

Voice morphology in Japanese argument structures*

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Abstract

In this paper, we review and investigate verbal argument structures in Japanese, especially transitivity alternations where transitive-intransitive verb “pairs” (e.g. *mawa-s-u* vs. *mawa-r-u*, ‘turn’) have been exclusively analyzed with mixed results in favor of both lexical (Miyagawa, 1984; Jacobsen, 1992) and syntactic (Miyagawa, 1998; Nishiyama, 1998) strands. Empirically, we closely examine hitherto unexplored verb “triplets” (Suga, 1980; de Chene, 2016), in which the same lexical roots are shared by multiple transitive/intransitive verbs with different transitivity morphology, and reveal their differential syntactic behaviors in the interpretation of external arguments (between multiple transitive verbs sharing the same root) and unaccusativity (between multiple intransitive verbs sharing the same root). Theoretically, within the framework of Distributed Morphology (Halle & Marantz, 1993), we propose the system in which transitivity morphology, previously identified as little *v* (Volpe, 2005; Harley, 2008; Marantz, 2013), is analyzed as Voice morphology differently specified regarding the presence/absence of external arguments (Schafer, 2008; Marantz, 2013; Wood, 2015; Alexiadou et al., 2015), and explain the syntax of transitivity alternations. Furthermore, the proposed Voice system will be extended to the broader empirical domain of Japanese argument structures and derive ditransitive verbs, “figure ditransitive” verbs, and syntactic causatives/passives. Finally, we discuss several theoretical consequences of our proposal concerning (i) lexical vs. syntactic approaches to argument structure, (ii) the distinctness of Voice and little *v* (Harley, 2013; Legate, 2014), and (iii) the unification of argument-introducing functional heads under *i** (Wood & Marantz, 2017).

Keywords: Argument structure, Transitivity alternation, Voice, Little *v*, Distributed Morphology, Japanese

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Contents

1	Introduction	3
2	Transitivity alternations in Japanese	4
2.1	Transitive-intransitive “pairs”	4
2.2	Transitive-transitive-intransitive “triplets”	6
2.3	Intransitive-intransitive-transitive “triplets”	8
3	Proposal	11
3.1	Theoretical assumptions	11
3.2	Voice	12
3.3	Little v	16
4	Empirical Extensions	18
4.1	Ditransitive verbs	18
4.2	“Figure ditransitive” verbs	22
4.3	Syntactic causatives/passives	24
5	Theoretical Consequences	26
5.1	Lexical vs. syntactic approaches to argument structure	26
5.2	On the distinctness of Voice and little v	28
5.3	The unification of argument-introducing functional heads	28
6	Conclusion	29
	References	30

1 Introduction

In the realm of argument structure, whether verbs are built in the lexicon or the syntax has been intensely debated between the lexicalist and anti-lexicalist traditions. Specifically, the lexical “projectionist” approach (Chomsky, 1981; Levin and Rappaport Hovav, 1995; Reinhart, 2002) claims that verbs are manipulated with lexical operations and their arguments are faithfully projected through syntactic derivations, while the syntactic “constructionist” approach (Hale and Keyser, 1993; Marantz, 1997; Borer, 2005) argues that the syntax constructs skeletal argument structures from functional heads and roots lexically modify those structures.

Japanese has been one of the major battlefields for theories of argument structure (Miyagawa, 1984, 1998; Harley, 1995, 2008; Jacobsen, 1992; Kageyama, 1996; Nishiyama, 1998; Volpe, 2005; Marantz, 2013a, among others). Interest in Japanese argument structures has been probably sparked by transitivity morphology, where suffixes marking verbal transitivity can be transparently observed. In particular, Japanese showcases various types of transitivity alternations identified in the typological literature (Haspelmath, 1987, 1993; Nichols et al., 2004), such as transitivity, intransitivity, and equipollent. In transitivity (1) and intransitivity (2) alternations, transitive and intransitive verbs are morphologically marked, respectively. In equipollent alternations (3), both transitive and intransitive verbs are morphologically marked on the shared roots:

(1) Transitivity:

- a. John-ga ringo-o koor-**as**-ta.
John-Nom apple-Acc freeze-Transitive-Past
'John froze an apple.'
- b. Ringo-ga koor- \emptyset -ta.
apple-Nom freeze- \emptyset -Past
'An apple became frozen.'

(2) Intransitivity:

- a. John-ga tori-o tsukam- \emptyset -ta.
John-Nom bird-Acc catch- \emptyset -Past
'John caught a bird.'
- b. Tori-ga tsukam-**ar**-ta.
bird-Nom catch-Intransitive-Past
'A bird became caught.'

(3) Equipollent:

- a. John-ga handoru-o mawa-**s**-ta.
John-Nom handle-Acc turn-Transitive-Past
'John turned a handle.'

- b. Handoru-ga mawa-**r**-ta.
 string-Nom turn-Intransitive-Past
 ‘A handle became turned.’

In this paper, we review and investigate verbal argument structures in Japanese, especially transitivity alternations. But unlike the previous analyses that primarily focused on transitive-intransitive verb “pairs” (Jacobsen, 1992), we will closely examine hitherto unexplored verb “triplets” (Suga, 1980; de Chene, 2016b). The important property of verb “triplets” is to allow us to keep lexical roots constant and vary only transitivity morphology, providing real minimal pairs to reveal the unique syntactic contributions of transitivity morphology. Then, following the generative constructionist approach to argument structure (Schafer, 2008; Marantz, 2013b; Wood, 2015; Alexiadou et al., 2015), we propose the system in which the transitivity morphology is identified with argument-introducing functional heads such as Voice, Appl, and little *p*. The argument structures of transitive/intransitive verbs, ditransitive verbs, “figure ditransitive” verbs, and syntactic causatives/passives, will be derived via various combinations of those functional heads.

The organization of this paper is as follows. In Section 2, we review transitivity alternations in Japanese and point out that previous theoretical analyses, both lexical and syntactic, have exclusively analyzed transitive-intransitive “pairs”. Moreover, hitherto unexplored “triplets” (transitive-transitive-intransitive or intransitive-intransitive-transitive) are investigated to identify differential syntactic behaviors among transitive/intransitive twins borne from the same roots in combination with transitivity morphology. In Section 3, within the framework of Distributed Morphology, we propose the system in which transitivity morphology, previously identified as little *v*, is Voice morphology with different specifications of external arguments, and explain the syntax of transitivity alternations in Japanese. In Section 4, the proposed Voice system is applied to the broader empirical domain of Japanese argument structures such as ditransitive verbs, “figure ditransitive” verbs, syntactic causatives/passives. In Section 5, several theoretical consequences are discussed concerning (i) lexical vs. syntactic approaches to argument structure, (ii) the distinctness of Voice and little *v*, and (iii) the unification of apparently distinct functional heads. Section 6 concludes this paper.

2 Transitivity alternations in Japanese

In this section, we first review transitivity alternation in Japanese and point out several problems with the exclusive focus on transitive-intransitive verb “pairs” (Section 2.1). Then, we observe previously unexplored verb “triplets”; specifically, transitive-transitive-intransitive “triplets” (Section 2.2) and intransitive-intransitive-transitive “triplets” (Section 2.3).

