst

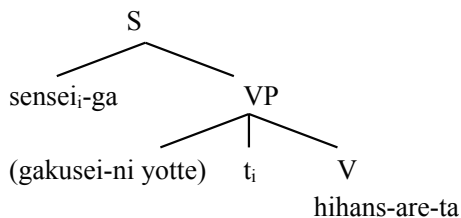
‘The teacher_i was affected by his student’s criticizing him_i.’



c. *ni yotte* passive:

sensei-ga (gakusei-ni yotte) hihans-are-ta
 teacher-nom (student-to owing) criticize-pass-pst

‘The teacher was criticized by his student.’



In the next subsection, I will present how these differences are recaptured under the current minimalist approach with the proposed theory of pair-Merge of heads.

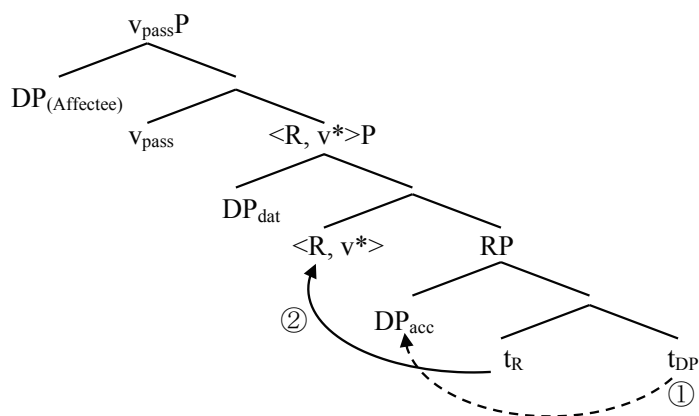
3.2. Analysis

Following Ishizuka (2012) and Fujita (2016), I adopt the passive voice system in Japanese and propose the following:

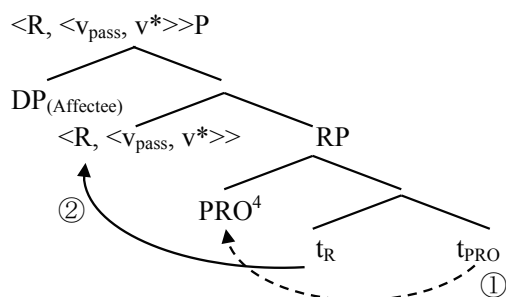
- (24) The passive morpheme *-rare* instantiates the voice projection (v_{pass}), which selects v , has a complete set of $u\phi$ (dative agreement), and selects external argument (Affectee/Experiencer).

Recapturing Hoshi's passive structures under the proposed theory, three kinds of passives will be as follows:^{2,3}

- (25) a. *ni* indirect passive: v_{pass}



- b. *ni* direct passive: $\langle v_{\text{pass}}, v^* \rangle$

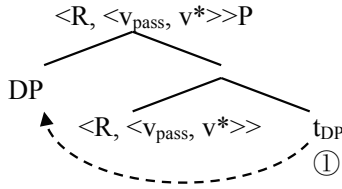


² Although Japanese is a head final language, I use head initial word order for expository purposes.

³ Throughout this paper, I will ignore adjuncts, *ni/ni yotte* phrases, in *ni* direct passive and *ni yotte* passive when we examine their structures.

⁴ Although Hoshi (1999) assumes that the matrix subject controls the complement object PRO, there is another possibility that the DP moves from the complement object position to the matrix subject position if we adopt the analysis that allows movement into theta position. See Hornstein (1999) for the movement theory of control.

c. *ni yotte* passive: $\langle R, \langle v_{\text{pass}}, v^* \rangle \rangle$



As for *ni* indirect passive in (25a), there have to be an affectee subject, an embedded subject (dative), and the theme object. Therefore, external pair-Merge of heads, which somehow ‘absorbs’ one argument position as we have seen in Section 2.2, does not take place. As for *ni* direct passive in (25b), since the subject of the *ni* direct passive is required to be an affectee by the passive voice *rare*, v_{pass} needs to be introduced as an active head in order to be able to assign the affectee role, while there is no subject in the complement clause. Therefore, I assume that pair-Merge externally forms $\langle v_{\text{pass}}, v^* \rangle$ so that the affectee role is assigned in the SPEC of $\langle v_{\text{pass}}, v^* \rangle$ because in this amalgam v_{pass} is visible while v^* is invisible so that v_{pass} can function as an assigner of an external argument. Notice however that there should be no Inheritance from the amalgam $\langle v_{\text{pass}}, v^* \rangle$ to R in (25b). Here I simply assume that Inheritance can take place only from the non-amalgamated phase head. In the case of *ni yotte* passive, there is neither theta subject nor the subject of the complement clause. This is illustrated in (25c). First, pair-Merge externally forms $\langle v_{\text{pass}}, v^* \rangle$ and then again pair-Merge externally forms $\langle R, \langle v_{\text{pass}}, v^* \rangle \rangle$. The amalgam $\langle R, \langle v_{\text{pass}}, v^* \rangle \rangle$ is set-Merged with DP, which is IA, with DP then raising to SPEC of $\langle R, \langle v_{\text{pass}}, v^* \rangle \rangle$.

Now let us see, step by step, how the derivation of *ni* indirect passive of (18a) goes:

(26) Indirect Passive: Transitive

- a. $\{R, DP_{\varphi}\}$
- b. $\{DP_{\varphi}, \{R, t_{\text{DP}}\}\}$
- c. $\{v^*_{\text{u}\varphi}, \{DP_{\varphi}, \{R, t_{\text{DP}}\}\}\dots$
- d. $\{DP_{\varphi}, \{v^*_{\text{u}\varphi}, \{DP_{\varphi}, \{R, t_{\text{DP}}\}\}\}\dots$
- e. $\{DP_{\varphi}, \{v^*, \{DP_{\varphi}, \{R_{\text{u}\varphi}, t_{\text{DP}}\}\}\}\dots$
- f. $\{DP_{\varphi}, \{v^*, \{DP_{\text{acc}}, \{R_{\text{u}\varphi}, t_{\text{DP}}\}\}\}\dots$
- g. $\{DP_{\varphi}, \{\langle R_{\text{u}\varphi}, v^* \rangle, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\dots$
- h. $\{v_{\text{passu}\varphi}, \{DP_{\varphi}, \{\langle R_{\text{u}\varphi}, v^* \rangle, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\}\dots$
- i. $\{DP_{\varphi}, \{v_{\text{passu}\varphi}, \{DP_{\varphi}, \{\langle R_{\text{u}\varphi}, v^* \rangle, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\}\}\dots$
- j. $\{DP_{\varphi}, \{v_{\text{pass}}, \{DP_{\varphi}, \{\langle R_{\text{u}\varphi}, v^* \rangle_{\text{u}\varphi}, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\}\}\dots$
- k. $\{DP_{\varphi}, \{v_{\text{pass}}, \{DP_{\text{dat}}, \{\langle R_{\text{u}\varphi}, v^* \rangle_{\text{u}\varphi}, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\}\}\dots$
- l. $\{T, \{DP_{\varphi}, \{v_{\text{pass}}, \{DP_{\text{dat}}, \{\langle R_{\text{u}\varphi}, v^* \rangle_{\text{u}\varphi}, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\}\}\}\dots$
- m. $\{DP_{\varphi}, \{T, \{t_{\text{DP}}, \{v_{\text{pass}}, \{DP_{\text{dat}}, \{\langle R_{\text{u}\varphi}, v^* \rangle_{\text{u}\varphi}, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\}\}\}\}\dots$
- n. $\{C_{\text{u}\varphi}, \{DP_{\varphi}, \{T, \{t_{\text{DP}}, \{v_{\text{pass}}, \{DP_{\text{dat}}, \{\langle R_{\text{u}\varphi}, v^* \rangle_{\text{u}\varphi}, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\}\}\}\}\}\dots$
- o. $\{C, \{DP_{\varphi}, \{T_{\text{u}\varphi}, \{t_{\text{DP}}, \{v_{\text{pass}}, \{DP_{\text{dat}}, \{\langle R_{\text{u}\varphi}, v^* \rangle_{\text{u}\varphi}, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\}\}\}\}\}\dots$
- p. $\{C, \{DP_{\text{nom}}, \{T_{\text{u}\varphi}, \{t_{\text{DP}}, \{v_{\text{pass}}, \{DP_{\text{dat}}, \{\langle R_{\text{u}\varphi}, v^* \rangle_{\text{u}\varphi}, \{DP_{\text{acc}}, \{t_{\text{R}}, t_{\text{DP}}\}\}\}\}\}\}\}\}\dots$
- q. [C [Tomo-nom [T [t_{DP} [v_{pass} [Haru-dat [$\langle R, v^* \rangle$] [Sora-acc [t_R [t_{DP}]]]]]]]]]]]]

What is special about this derivation is dative agreement. By assumption, v_{pass} has a complete set of $u\phi$ and as v^* licenses accusative agreement, v_{pass} licenses dative agreement. As in (26j), Inheritance of $u\phi$ from v_{pass} to $\langle R, v^* \rangle$ takes place and the complement of v_{pass} is labeled $\langle \phi, \phi \rangle$ and then the DP is valued with dative Case under minimal search.⁵ Accusative Case and nominative Case in (26) are valued in a normal fashion.