2.1 Transitive-intransitive “pairs”

Transitivity alternations in Japanese have been extensively discussed from both traditional grammar and theoretical perspectives (see papers in Suga and Hayatsu, 1995; Kageyama and Jacobsen, 2016). In particular, Jacobsen (1982, 1992) stand out as comprehensive analysis of Japanese

transitive-intransitive verb “pairs” and paradigmatically classified them into 15 classes based on transitivity morphology (cf. Volpe, 2005):¹

Class	Intransitive	Transitive	Examples		Meaning
1.	-e-	-∅-	hag-e-ru	hag-∅-u	‘peel’
2.	-∅-	-e-	ak-∅-u	ak-e-ru	‘open’
3.	-ar-	-e-	ham-ar-u	ham-e-ru	‘fit’
4.	-ar-	-∅-	tsunag-ar-u	tsunag-∅-u	‘connect’
5.	-r-	-s-	ama-r-u	ama-s-u	‘remain’
6.	-re-	-s-	kowa-re-ru	kowa-s-u	‘break’
7.	-ri-	-s-	ka-ri-ru	ka-s-u	‘borrow/lend’
8.	-∅-	-as-	her-∅-u	her-as-u	‘decrease’
9.	-e-	-as-	tok-e-ru	tok-as-u	‘melt’
10.	-i-	-as-	nob-i-ru	nob-as-u	‘extend’
11.	-i-	-os-	ok-i-ru	ok-os-u	‘get up’
12.	-∅-	-se-	abi-∅-ru	abi-se-ru	‘pour’
13.	-e-	-akas-	obi-e-ru	obi-yakas-u	‘frighten’
14.	-or-	-e-	kom-or-u	kom-e-ru	‘fill’
15.	-are-	-e-	toraw-are-ru	toraw-e-ru	‘catch’

Table 1: Transitive-intransitive “pairs” in Japanese (Jacobsen, 1992, pp.258-269)

At first sight, there appears to be no regularity in this verbal paradigm. However, abstracting away from allomorphic differences of transitivity morphology as an idiosyncratic function of roots, three descriptive generalizations emerge: (i) suffixes containing **-s-** (e.g. *-s-*, *-as-*, *-os-*, *-se-*) are exclusively transitive, (ii) suffixes containing **-r-** (e.g. *-r-*, *-ar-*, *-or-*, *-re-*) are exclusively intransitive, and (iii) suffixes consisting of **-e-** (or **-i-**) are “ambivalent”, either transitive or intransitive.² In fact, Jacobsen (1992) was aware of the first two generalizations, what we collectively call **Jacobsen’s Generalization** (cf. Nishiyama, 1998):

- (4) **Jacobsen’s Generalization:** “every suffix involved in transitive vs. intransitive oppositions containing [-s-] is transitive, and affixes containing [-r-] are preponderantly intransitive” (Jacobsen, 1992, p.59)³

¹More precisely, Jacobsen (1982, 1992) has Class 16, but since that class is “miscellaneous” without clear regularity, only 15 classes are summarized here.

²Kuroda (1993) proposed that vowel differences between /a/ and /o/ are the residue of vowel harmony between roots and suffixes. Additionally, one may wonder whether the suffixes consisting of **-e-** can be derived via consonant deletion from transitive suffixes (e.g. *-se-*) or intransitive suffixes (e.g. *-re-*), explaining apparent “ambivalence”. However, this possibility should be untenable given that consonant deletion is not independently motivated in Japanese morphophonology (Nishiyama, 1996; de Chene, 2016a).

³According to Wesley Jacobsen (personal communication), the term “preponderantly” was used in the case of *-r-* because “I may have been thinking of pairs like *war-u* vs. *war-e-ru* or *yur-u* vs. *yur-e-ru* where the transitive form has a

In the following discussions, building on Kageyama (1996) and Kitagawa and Fujii (1999), we employ the abstract transitivity morphemes **-S-**, **-R-**, and **-E-** to represent the suffixes containing **-s-**, **-r-**, and **-e-** (or **-i-**), respectively. These abstract transitivity morphemes will be called “transitive morphology” (**-S-**), “intransitive morphology” (**-R-**), and “ambivalent morphology” (**-E-**).

In the previous literature, those transitive-intransitive verb “pairs” have been taken to be the major empirical basis for various theoretical proposals on argument structures. For example, in the lexical strand, Miyagawa (1984) proposed the Paradigmatic Structure and morphological “blocking” as explanatory principles in the lexicon. In the syntactic strand, the transitive **-S-** and intransitive **-R-** morphology have been argued to be different “flavors” of V (Miyagawa, 1998), Tr(ansitivity) (Nishiyama, 1998), “affixal particles” (Volpe, 2005), and little *v* (Harley, 2008; Marantz, 2013a). Furthermore, there was a debate between Kageyama (1996) and Matsumoto (2000) concerning the division of labor between transitivity morphology and lexical roots; Kageyama (1996) put more weight on transitivity morphology, while Matsumoto (2000) on lexical semantic properties of roots.

However, there is one methodological problem with the exclusive focus on transitive-intransitive verb “pairs”, in which the same roots can derive only one transitive and intransitive verbs. That is, transitivity morphology and lexical roots inevitably covary (i.e. when different transitivity morphology are compared, verbs with different lexical roots must be examined), hence the failure to isolate the unique contribution of transitivity morphology. In order to avoid this problem, this paper will investigate verb “triplets” (Suga, 1980; de Chene, 2016b), in which the same roots can derive transitive or intransitive twins. In each subsection below, we describe transitive-transitive-intransitive “triplets” and intransitive-intransitive-transitive “triplets”.

2.2 Transitive-transitive-intransitive “triplets”

As seminal documented by Suga (1980), there are several instances of transitive-transitive-intransitive “triplets”, where two transitive verbs and one intransitive verb are derived from the same root, as exemplified in Table 2:

Root	Meaning	Unmarked Transitive	Marked Transitive	Intransitive
<i>hag</i>	‘peel’	<i>hag-∅-u</i>	<i>hag-as-u</i>	<i>hag-e-ru</i>
<i>tok</i>	‘dissolve’	<i>tok-∅-u</i>	<i>tok-as-u</i>	<i>tok-e-ru</i>
<i>kir</i>	‘cut’	<i>kir-∅-u</i>	<i>kir-as-u</i>	<i>kir-e-ru</i>
<i>nuk</i>	‘pull’	<i>nuk-∅-u</i>	<i>nuk-as-u</i>	<i>nuk-e-ru</i>
...				

Table 2: Transitive-transitive-intransitive “triplets”

For example, the same root *hag* ‘peel’ is shared by two transitive verbs, one unmarked (i.e. *hag-∅-u*) and another marked by the transitive morphology **-S-** (i.e. *hag-as-u*). Jacobsen (1992) re-

consonant stem ending in *-r-*, but this is admittedly not a true affix.” Note, however, that there are also pairs like *hus-e-ru* vs. *hus-u* in which the intransitive form has a consonant stem ending in *-s-*.

dundantly listed the former transitive verb in Class 1 and the latter in Class 9, each paired with the same intransitive verb (i.e. *hag-e-ru*), suggesting that Japanese transitive/intransitive verbs are not morphologically pairwise. Importantly, these transitive-transitive-intransitive “triplets”, unlike transitive-intransitive “pairs”, allow us to create minimal pairs to isolate the unique contribution of transitive morphology, in which two transitive verbs are differently marked morphologically with the lexical root kept constant:⁴

(5) **Transitive twins:**

- a. John-ga posutaa-o hag- $\{\emptyset|\text{as}\}$ -ta.
John-Nom poster-Acc peel- $\{\emptyset|\text{Transitive}\}$ -Past
‘John peeled a poster.’
- b. Mary-ga kona-o tok- $\{\emptyset|\text{as}\}$ -ta.
Mary-Nom powder-Acc dissolve-Transitive-Past
‘Mary dissolved powder.’

When the external argument is Agent as in the examples (5), the unmarked and marked transitive verbs seem to freely alternate with no obvious differences. However, Suga (1980) insightfully observed that unmarked transitive verbs express “activity”, whereas transitive verbs marked by the transitive morphology **-S-** mean “change of state”. This distinction seems to be reflected in the interpretation of external arguments:

(6) **Transitive twins - Causer:**

- a. **Sitsudo-ga** posutaa-o hag- $\{*\emptyset|\text{as}\}$ -ta.
humidity-Nom poster-Acc peel- $\{\emptyset|\text{Transitive}\}$ -Past
‘Humidity peeled a poster.’
- b. **Ame-ga** kona-o tok- $\{*\emptyset|\text{as}\}$ -ta.
rain-Nom powder-Acc dissolve- $\{\emptyset|\text{Transitive}\}$ -Past
‘Rain dissolved powder.’

Interestingly, when the external argument is switched from Agent to Causer as in the examples (6), only the transitive verbs marked by the transitive morphology **-S-** become acceptable. The Agent/Causer dichotomy is further corroborated by phrasal idioms:

(7) **Transitive twins - phrasal idioms:**

- a. John-ga kami-o kir- $\{\emptyset|*\text{as}\}$ -ta.
John-Nom paper-Acc cut- $\{\emptyset|\text{Transitive}\}$ -Past
‘John cut a paper.’

⁴Throughout this paper, the notation $\{X|Y\}$ will be used to mark the acceptability of transitivity morphology: $\{X|Y\}$ means both X and Y are acceptable, $\{X|*Y\}$ means only X is acceptable, and $\{*X|Y\}$ means only Y is acceptable.

- b. John-ga iki-o kir- $\{*\emptyset|\text{as}\}$ -ta.
John-Nom breath-Acc cut- $\{\emptyset|\text{Transitive}\}$ -Past
'John cut his breath (John was out of breath).'
- (8) a. Mary-ga kugi-o nuk- $\{\emptyset|*\text{as}\}$ -ta.
Mary-Nom nail-Acc pull- $\{\emptyset|\text{Transitive}\}$ -Past
'Mary pulled a nail.'
- b. Mary-ga koshi-o nuk- $\{*\emptyset|\text{as}\}$ -ta.
Mary-Nom waist-Acc pull- $\{\emptyset|\text{Transitive}\}$ -Past
'Mary pulled her waist (Mary was paralyzed with shock).'

These examples show that agentive interpretations (7a and 8a) are permitted by unmarked transitive verbs, while idiomatic non-agentive interpretations (7b and 8b) are only compatible with the transitive verbs marked by the transitive morphology *-S-*. Note that even though the external arguments of these examples are all volitional, agentive events are relevant here. In summary, these observations lead to the following descriptive generalization:

- (9) **Generalizations about transitive twins:**
- a. The external argument of unmarked transitive verbs is Agent.
- b. The external argument of *S*-marked transitive verbs is Cause.

Now we move to another type of verb “triplets”: intransitive-intransitive-transitive “triplets”.

2.3 Intransitive-intransitive-transitive “triplets”

Suga (1980) also observed several instances of intransitive-intransitive-transitive “triplets”, where two intransitive verbs and one transitive verb are generated from the same root, as in Table 3:

Root	Meaning	Unmarked Intransitive	Marked Intransitive	Transitive
chijim	'shrink'	chijim- \emptyset -u	chijim-ar-u	chijim-e-ru
karam	'connect'	karam- \emptyset -u	karam-ar-u	karam-e-ru
yurum	'loosen'	yurum- \emptyset -u	yurum-ar-u	yurum-e-ru
tsutaw	'move'	tsutaw- \emptyset -u	tsutaw-ar-u	tsutaw-e-ru
yasum	'rest'	yasum- \emptyset -u	yasum-ar-u	yasum-e-ru
...				

Table 3: Intransitive-intransitive-transitive “triplets”

Just like transitive-transitive-intransitive “triplets”, the same root *chijim* ‘shrink’ is shared by two intransitive verbs, one unmarked (i.e. *chijim- \emptyset -u*) and another marked by the intransitive morphology *-R-* (i.e. *chijim-ar-u*). Here again, Jacobsen (1992) redundantly listed the former intransitive verb in Class 2 and the latter in Class 3, each paired with the same transitive verb (i.e. *chijim-e-ru*),

suggesting that the pairwise paradigmatic approach to transitivity alternation is inherently deficient. The following twins can be constructed from these intransitive-intransitive-transitive “triplets” to isolate the unique contribution of the intransitive morphology *-R-*:

(10) **Intransitive twins:**

- a. Syatsu-ga chijim- $\{\emptyset|\text{ar}\}$ -ta.
shirt-Nom shrink- $\{\emptyset|\text{Intransitive}\}$ -Past
'A shirt shrank.'
- b. Tsuta-ga karam- $\{\emptyset|\text{ar}\}$ -ta.
ivy-Nom wind- $\{\emptyset|\text{Intransitive}\}$ -Past
'An ivy wound.'

Now one may wonder what the division of labor is between these intransitive twins. Suga (1980) again suggests that unmarked and marked intransitive verbs express “activity” and “change of state”, respectively, which is reminiscent of the unergative/unaccusative distinction. In fact, this possibility seems to be borne out by several unaccusativity diagnostics in Japanese. First, the *takusan* ‘a lot’ construction (Kageyama, 1993) serves for this purpose:

(11) **Intransitive twins - the *takusan* construction:**

- a. Takusan chijim- \emptyset -ta.
a.lot shrink- \emptyset -Past
?'A lot of shirts shrank.' (argument modifier)
'Some shirt shrank a lot.' (event modifier)
- b. Takusan chijim-*ar*-ta.
a.lot shrink-Intransitive-Past
'A lot of shirts shrank.' (argument modifier)
*‘Some shirt shrank a lot.’ (event modifier)

- (12) a. Takusan karam- \emptyset -ta.
a.lot wind- \emptyset -Past
?'A lot of ivies wound.' (argument modifier)
'Some ivy wound a lot.' (event modifier)
- b. Takusan karam-*ar*-ta.
a.lot wind-Intransitive-Past
'A lot of ivies wound.' (argument modifier)
*‘Some ivy wound a lot.’ (event modifier)

It has been proposed by Kageyama (1993, 1996) that the adverb *takusan* ‘a lot’ can modify either the implicit internal argument or the event itself, which are preferentially available with unaccusative and unergative verbs, respectively. Crucially, in the examples above, both interpretations

seem to be possible with unmarked intransitive verbs (11a and 12a), but the argument modifier interpretation is strongly preferred with marked intransitive verbs (11b and 12b). This indicates that unmarked intransitive verbs can be either unergative or unaccusative, while intransitive verbs marked by the intransitive morphology *-R-* are designated as unaccusative. Second, the *teiru* ‘being’ construction converges on the same conclusion:

(13) **Intransitive twins - the *teiru* construction:**

- a. Syatsu-ga chijim- \emptyset -teiru.
shirt-Nom shrink- \emptyset -Asp
?’A shirt has shrunk.’ (resultative)
‘A shirt is shrinking.’ (progressive)
- b. Syatsu-ga chijim-*ar*-teiru.
shirt-Nom shrink-Intransitive-Asp
‘A shirt has shrunk.’ (resultative)
*‘A shirt is shrinking.’ (progressive)