Now let us consider the derivation of *ni* indirect passive of (18b), where the verb is unergative:

(27) Indirect Passive: Intransitive (Unergative)

- a. $\{ v^*_{u\phi}, R \}$
 b. $\{ DP_{\phi}, \{ v^*_{u\phi}, R \} \}$
 c. $\{ DP_{\phi}, \{ \langle R, v^*_{u\phi} \rangle, t_R \} \}$
 d. $\{ v_{\text{pass}u\phi}, \{ DP_{\phi}, \{ \langle R, v^*_{u\phi} \rangle, t_R \} \} \}$
 e. $\{ DP_{\phi}, \{ v_{\text{pass}u\phi}, \{ DP_{\phi}, \{ \langle R, v^*_{u\phi} \rangle, t_R \} \} \} \}$
 f. $\{ DP_{\phi}, \{ v_{\text{pass}}, \{ DP_{\phi}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_R \} \} \} \}$
 g. $\{ DP_{\phi}, \{ v_{\text{pass}}, \{ DP_{\text{dat}}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_R \} \} \} \}$
 h. $\{ T, \{ DP_{\phi}, \{ v_{\text{pass}}, \{ DP_{\text{dat}}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_R \} \} \} \} \}$
 i. $\{ DP_{\phi}, \{ T, \{ t_{DP}, \{ v_{\text{pass}}, \{ DP_{\text{dat}}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_R \} \} \} \} \} \}$
 j. $\{ C_{u\phi}, \{ DP_{\phi}, \{ T, \{ t_{DP}, \{ v_{\text{pass}}, \{ DP_{\text{dat}}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_R \} \} \} \} \} \} \}$
 k. $\{ C, \{ DP_{\phi}, \{ T_{u\phi}, \{ t_{DP}, \{ v_{\text{pass}}, \{ DP_{\text{dat}}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_R \} \} \} \} \} \} \}$
 l. $\{ C, \{ DP_{\text{nom}}, \{ T_{u\phi}, \{ t_{DP}, \{ v_{\text{pass}}, \{ DP_{\text{dat}}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_R \} \} \} \} \} \} \}$
 m. $[C [Uehara\text{-nom} [T [t_{DP} [v_{\text{pass}} [Ichiro\text{-dat} [\langle R, v^* \rangle t_R]]]]]]]]]]$

As in (27a), when R does not take any argument, set-Merge externally forms $\{v^*, R\}$.⁶ In (27b) set-Merge externally merges DP, which is an EA, to $\{v^*, R\}$. In (27c), since there is no need to transmit $u\phi$ to the head of the phase-head-complement for purposes of subsequent Case-valuation, Inheritance does not take place and pair-Merge of R to v^* takes place, making v^* invisible (together with $u\phi$). In (27f), as we have seen in (26), Inheritance of $u\phi$ from v_{pass} to $\langle R, v^* \rangle$ takes place and the complement of v_{pass} is labeled $\langle \phi, \phi \rangle$ and then the DP is valued with dative Case under minimal search. Thus, the proposed mechanism correctly derives *ni* indirect passive even when the embedded verb is unergative.

Now consider the derivation of *ni* indirect passive of (18c), where the verb is unaccusative:

⁵ In this paper, I simply assume that Case valuation takes place under minimal search, although it is commonly assumed that the valuation takes place under an operation Agree and that Agree should take place between T and DP in SPEC- v^* . Notice, however, that for instance, under the system of Chomsky (2015b), EA has already been in SPEC-T when Inheritance from C to T takes place. Therefore, the operation Agree needs to be modified under the current theory.

⁶ Although v^* and R are both heads, I assume that when R does not merge with IA, set-Merge takes place between v^* and R, with internal pair-Merge later taking place between R and v^* as in (27c).

(28) Indirect Passive: Intransitive (Unaccusative)

- a. $\langle R, v^*_{u\phi} \rangle$
- b. $\{ \langle R, v^*_{u\phi} \rangle, DP_{\phi} \}$
- c. $\{ DP_{\phi}, \{ \langle R, v^*_{u\phi} \rangle, t_{DP} \} \}$
- d. $\{ v_{pass\phi}, \{ DP_{\phi}, \{ \langle R, v^*_{u\phi} \rangle, t_{DP} \} \} \}$
- e. $\{ DP_{\phi}, \{ v_{pass\phi}, \{ DP_{\phi}, \{ \langle R, v^*_{u\phi} \rangle, t_{DP} \} \} \} \}$
- f. $\{ DP_{\phi}, \{ v_{pass}, \{ DP_{\phi}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_{DP} \} \} \} \}$
- g. $\{ DP_{\phi}, \{ v_{pass}, \{ DP_{dat}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_{DP} \} \} \} \}$
- h. $\{ T, \{ DP_{\phi}, \{ v_{pass}, \{ DP_{dat}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_{DP} \} \} \} \} \}$
- i. $\{ DP_{\phi}, \{ T, \{ t_{DP}, \{ v_{pass}, \{ DP_{dat}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_{DP} \} \} \} \} \} \}$
- j. $\{ C_{u\phi}, \{ DP_{\phi}, \{ T, \{ t_{DP}, \{ v_{pass}, \{ DP_{dat}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_{DP} \} \} \} \} \} \} \}$
- k. $\{ C, \{ DP_{\phi}, \{ T_{u\phi}, \{ t_{DP}, \{ v_{pass}, \{ DP_{dat}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_{DP} \} \} \} \} \} \} \}$
- l. $\{ C, \{ DP_{nom}, \{ T_{u\phi}, \{ t_{DP}, \{ v_{pass}, \{ DP_{dat}, \{ \langle R, v^*_{u\phi} \rangle_{u\phi}, t_{DP} \} \} \} \} \} \} \}$
- m. [C [Mai-nom [T [t_{DP} [v_{pass} [ame-dat [⟨R, v*⟩ t_{DP}]]]]]]]]]