- (14) a. Tsuta-ga karam- \emptyset -teiru.
ivy-Nom wind- \emptyset -Asp
?’An ivy has wound.’ (resultative)
‘An ivy is winding.’ (progressive)
- b. Tsuta-ga karam-*ar*-teiru.
ivy-Nom wind-Intransitive-Asp
‘An ivy has wound.’ (resultative)
*‘An ivy is winding.’ (progressive)

It is widely known in Japanese that the aspectual morpheme *teiru* ‘being’ has two interpretations, “progressive” and “resultative” interpretations, and the “resultative” interpretation is argued to be only available with unaccusative verbs, but not with unergative verbs (Tsujimura, 1991). The examples above clearly indicate that both interpretations can obtain with unmarked intransitive verbs (13a and 14a), but marked intransitive verbs only allow the “resultative” interpretation (14a and 14b), confirming the unaccusative status of intransitive verbs marked with the intransitive morphology *-R-*. Finally, if only unmarked intransitive verbs can be unergative and the marked intransitive verbs are exclusively unaccusative, non-agentive phrasal idioms should come with marked intransitive verbs, which seems to be borne out:

(15) **Intransitive twins - phrasal idioms:**

- a. John-ga mura-ni tsutaw- $\{\emptyset|*ar\}$ -ta.
John-Nom village-Dat move- $\{\emptyset|Intransitive\}$ -Past
‘John moved to a village.’

- b. Nyuusu-ga mura-ni tsutaw- $\{*\emptyset|\text{ar}\}$ -ta.
news-Nom village-Dat move- $\{\emptyset|\text{Intransitive}\}$ -Past
'News moved to a village (news was transmitted to a village).'
- (16) a. Mary-ga yasum- $\{\emptyset|*\text{ar}\}$ -ta.
Mary-Nom rest- $\{\emptyset|\text{Intransitive}\}$ -Past
'Mary rested.'
- b. Kokoro-ga yasum- $\{*\emptyset|\text{ar}\}$ -ta.
mind-Nom transmit- $\{\emptyset|\text{Intransitive}\}$ -Past
'Mind rested (someone felt relaxed).'

When the surface subjects are volitional (15a and 16a) and the events are interpreted as agentive, unmarked intransitive verbs are employed, while marked intransitive verbs are used with non-agentive interpretations (15b and 16b). These observations taken together, we can make the following generalizations:

- (17) **Generalizations about intransitive twins:**
- a. Unmarked intransitive verbs are either unergative or unaccusative.
 - b. R-marked intransitive verbs are unaccusative.

In this section, we closely examined verb “triplets” in Japanese, whose generalizations can be synthesized as follows: (i) S-marked transitive verbs have Causer external arguments, (ii) R-marked intransitive verbs have no external arguments, hence unaccusative, and (iii) unmarked verbs optionally have Agent external arguments. These generalizations collectively suggest that transitivity morphology (-S-, -R-, as well as - \emptyset -) should not be relegated as contextual allomorphy (Miyagawa, 1998; Nishiyama, 1998; Harley, 2008), but reflected in the syntax. In the next section, we implement the syntax of transitivity morphology as Voice.

3 Proposal

In this section, after theoretical assumptions of the “constructionist” approach to argument structure are introduced within the framework of Distributed Morphology (Section 3.1), we propose the system of Voice to explain the syntax of transitivity alternations (Section 3.2). The prediction about little *v* is also discussed (Section 3.3).

3.1 Theoretical assumptions

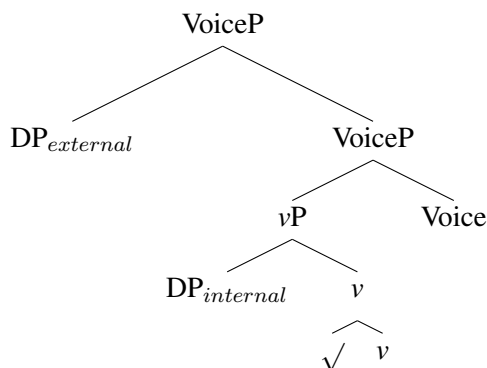
We adopt the syntactic “constructionist” approach to argument structure (Schafer, 2008; Marantz, 2013b; Wood, 2015; Alexiadou et al., 2015) couched within the framework of Distributed Morphology (Halle and Marantz, 1993). Under this approach, there are two primary building blocks of argument structures, functional heads and lexical roots, where various combinations of functional

heads build skeletal argument structures that roots lexically modify, unlike the “projectionist” approach (see Borer, 2005, for a summary of “constructionist” and “projectionist” approaches). In particular, the following set of theoretical assumptions will be made throughout this paper:

- (18) **Theoretical assumptions of the “constructionist” approach:**
- a. Functional heads build skeletal argument structures.
 - b. Roots are lexical semantic “modifiers” of argument structures.
 - c. Functional heads and lexical roots jointly determine event interpretations.

There are two important functional heads repeatedly proposed in the literature (see Alexiadou et al., 2006, 2015, for a summary): Voice and little *v*. First, Voice is the functional head that specifies the presence/absence of external arguments, as well as their thematic interpretations (Kratzer, 1996). Second, little *v* is the functional head that verbalizes roots and introduces events (Marantz, 1997). The core argument structure can be constructed from Voice and little *v*, as represented in (19):

- (19) **Core argument structure (head-final order):**



In this structure, external arguments (i.e. $DP_{external}$) are introduced by Voice and, since there is only one little *v*, this argument structure represents a single event. Roots adjoin to little *v* as “modifier” and lexically specifies this event. In the next subsection, we introduce several variants of Voice and explain transitivity alternations in Japanese.

3.2 Voice

Based on detailed examinations of argument structures in German (Schafer, 2008), Icelandic (Wood, 2015), and Hebrew (Kastner, 2016), three types of Voice have been proposed with respect to the presence/absence of external arguments:⁵

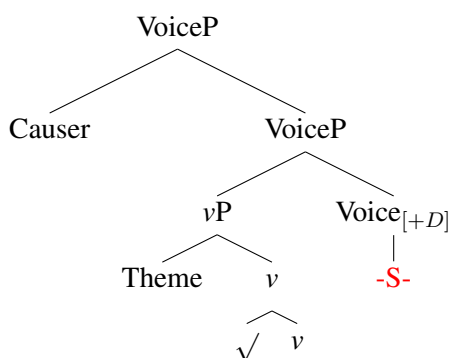
⁵Jim Wood (personal communication) suggests that, although [+D] resembles EPP, the [+D] feature specification is different from EPP in that (i) [+D] specifies the syntactic category as DP and (ii) [+D] only conditions External Merge (i.e. base generation), not Internal Merge (i.e. movement).

(20) **Voice:**

- a. Voice_[+D]: Specified as the obligatory presence of DP in SpecVoice.
- b. Voice_[-D]: Specified as the obligatory absence of DP in SpecVoice.
- c. Voice: Underspecified regarding the presence/absence of DP in SpecVoice.

This typology of Voice slightly diverges from Schafer (2008) and Wood (2015) in that the underspecified variant of Voice is included, which may or may not introduce an external argument (cf. Kastner, 2016). However, this typology is straightforwardly expected if features are bivalent, not privative (Harbour, 2011): bivalent features allow the three-way distinction ([+F], [-F], and \emptyset), while privative features only permit the two-way distinction ([F] and \emptyset). Here, three types of Voice naturally follow corresponding to three different feature specifications ([+D], [-D], and \emptyset), unless otherwise stipulated. In the rest of this subsection, we propose that the transitivity morphology in Japanese is best analyzed as Voice differently specified regarding external arguments. Remember importantly for the purpose here that this typology of Voice has been motivated crosslinguistically, independently of Japanese.

First, we propose that the transitive morphology **-S-** is Voice_[+D], which explains the first half of Jacobsen’s generalization (4) that the transitive morphology **-S-** only occurs in the transitive paradigm:

(21) **Argument structure of marked transitive verbs:**

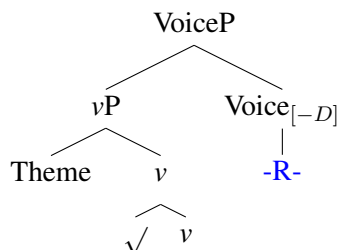
According to the generalization in (9), the external argument introduced by the transitive morphology **-S-** is Causer, which requires Theme to undergo the change of state, ensuring that unergative verbs are unattested with the transitive morphology **-S-**. Although the compositional semantic derivation is beyond the scope of this paper, the denotation of Voice_[+D] is defined as follows:⁶

$$(22) \quad \llbracket \text{Voice}_{[+D]} \rrbracket = \lambda x \lambda e. \text{Causer}(x, e)$$

⁶For the semantic derivations, see the parallel analyses of Hebrew “causative” (Voice_[+D]), “middle” (Voice_[-D]), and “simple” (Voice) templates in Kastner (2016), built on Doron (2003) and Alexiadou and Doron (2012).

Second, in the same vein, we propose that the intransitive morphology **-R-** is $\text{Voice}_{[-D]}$, which captures the second half of Jacobsen’s generalization (4) that the intransitive morphology **-R-** only occurs in the intransitive paradigm:

(23) **Argument structure of marked intransitive verbs:**

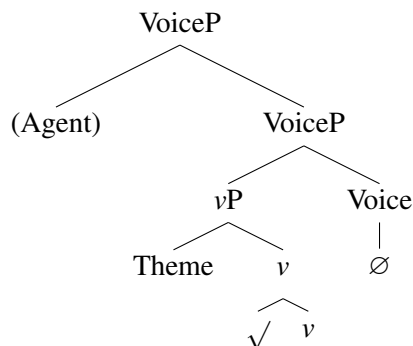


This structure captures the generalization in (17) that **R-**marked intransitive verbs are unaccusative, in which Theme must move to SpecTP to satisfy EPP and becomes the surface subject. Since the external argument is obligatorily suppressed, the denotation of $\text{Voice}_{[-D]}$ is specified as an identity function:

$$(24) \llbracket \text{Voice}_{[-D]} \rrbracket = \lambda P_{\langle s,t \rangle} . P$$

Finally, we argue that the zero morphology $-\emptyset-$ is the underspecified variant of Voice:

(25) **Argument structure of unmarked verbs:**



Since the default Voice is underspecified regarding the presence/absence of external arguments, the external argument is optional, explaining the fact that unmarked verbs can be both transitive/unergative (with external arguments) and unaccusative (without external arguments). Furthermore, the generalization in (9) suggests that the optional external argument introduced by the default Voice is Agent, hence the following denotation:⁷

⁷However, the external arguments of unmarked intransitive verbs (e.g. *syatsu* ‘shirt’) indicate that Agent is not accurate. Generalized θ -roles such as “Initiator” (Folli and Harley, 2008) or “Effector” (Koontz-Garboden, 2009) might be more appropriate.

$$(26) \quad \llbracket \text{Voice} \rrbracket = \lambda x \lambda e. \text{Agent}(x, e) / \llbracket \text{Voice} \rrbracket = \lambda P_{\langle s, t \rangle}. P$$

This then predicts that the same unmarked verbs can be used as both transitive and intransitive verbs (i.e. the so-called *labile* transitivity alternation; Haspelmath, 1993). This prediction is borne out by the following examples:

(27) **Labile:**

- a. John-ga doa-o **hirak**- \emptyset -ta.
John-Nom door-Acc open- \emptyset -Past
'John opened the door.'
- b. Doa-ga **hirak**- \emptyset -ta.
door-Nom open- \emptyset -Past
'The door opened.'
- c. John-ga doa-o **tozi**- \emptyset -ta.
John-Nom door-Acc close- \emptyset -Past
'John closed the door.'
- d. Doa-ga **tozi**- \emptyset -ta.
door-Nom close- \emptyset -Past
'The door closed.'

There are several unmarked verbs in Japanese that undergo labile transitivity alternations. For example, the same unmarked verbs *hirak*- \emptyset -*u* 'open' (27a and 27b) or *tozi*- \emptyset -*ru* 'close' (27c and 27d) can be used both transitively and intransitively, confirming the prediction above. This fact also suggests that the default Voice proposed here underlies labile transitivity alternations in English (e.g. *open*, *close*, etc.).

Furthermore, we propose that the "ambivalent" morphology **-E-** is the overt counterpart of the underspecified Voice, consistent with the "ambivalent" (transitive or intransitive) nature of **-E-**. This proposal predicts that unmarked and **E**-marked transitive/intransitive verbs behave similarly relative to marked transitive/intransitive verbs, which appears to be borne out:⁸

(28) **Marked transitive twins - Causer:**

- a. **Uso-ga** hana-o nob- $\{ *e|as \}$ -ta.
lie-Nom nose-Acc extend- $\{ \text{Ambivalent} | \text{Transitive} \}$ -Past
'A lie extended someone's nose.'
- b. **Taifuu-ga** iwa-o dok- $\{ *e|as \}$ -ta.
typhoon-Nom rock-Acc displace- $\{ \text{Ambivalent} | \text{Transitive} \}$ -Past
'A typhoon displaced a rock.'

⁸Interestingly, Kageyama (1996) argued that the "ambivalent" morphology **-E-** signals "reflexivization", suggesting that unmarked and **E**-marked transitive/intransitive verbs are not exactly the same (see also Suga, 1980; Kitagawa and Fujii, 1999). Whether the zero morphology and the "ambivalent" morphology are different realizations of the same default Voice remains to be further investigated.

(29) **Marked intransitive twins - the *takusan* construction:**

- a. Takusan korog-**e**-ta.
 a.lot roll-Ambivalent-Past
 ?‘A lot of balls rolled.’ (argument modifier)
 ‘Some ball rolled a lot.’ (event modifier)
- b. Takusan korog-**ar**-ta.
 a.lot roll-Intransitive-Past
 ‘A lot of balls rolled.’ (argument modifier)
 *‘Some ball rolled a lot.’ (event modifier)

There exist few verb “triplets” with marked transitive/intransitive twins (one with the “ambivalent” morphology and another with the transitive/intransitive morphology). Notice here that **E**-marked transitive/intransitive verbs behave like unmarked transitive/intransitive verbs (cf. the examples in 6 and 11).