In (28a), pair-Merge externally forms $\langle R, v^*_{u\phi} \rangle$, making v^* invisible (together with $u\phi$). In (28b), set-Merge externally forms $\{ \langle R, v^*_{u\phi} \rangle, DP_{\phi} \}$, where DP is an IA. As in (28f-g), Inheritance from v_{pass} to $\langle R, v^* \rangle$ takes place and the complement of v_{pass} is labeled $\langle \phi, \phi \rangle$ and then the DP is valued with dative Case under minimal search. The rest of the derivation goes in the same way as in (26) and (27).

As we have seen in Section 3.1., there is a contrast between *ni* direct passive and *ni yotte* passive. The *ni* direct passive requires the subject to be an affectee, while the *ni yotte* passive does not. Assuming the structures proposed in (25b) and (25c), we can capture this difference. Let us take a look at these derivations:

(29) Ni Direct Passive

- a. $\{ R, PRO \}$
- b. $\{ PRO, \{ R, t_{PRO} \} \}$
- c. $\{ \langle v_{passu\phi}, v^*_{u\phi} \rangle, \{ PRO, \{ R, t_{PRO} \} \} \}$
- d. $\{ DP_{\phi}, \{ \langle v_{passu\phi}, v^*_{u\phi} \rangle, \{ PRO, \{ R, t_{PRO} \} \} \} \}$
- e. $\{ DP_{\phi}, \{ \langle R, \langle v_{passu\phi}, v^*_{u\phi} \rangle \rangle, \{ PRO, \{ t_R, t_{PRO} \} \} \} \}$
- f. $\{ DP_{\phi}, \{ \langle R, \langle v_{passu\phi}, v^*_{u\phi} \rangle \rangle, \{ PRO, \{ t_R, t_{PRO} \} \} \} \}$
- g. $\{ T, \{ DP_{\phi}, \{ \langle R, \langle v_{passu\phi}, v^*_{u\phi} \rangle \rangle, \{ PRO, \{ t_R, t_{PRO} \} \} \} \} \}$
- h. $\{ DP_{\phi}, \{ T, \{ t_{DP}, \{ \langle R, \langle v_{passu\phi}, v^*_{u\phi} \rangle \rangle, \{ PRO, \{ t_R, t_{PRO} \} \} \} \} \} \}$
- i. $\{ C_{u\phi}, \{ DP_{\phi}, \{ T, \{ t_{DP}, \{ \langle R, \langle v_{passu\phi}, v^*_{u\phi} \rangle \rangle, \{ PRO, \{ t_R, t_{PRO} \} \} \} \} \} \} \}$
- j. $\{ C, \{ DP_{\phi}, \{ T_{u\phi}, \{ t_{DP}, \{ \langle R, \langle v_{passu\phi}, v^*_{u\phi} \rangle \rangle, \{ PRO, \{ t_R, t_{PRO} \} \} \} \} \} \} \}$
- k. $\{ C, \{ DP_{nom}, \{ T_{u\phi}, \{ t_{DP}, \{ \langle R, \langle v_{passu\phi}, v^*_{u\phi} \rangle \rangle, \{ PRO, \{ t_R, t_{PRO} \} \} \} \} \} \} \}$
- l. [Sora-nom [T [t_{DP} [⟨R, ⟨v_{pass}, v*⟩⟩ [PRO [t_R [t_{PRO}]]]]]]]]

As you can see in (29c), pair-Merge externally forms $\langle v_{passu\phi}, v^*_{u\phi} \rangle$ and it is set-Merged with $\{ PRO, \{ R, t_{PRO} \} \}$. The external pair-Merge of $v_{passu\phi}$ to $v^*_{u\phi}$ makes $v^*_{u\phi}$ invisible but the amalgam $\langle v_{passu\phi}, v^*_{u\phi} \rangle$ has an ability to select external argument (affectee) because v_{pass} is

visible. Therefore, the subject of *ni* direct passive can be interpreted as an affectee. Assuming that Inheritance can take place only from the non-amalgamated phase head, no Inheritance of $u\phi$ of v_{pass} to R takes place. Thus, R raises to $\langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle$ by internal pair-Merge, forming $\langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle$ and making $\langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle$ invisible to LA. Again, the rest of the derivation goes in the same way as in (26), (27), and (28).