In summary, this subsection proposed the Voice system in which the transitive morphology **-S-**, the intransitive morphology **-R-**, and the zero/“ambivalent” morphology **-E-** realize Voice_[+D], Voice_[-D], and Voice, respectively.⁹

3.3 Little *v*

Transitivity morphology in Japanese has been identified as little *v* (Harley, 2008; Marantz, 2013a), but given our proposal that transitivity morphology is Voice morphology, little *v* is now vacated. The prediction then is that little *v* morphology should be attested between roots and transitivity morphology. In fact, as independently pointed out by de Chene (2016b), some verbal stems identified by Jacobsen (1992) are morphologically complex. First, there are some deadjectival verbs:

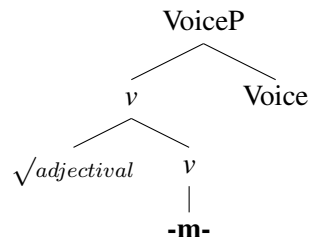
(30) **Deadjectival verbs:**

- a. huka-**m**-{**e**|**ar**}-u
 deep-*v*-{Ambivalent|Intransitive}-Pres
 ‘deepen/become deep.’
- b. taka-**m**-{**e**|**ar**}-u
 high-*v*-{Ambivalent|Intransitive}-Pres
 ‘highten/become high.’

⁹This three-way distinction is consistent with the diachronic arguments made by Frellesvig and Whitman (2016), who argue that (i) the transitive morphology **-S-** is etymologically the verb *su* ‘do’, (ii) the intransitive morphology **-R-** is etymologically the verb *ar* ‘be’, and (iii) the “ambivalent” morphology **-E-** is etymologically the verb *e* ‘get’. The connection between the “ambivalent” morphology and the verb *e* ‘get’ makes sense, given that the verb *get* in English is also “ambivalent”, between *get*-causative and *get*-passive (Haegeman, 1985).

These deadjectival verbs are built from the adjectival roots, independently appeared as adjectives (e.g. *huka-i* ‘deep’, *taka-i* ‘high’), followed by the verbalizing morpheme **-m-**. We argue that little *v* is overtly realized as **-m-**, when adjoined by adjectival roots:

(31) **Little *v* adjoined by adjectival roots:**



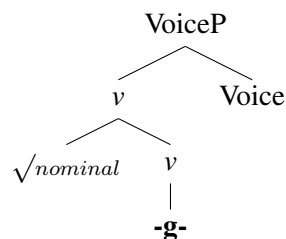
Second, there are several denominal verbs (cf. de Chene, 2016b):¹⁰

(32) **Denominal verbs:**

- a. *tuna-g-*{ \emptyset |**ar**}-*u*
rope-v-{ \emptyset |Intransitive}-Pres
 ‘connect’
- b. *mata-g-*{ \emptyset |**ar**}-*u*
crotch-v-{ \emptyset |Intransitive}-Pres
 ‘straddle’

In the same way, these denominal verbs are constructed from the nominal roots, independently attested as nouns (e.g. *tuna* ‘rope’, *mata* ‘crotch’), followed by the verbalizing morpheme **-g-**. This verbalizing morpheme should be the overt realization of little *v* adjoined by nominal roots:

(33) **Little *v* adjoined by nominal roots:**



¹⁰Harley (2008), credited to Yosuke Sato (personal communication), points out that Japanese psychological verbs unexceptionally contain the morpheme **-gar-**, such as *samu-gar* ‘feel cold’, *atsu-gar* ‘feel hot’, and *kowa-gar* ‘fear’. Given that the roots in psychological verbs are all adjectival, not nominal, whether the morpheme **-gar-** should be decomposed into the verbalizing morpheme **-g-** and the intransitive morphology **-R-** remains to be explored.

To recapitulate, this subsection has shown that some verbal stems in Jacobsen (1992) are morphologically complex and little *v* is overtly realized in Japanese between roots and transitivity morphology, when adjoined by adjectival or nominal roots.

In this section, we proposed the system of Voice to explain the syntax of transitivity alternations in Japanese. Three types of Voice were argued to be overtly realized by the transitive **-S-**, intransitive **-R-**, and “ambivalent” **-E-** morphology, respectively. Furthermore, we showed that the overt realizations of little *v* are independently attested in the structure between roots and Voice in deadjectival and denominal verbs.¹¹

4 Empirical Extensions

In this section, the empirical domain of investigations will be extended to ditransitive verbs (Section 4.1), “figure ditransitive” verbs (Section 4.2), and syntactic causatives/passives (Section 4.3), where transitive **-S-** and intransitive **-R-** morphology also appear.

4.1 Ditransitive verbs

As noticed by Volpe (2005), some “transitive-intransitive” verb pairs in Jacobsen (1992) are actually ditransitive-transitive verb pairs: the “transitive” morphology **-se-** derives ditransitive verbs:

(34) **‘pour’:**

- a. John-ga syawaa-o abi- \emptyset -ta.
John-Nom shower-Acc pour- \emptyset -Past
‘John poured a shower over himself.’
- b. John-ga **Mary-ni** syawaa-o abi-**se**-ta.
John-Nom Mary-Dat shower-Acc pour-Transitive-Past
‘John poured a shower over Mary.’

(35) **‘put on’:**

- a. John-ga bousi-o kabu- \emptyset -ta.
John-Nom cap-Acc put.on- \emptyset -Past
‘John put a cap on himself.’

¹¹Richard Kayne (personal communication) correctly pointed out that, given three variants of Voice and little *v*, nine possible combinations are logically predicted:

	Voice	Voice _[+D]	Voice _[-D]
<i>v</i>	✓	✓	✓
<i>v</i> _{adjectival}	✓	*	✓
<i>v</i> _{nominal}	✓	*	✓

Interestingly, this prediction is not born out; that is, the combinations of *v*_{adjectival}/*v*_{nominal} and Voice_[+D] are not attested. These “paradigm gaps” will be left for future research.

- b. John-ga **Mary-ni** bousi-o kabu-se-ta.
 John-Nom Mary-Dat cap-Acc put.on-Transitive-Past
 ‘John put a cap on Mary.’

(36) ‘get on’:

- a. John-ga kuruma-ni no- \emptyset -ta.
 John-Nom car-P get.on- \emptyset -Past
 ‘John got on a car.’
- b. John-ga **Mary-o** kuruma-ni no-se-ta.
 John-Nom Mary-Acc car-P get.on-Transitive-Past
 ‘John let Mary get on a car.’

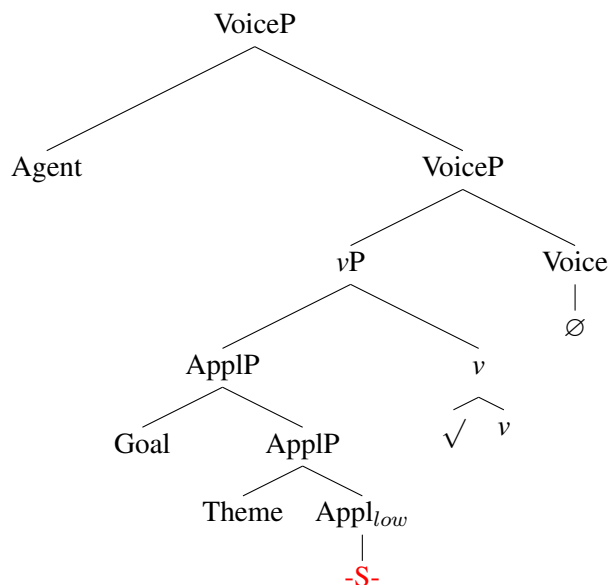
(37) ‘approach’:

- a. John-ga ki-ni yo- \emptyset -ta.
 John-Nom tree-P approach- \emptyset -Past
 ‘John approached a tree.’
- b. John-ga **Mary-o** ki-ni yo-se-ta.
 John-Nom Mary-Acc tree-P approach-Transitive-Past
 ‘John let Mary approach a tree.’