(30) *Ni yotte* Passive

- a. $\langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle$
 b. $\langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle$
 c. $\{ \langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle, DP_{\phi} \}$
 d. $\{ DP_{\phi}, \{ \langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle, t_{DP} \} \}$
 e. $\{ T, \{ DP_{\phi}, \{ \langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle, t_{DP} \} \} \}$
 f. $\{ DP_{\phi}, \{ T, \{ t_{DP}, \{ \langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle, t_{DP} \} \} \} \}$
 g. $\{ C_{u\phi}, \{ DP_{\phi}, \{ T, \{ t_{DP}, \{ \langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle, t_{DP} \} \} \} \} \}$
 h. $\{ C, \{ DP_{\phi}, \{ T_{u\phi}, \{ t_{DP}, \{ \langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle, t_{DP} \} \} \} \} \}$
 i. $\{ C, \{ DP_{\text{nom}}, \{ T_{u\phi}, \{ t_{DP}, \{ \langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle, t_{DP} \} \} \} \} \}$
 j. [**Sora-nom** [T [t_{DP} [$\langle R, \langle v_{\text{pass}}, v^* \rangle \rangle$] [t_{DP}]]]]]

Now let us consider *ni yotte* passive in (30). The subject of *ni yotte* passive cannot be interpreted as an affectee. In (30a), pair-Merge externally forms $\langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle$, making v^* invisible so that this amalgam cannot take an agentive external argument. In (30b), pair-Merge externally forms $\langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle$, making $\langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle$ invisible. Therefore, what is visible is only R in the amalgam $\langle R, \langle v_{\text{passu}\phi}, v^*_{u\phi} \rangle \rangle$ so that it can only take an IA. Hence, it cannot take an affectee argument.

In this subsection, we have seen how the proposed theory of pair-Merge can deal with three kinds of passives given in (16), (17), and (18). In the next section, I will show that this proposed mechanism can easily extend to causatives in Japanese.

4. Causatives in Japanese

It has been observed in the literature on Japanese (Kuroda 1965, Harada 1973, Kuno 1973, Shibatani 1978, Terada 1990, Miyagawa 1999, Miyamoto 1999; among others) that (i) the causee can be marked with either *-o* or *-ni* in the unergative causative, (ii) it can only be marked with *-o* in the unaccusative causative, and (iii) it can only be marked with *-ni* in the transitive causative. These are illustrated in (31).

- (31) a. Unergative causative
 Kantoku-ga Ichiro-**ni/o** hasir-ase-ta
 manager.-nom I.-dat/acc run-caus-pst
 ‘The manager let/made Ichiro run.’

- b. Unaccusative causative
 Ameotoko-ga ame-***ni/o** fur-ase-ta
 rain-man-nom rain-dat/acc fall-caus-pst
 ‘The rain man made it rain.’
- c. Transitive causative
 Masa-ga Haru-**ni/*o** Sora-o nagur-ase-ta
 M.-nom H.-dat/acc S.-acc hit-caus-pst
 ‘Masa made/let Haru hit Sora.’

In this section, I will show that the proposed theory of pair-Merge provides a straightforward account for the difference between unergative causative and unaccusative causative constructions. Further I argue that the ungrammaticality with *-o* in the transitive causative is simply due to a language particular constraint in Japanese.

4.1. The Subject of the Embedded Clause of the Causative Construction

It is well known since Kuroda (1965) that Japanese causative constructions are biclausal, despite their appearance that does exhibit monoclausal properties. The biclausality of these constructions is supported by the example in (32).

- (32) Tomo_i-ga Sora_j-ni zibun_{i,j}-no sensei-o hihans-ase-ta
 T.-nom S.-dat self-gen teacher-acc criticize-caus-pst
 ‘Tomo made Sora criticize her/his teacher.’
- (33) a. Tomo_i-ga Sora_j-ni zibun_{i,*j}-no sensei-o syookaisi-ta
 T.-nom S.-dat self-gen teacher-acc introduce-pst
 ‘Tomo introduced her teacher to Sora.’
- b. Tomo_i-ga Sora_j-o zibun_{i,*j}-no sensei-ni syookaisi-ta
 T.-nom S.-acc self-gen teacher-dat introduce-pst
 ‘Tomo introduced Sora to her teacher.’

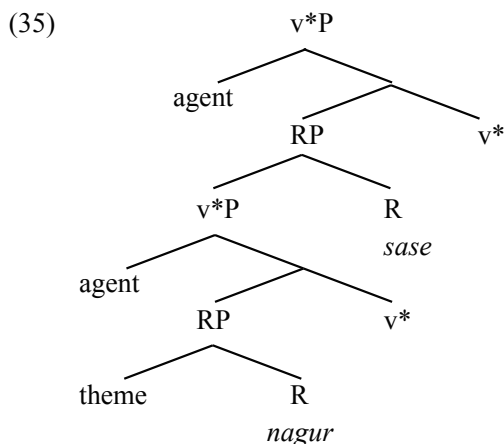
In (32), the causee *Sora* can be the antecedent of *zibun* as well as the causer *Tomo*. This means that *Sora* is the embedded subject since the reflexive *zibun* is subject-oriented. The examples in (33) show that neither *-o* marked object nor *-ni* marked object can be the antecedent of *zibun*. Consider (34), where the example involves clausal embedding.