Interestingly, there appear to be two types of ditransitive-transitive verb pairs. In the examples (34 and 35), the dative DPs marked by *-ni* appear to be introduced by the transitive morphology *-se-*. In the examples (36 and 37), in contrast, the obligatory PPs marked by *-ni* occur by default, and the accusative DPs marked by *-o* are introduced by the transitive morphology. Because the obligatory presence of PPs is the defining property of “figure reflexive” verbs (Wood, 2014), we only call the former type genuine ditransitive verbs, and name the latter type “figure ditransitive” verbs to be analyzed in the next subsection.

Ditransitive verbs have been previously analyzed with Appl(icative) heads, and Pykkänen (2002, 2008) explicitly proposed that there are two types of Appl: Appl_{low} and Appl_{high}. Appl_{low} associates one DP complement with another DP in SpecAppl, whereas Appl_{high} predicates a VP complement of a DP in SpecAppl. Importantly for the purpose here, Pykkänen (2008) argued based on several applicative diagnostics (applicativized unergative verbs, applicativized stative verbs, and predicative modification) that Japanese is the language that employs Appl_{low}, though covertly (cf. Miyagawa and Tsujioka, 2004). Following this line of research, we propose that Appl_{low} in Japanese can be overtly realized as the transitive morphology *-S-*. In particular, the ditransitive verbs have the following argument structure, in which the Goal argument is applied by Appl_{low}, while the Agent argument is introduced by the default Voice:¹²

¹²Given the head-final order, head movement of Appl_{low} though little *v* to Voice generates the following complex head via left adjunction (Kayne, 1994), which can map to the correct linear order (Mirror Principle; Baker, 1985):

(38) **Marked ditransitive verbs (derived from unmarked transitive):**

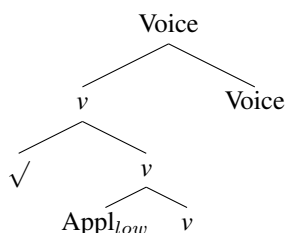
The proposed argument structure makes two predictions. First, if the transitive morphology **-S-** is the overt realization of $Appl_{low}$, unergative and stative verbs should be incompatible (Pyllkänen, 2008). This prediction is trivially borne out by the fact that the verbs in the examples (34 and 35) are neither unergative nor stative. Second, since the external argument introduced by Voice is Agent, Causer external arguments should be unacceptable. This prediction is also borne out by the following example, in which the external argument is Causer:

- (39) * Suimin-ga Mary-ni akumu-o mi-se-ta.
 sleep-Nom Mary-Dat nightmare-Acc see-Transitive-Past
 ‘Sleep showed a nightmare to Mary.’

This observation confirms that the transitive morphology **-S-** is $Appl_{low}$, and the Agent external argument is introduced by the default Voice.

Now one may wonder whether the opposite ditransitive-transitive alternation is observed; namely, ditransitive verbs are unmarked, whereas transitive verbs are marked by the intransitive morphology **-R-**. In this respect, observe the following examples:

i.



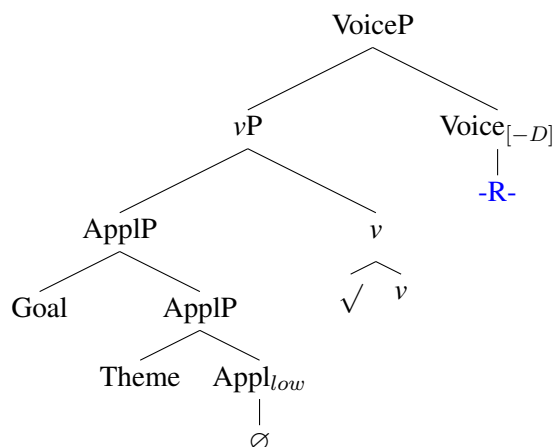
(40) ‘keep’:

- a. Mary-ga kaban-o azuk-**ar**-ta.
Mary-Nom bag-Acc keep-Intransitive-Past
‘Mary kept a bag (from someone)’
- b. **John-ga** Mary-ni kaban-o azuk-**e**-ta.
John-Nom Mary-Dat bag-Acc keep-Ambivalent-Past
‘John entrusted a bag to Mary.’

(41) ‘learn’:

- a. Mary-ga nihongo-o osow-**ar**-ta.
Mary-Nom Japanese-Acc learn-Intransitive-Past
‘Mary learned Japanese (from someone)’
- b. **John-ga** Mary-ni nihongo-o osi-**e**-ta.
John-Nom Mary-Dat Japanese-Acc learn-Ambivalent-Past
‘John taught Japanese to Mary.’

In the examples (40 and 41), the transitive verbs are derived by the intransitive morphology **-R-** and the ditransitive counterparts are marked by the “ambivalent” morphology **-E-** here proposed as the overt realization of the default Voice. The argument structure can be assigned as follows:

(42) **Marked transitive verbs (derived from unmarked ditransitive):**

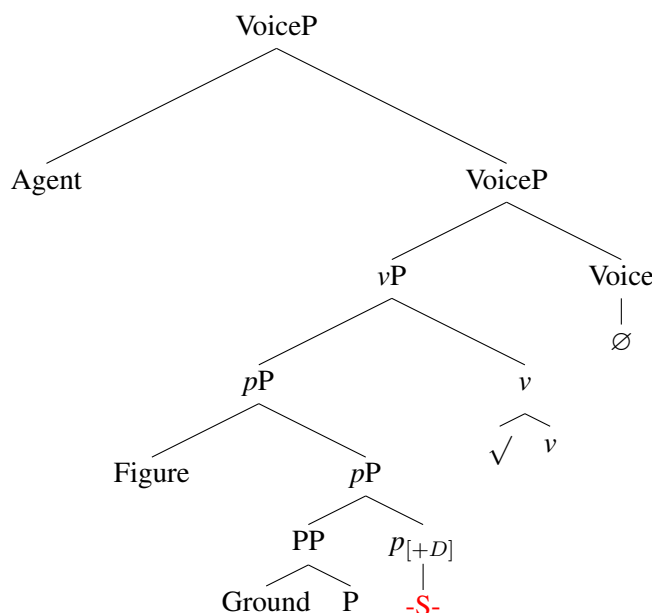
This is the “ditransitive unaccusative” structure reminiscent of psychological verbs (Belletti and Rizzi, 1988; Pesetsky, 1995), in which the highest argument (Goal, in this case) eventually moves to SpecTP because of EPP. This further expects that psychological verbs in Japanese are derived by the intransitive morphology **-R-**, where the Experiencer argument is base-generated low and moves up to SpecTP. This seems to be correct, as suggested by the morpheme **-gar-** of the examples in Footnote 10, but remains to be investigated in future.

4.2 “Figure ditransitive” verbs

The verbs in the examples (36a and 37a) are called “figure reflexive” verbs, because “the subject bears an external agentive θ -role and is also understood as a ‘figure’ with respect to a spatial ‘ground’, in the sense of Talmy (1985)” (Wood, 2014, p.1387). According to Svenonius (2003), the Figure is “the entity in motion or at rest which is located with respect to the Ground”, while the Ground is “location with respect to which the figure is located”.