- (34) Tomo_i-ga Haru_j-ni Sora_k-ga zibun_{i,*j,k}-no sensei-o hihansi-ta to it-ta
 T.-nom H.-dat S.-nom self-gen teacher-acc criticize-pst comp say-pst
 ‘Tomo said to Haru that Sora criticized her/his teacher’

The possible antecedents of *zibun* in (34) are both the matrix subject *Tomo* and the embedded subject *Sora*, but not the indirect object *Haru*. Hence only the subject can be the antecedent of *zibun*. Thus, despite its appearance, the causee *Sora* is the subject of the embedded clause of the causative construction in (32).

4.2. Analysis

Following Murasugi and Hashimoto (2004) and Saito (2011), I assume that the structure of (31c) is roughly as in (35).



Adopting Woolford’s proposal that *v* heads license inherent dative Case of an external argument, I propose that Inherent Case is licensed in SPEC-*v**.

(36) Little/light *v* heads license inherent Case (dative Case) on an external argument. (cf. Woolford 2006:113)

Assuming the structure of causative construction is as in (35) and adopting (36), I will now show the difference between unergative causative and unaccusative causative constructions.

As we have seen in (31a), the causee can be marked with either *-o* or *-ni* in the unergative causative. Let us first take a look at the derivation of *ni* unergative causatives.

(37) *Ni* unergative causative

- a. { v*_{uφ}, R }
- b. { DP_φ, { v*_{uφ}, R } }
- c. { DP_φ, { <R, v*_{uφ}>, t_R } }
- d. { R, { DP_φ, { <R, v*_{uφ}>, t_R } } }
- e. { v*_{uφ}, { R, { DP_φ, { <R, v*_{uφ}>, t_R } } } }
- f. { DP_φ, { v*_{uφ}, { R, { DP_φ, { <R, v*_{uφ}>, t_R } } } } }
- g. { DP_φ, { <R, v*_{uφ}>, { t_R, { DP_φ, { <R, v*_{uφ}>, t_R } } } } }
- h. { DP_φ, { <R, v*_{uφ}>, { t_R, { DP_{dat}, { <R, v*_{uφ}>, t_R } } } } }

- i. [Kantoku-nom[T [t_{DP} [<R, v*> [t_R [**Ichiro-dat** [<R, v*> [t_R]]]]]]]]]]

In (37b), a DP is externally set-Merged with {v*_{uφ}, R} and hence it is an EA. In (37c), there is no DP in {v*_{uφ}, R} so that there is no need to transmit uφ from v* to R for purposes of subsequent Case-valuation and thus internal pair-Merge of R to v*_{uφ} takes place prior to Inheritance, making v*_{uφ} invisible. As in (37e), DP may not raise to the SPEC of R if operations apply freely and thus v* can be externally set-Merged with {R, {DP_φ, {<R, v*_{uφ}>, t_R}}}. If this is the case, then Inheritance from v* to R does not take place because there is no DP in the SPEC of R. Thus, pair-Merge of R to v* takes place as in (37g). In this derivation, a DP in the SPEC of the embedded v*, which is an external argument, remains in situ so that Inherent dative Case is licensed on it by assumption in (36).

Now let us consider the derivation of *o* unergative causatives.

(38) *O* unergative causative

- a. { v*_{uφ}, R }
- b. { DP_φ, { v*_{uφ}, R } }
- c. { DP_φ, { <R, v*_{uφ}>, t_R } }
- d. { R, { DP_φ, { <R, v*_{uφ}>, t_R } } }
- e. { DP_φ, { R, { t_{DP}, { <R, v*_{uφ}>, t_R } } } }
- f. { v*_{uφ}, { DP_φ, { R, { t_{DP}, { <R, v*_{uφ}>, t_R } } } } }
- g. { DP_φ, { v*_{uφ}, { DP_φ, { R, { t_{DP}, { <R, v*_{uφ}>, t_R } } } } } }
- h. { DP_φ, { v*, { DP_φ, { R_{uφ}, { t_{DP}, { <R, v*_{uφ}>, t_R } } } } } }
- i. { DP_φ, { v*, { DP_{acc}, { R_{uφ}, { t_{DP}, { <R, v*_{uφ}>, t_R } } } } } }
- j. { DP_φ, { <R_{uφ}, v* >, { DP_{acc}, { t_R, { t_{DP}, { <R, v*_{uφ}>, t_R } } } } } }
- k. [Kantoku-nom[T [t_{DP} [<R, v*> [**Ichiro-acc** [t_R [t_{DP} [<R, v*> [t_R]]]]]]]]]]

In (38e), a DP raises to the SPEC of R. Then v* is externally set-Merged with {DP_φ, {R, {t_{DP}, {<R, v*_{uφ}>, t_R}}}}. As in (38h-i), Inheritance of uφ from v* to R takes place and then the complement of v* is labeled <φ, φ> and then the DP is valued with accusative Case under minimal search.

Now the ungrammaticality of *ni* unaccusative causatives in (31b) can be easily accounted for. In (31b), *ame* is not an EA but an IA. Based on the assumption that inherent Case is only licensed on an external argument, there is no chance for an DP *ame* to be marked with dative Case. Therefore, the only possible Case that the DP *ame* can receive is accusative Case as shown in (39).

(39) Unaccusative causative

- a. <R, v*_{uφ}>
- b. { <R, v*_{uφ}>, DP_φ }
- c. { DP_φ, { <R, v*_{uφ}>, t_{DP} } }
- d. { R, { DP_φ, { <R, v*_{uφ}>, t_{DP} } } }
- e. { DP_φ, { R, { t_{DP}, { <R, v*_{uφ}>, t_{DP} } } } }

- f. $\{ v^*_{u\phi}, \{ DP_{\phi}, \{ R, \{ t_{DP}, \{ \langle R, v^*_{u\phi} \rangle, t_{DP} \} \} \} \} \}$
- g. $\{ DP_{\phi}, \{ v^*_{u\phi}, \{ DP_{\phi}, \{ R, \{ t_{DP}, \{ \langle R, v^*_{u\phi} \rangle, t_{DP} \} \} \} \} \}$
- h. $\{ DP_{\phi}, \{ v^*, \{ DP_{\phi}, \{ R_{u\phi}, \{ t_{DP}, \{ \langle R, v^*_{u\phi} \rangle, t_{DP} \} \} \} \} \}$
- i. $\{ DP_{\phi}, \{ v^*, \{ DP_{acc}, \{ R_{u\phi}, \{ t_{DP}, \{ \langle R, v^*_{u\phi} \rangle, t_{DP} \} \} \} \} \}$
- j. $\{ DP_{\phi}, \{ \langle R_{u\phi}, v^* \rangle, \{ DP_{acc}, \{ t_R, \{ t_{DP}, \{ \langle R, v^*_{u\phi} \rangle, t_{DP} \} \} \} \} \}$
- k. [Ameotoko-nom[T [t_{DP} [⟨R, v*⟩ [ame-acc/*dat [t_R [t_{DP} [⟨R, v*⟩ [t_R]]]]]]]]]]]]]]

As in (39e), a DP raises to the SPEC of R. Then v^* is externally set-Merged with $\{ DP_{\phi}, \{ R, \{ t_{DP}, \{ \langle R, v^*_{u\phi} \rangle, t_{DP} \} \} \} \}$. As in (39h-i), Inheritance of $u\phi$ from v^* to R takes place and then the complement of v^* is labeled $\langle \phi, \phi \rangle$ and then the DP is valued with accusative Case under minimal search. This is exactly the same way that accusative Case is valued in *O* unergative causative.

Finally, as for the transitive causatives, I argue that the ungrammaticality with the causee marked with $-o$ is simply due to a language particular constraint in Japanese. As in (35), there are two v^* s, which can value accusative Case in causative constructions. Therefore, the causee should be able to be marked with $-o$ in (31c), contrary to fact. Interestingly, as Jung and Miyagawa (2004) show, unlike Japanese, Korean does allow the causee to be marked with accusative Case. This is illustrated in (40) and (41).

- (40) John-i Mary-eykey/lul pica-lul mek-i-ess-ta. (Korean)
 John-nom Mary-dat/acc pizza-acc eat-caus-pst-dec

‘John caused Mary to eat pizza.’

- (41) John-ga Mary-ni/*o piza-o tabe-sase-ta. (Japanese)
 John-nom Mary-dat/acc pizza-acc eat-caus-pst

‘John caused Mary to eat pizza.’

Given the fact that the causee can be marked with accusative Case in Korean, I claim that syntax allows the causee to be marked with accusative Case in causative constructions. Thus the ungrammaticality with the causee marked with $-o$ in (31c) must be due to a language particular constraint in Japanese. In fact, Korean allows two objects to be marked with accusative Case in double object constructions, while double accusative is not allowed in their Japanese counterparts.

- (42) a. Mary-ka John-eykey chayk-ul cwu-ess-ta.
 Mary-nom John-dat book-acc give-pst-dec

‘Mary gave a book to John.’

- b. Mary-ka John-ul chayk-ul cwu-ess-ta.
 Mary-nom John-acc book-acc give-pst-dec

‘Mary gave John a book.’

- (43) a. Mary-ga John-ni hon-o age-ta.
 Mary-nom John-dat book-acc give-pst
 ‘Mary gave a book to John.’
- b. *Mary-ga John-o hon-o age-ta.
 Mary-nom John-acc book-acc give-pst
 ‘Mary gave John a book.’
- (44) a. Mary-ka haksayngtul-*eykey* yenge-lul kaluchi-ess-ta.
 Mary-nom students-dat English-acc teach-pst-dec
 ‘Mary taught English to the students.’
- b. Mary-ka haksayngtul-*ul* yenge-lul kaluchi-ess-ta.
 Mary-nom students-acc English-acc teach-pst-dec
 ‘Mary taught the students English.’
- (45) a. Mary-ga gakusei-*ni* eigo-o osie-ta.
 Mary-nom students-dat English-acc teach-pst
 ‘Mary taught English to the students.’
- b. *Mary-ga gakusei-*o* eigo-o osie-ta.
 Mary-nom students-acc English-acc teach-pst
 ‘Mary taught the students English.’

Given these facts, following Saito (1982), I assume double-*o* constraint in Japanese.

- (46) Double-*o* constraint (Saito 1982:18)
 A verb can assign accusative (or objective) case to at most one NP.

To sum up, I have shown that the proposed theory of pair-Merge provides a straightforward account for the difference between unergative causative and unaccusative causative constructions in Japanese. Since Korean allows the causee to be marked with accusative Case, I have argued that the ungrammaticality with *-o* in the transitive causative in Japanese is simply due to a language particular constraint.

5. Remaining Issues

Several issues remain to be addressed. First, the complement of R in *ni* unergative causatives in (37) seems not to be labeled. the derivation of *ni* unergative causatives is repeated here in (47).

(47) *Ni* unergative causative

- a. $\{ v^*_{u\phi}, R \}$
- b. $\{ DP_\phi, \{ v^*_{u\phi}, R \} \}$
- c. $\{ DP_\phi, \{ \langle R, v^*_{u\phi} \rangle, t_R \} \}$
- d. $\{ R, \{ DP_\phi, \{ \langle R, v^*_{u\phi} \rangle, t_R \} \} \}$
- e. $\{ v^*_{u\phi}, \{ R, \{ DP_\phi, \{ \langle R, v^*_{u\phi} \rangle, t_R \} \} \} \}$
- f. $\{ DP_\phi, \{ v^*_{u\phi}, \{ R, \{ DP_\phi, \{ \langle R, v^*_{u\phi} \rangle, t_R \} \} \} \} \}$
- g. $\{ DP_\phi, \{ \langle R, v^*_{u\phi} \rangle, \{ t_R, \{ DP_\phi, \{ \langle R, v^*_{u\phi} \rangle, t_R \} \} \} \} \}$
- h. $\{ DP_\phi, \{ \langle R, v^*_{u\phi} \rangle, \{ t_R, \{ DP_{dat}, \{ \langle R, v^*_{u\phi} \rangle, t_R \} \} \} \} \}$
- i. [Kantoku-nom[T [t_{DP} [⟨R, v*⟩ [t_R [**Ichiro-dat** [⟨R, v*⟩ [t_R]]]]]]]]]]]]

In (47d), the complement of R is of the form {XP, YP} because the DP stays in situ in the SPEC of v*. Under Chomsky's (2015b) system, the head of XP must share the same features with the head of YP, for instance, labeling $\langle \phi, \phi \rangle$ but that is not the case in (47). Since according to Chomsky (2015a:102), "every syntactic object transferred to the interface has to be labeled, optimally by a minimal search algorithm (like Agree)," the complement of R must be labeled. Notice that the DP is marked with inherent Case (dative Case) by assumption. One might argue that θ -relation is established between XP and YP and the complement of R is labeled $\langle \theta, \theta \rangle$ under minimal search.

Another issue is that Under Chomsky's (2015b) framework, it is not certain how adjuncts can be dealt with. Especially, we do not know how we can label the adjunct structures. Therefore, although we have seen that three kinds of passives in Japanese are recaptured under Chomsky's (2015b) new framework, we are not able to show where the *by*-phrases (*ni* and *ni yotte* phrases) adjoin. Pair-Merge of heads is a new theory of the adjunction of X and Y but pair-Merge of phrases has not been established yet under Chomsky's new framework. We eagerly await further research.

6. Conclusion

In this paper, I have attempted to pursue the theory of syntax where the core structure building operations is as follows:

(48) The core structure building operations:

- a. (Set-)Merge $(\alpha, \beta) = \{ \alpha, \beta \}$
- b. Pair-Merge $(\alpha, \beta) = \langle \alpha, \beta \rangle$

I have shown that in addition to set-Merge, pair-Merge is in fact a necessary operation for structure building. In Japanese, there are at least three kinds of passive constructions: *ni yotte* passive, *ni* direct passive, and *ni* indirect passive. Once we adopt the idea that pair-Merge can apply freely, we can succinctly derive these three passives from the single passive morpheme, without stipulating morphologically same but syntactically different passive morphemes. As we have seen, there are a lot of issues that remain to be addressed since this proposed theory

of pair-Merge is still under development but if this is on the right track, then most of (or maybe all of) the optionality in verbal structures might be explained by the free application of pair-Merge. Therefore, Japanese complex predicates provide an important testing ground to evaluate the theory of pair-Merge, especially regarding the optionality in grammar.

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