Svenonius (2003, 2007) proposed little p as the functional head specified regarding the presence/absence of Figure external arguments in the prepositional domain, selecting PP whose complement is Ground. Following the analysis of “figure reflexive” verbs in Wood (2014), where the argument structure of “figure reflexive” verbs involves little $p_{[-D]}$ that obligatorily suppresses the external argument, we propose that “figure ditransitive” verbs (36b and 37b) are derived by little $p_{[+D]}$ overtly realized as the transitive morphology **-S-**:

(43) Marked “figure ditransitive” verbs (derived from unmarked “figure reflexive”):



There is independent evidence that the phrases marked by *-ni* are PPs, not dative DPs. Sadakane and Koizumi (1995) argued that there are two types of *-ni* in Japanese, postposition *-ni* and dative *-ni*, and quantifier floating is only compatible with the dative *-ni*. The phrases marked by *-ni* in the “figure reflexive” examples (36a and 37a) seem to be unacceptable with quantifiers floated:

(44) Quantifier floating with “figure reflexive” verbs:

- a. * John-ga kuruma-ni **san-dai** no- \emptyset -ta.
 John-Nom car-P three-Cl get.on- \emptyset -Past

- ‘John got on three cars.’
- b. * John-ga ki-ni **san-bon** yo- \emptyset -ta.
 John-Nom tree-P three-Cl approach- \emptyset -Past
 ‘John approached three trees.’

This strongly suggests that the phrases marked by *-ni* are PPs and the transitive morphology *-S-* is the overt realization of little $p_{[+D]}$ that obligatorily introduces the Figure external argument.

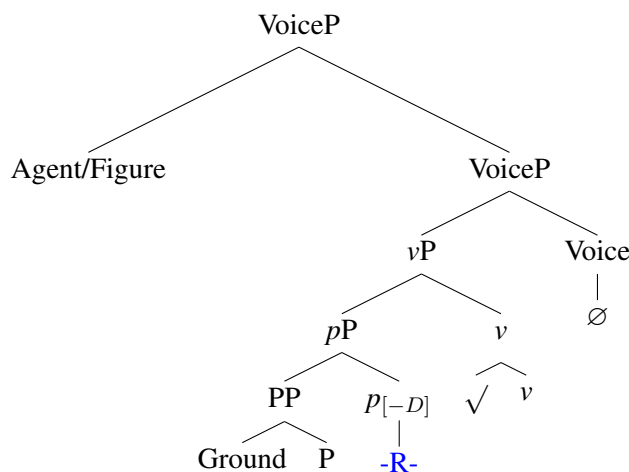
Given that *-st* in Icelandic is overt (Wood, 2014), can little $p_{[-D]}$ be overtly realized? The answer seems to be positive, as evidenced by the following examples:

(45) **Marked “figure reflexive” verbs:**

- a. John-ga seki-o kaw-**ar**-ta.
 John-Nom seat-Acc change-Intransitive-Past
 ‘John changed his seat’
- b. John-ga daigaku-o utsu-**r**-ta.
 John-Nom university-Acc move-Intransitive-Past
 ‘John moved his university.’

These examples have been called “unaccusative transitive” by Hasegawa (2001, 2004). Although the Acc object needs some explanation, they count as “figure reflexive” according to Wood’s (2014) definition above: the surface subject is both Agent and Figure with respect to Ground expressed by the object. Importantly, the “figure reflexive” verbs in the examples (45) are marked by the intransitive morphology *-R-*, whose argument structure can be represented as follows:

(46) **Marked “figure reflexive” verbs (derived from unmarked “figure ditransitive”):**



In this structure, the Figure θ -role semantically introduced by $p_{[-D]}$ is “passed up” to SpecVoice and the external argument satisfies both Agent and Figure θ -roles at the same time (the so-called “delayed gratification”; Myler, 2016). See Wood (2014) for detailed syntactic/semantic derivations.

4.3 Syntactic causatives/passives

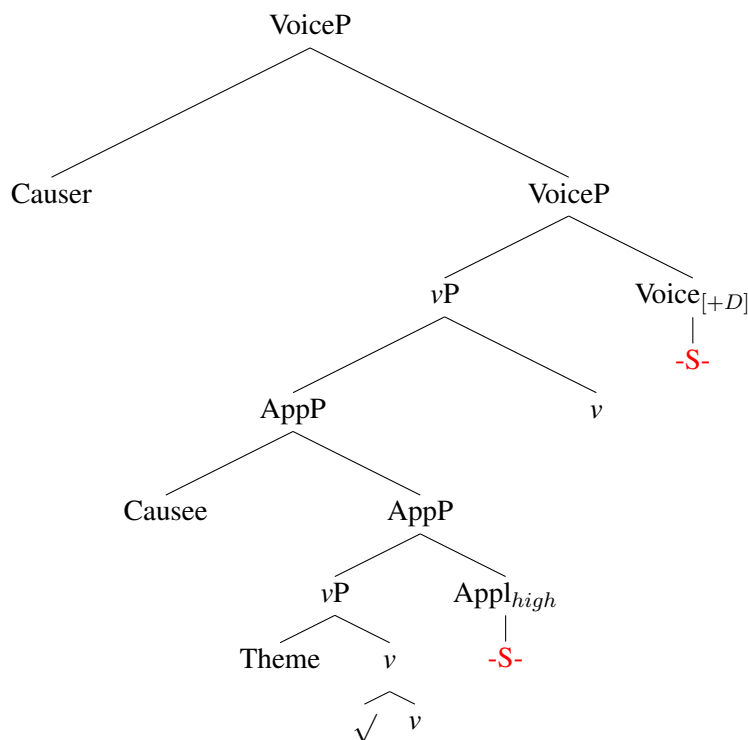
This subsection speculates how the proposed system can extend to syntactic causatives and passives. First, the syntactic causatives in Japanese have been extensively described, and morphologically marked by the causative morphology *-sase-* (Shibatani, 1973; Miyagawa, 1984, 1998, 1999):

(47) **Syntactic causatives in Japanese:**

- a. Mary-ga syasin-o mi- \emptyset -ta.
Mary-Nom picture-Acc see-Transitive-Past
'Mary saw a picture.'
- b. John-ga Mary-ni syasin-o mi-*sase*-ta.
John-Nom Mary-Dat picture-Acc see-Causative-Past
'John made Mary see a picture.'

It has been pointed out in the literature that apparent similarity between the causative morphology *-sase-* and the transitive morphology *-S-* should not be accidental (Miyagawa, 1984, 1998, 1999; Nishiyama, 1998; Harley, 2008). Building on this insight, we suggest that the causative morphology *-sase-* should be morphologically decomposed into two occurrences of the transitive morphology *-S-*. The argument structure of syntactic causatives would be represented as follows, in which $\text{Voice}_{[+D]}$ and Appl_{high} are combined (Pykkänen, 2008):

(48) **Argument structure of syntactic causatives:**



In this structure, the Causer external argument is introduced by $\text{Voice}_{[+D]}$, whereas the Causee argument is applied by Appl_{high} . The prediction here is that, since the external argument is now introduced by $\text{Voice}_{[+D]}$, the Causer external argument should be possible. This prediction seems to be on the right track, as indicated by the following causative example minimally different from the ditransitive example in (39), repeated below:

(49) **Causative vs. ditransitive - Causer:**

- a. Suimin-ga Mary-ni akumu-o mi-**sase**-ta.
sleep-Nom Mary-Dat nightmare-Acc see-Causative-Past
'Sleep made Mary see a nightmare.'
- b. * Suimin-ga Mary-ni akumu-o mi-**se**-ta.
sleep-Nom Mary-Dat nightmare-Acc see-Transitive-Past
'Sleep showed a nightmare to Mary.'

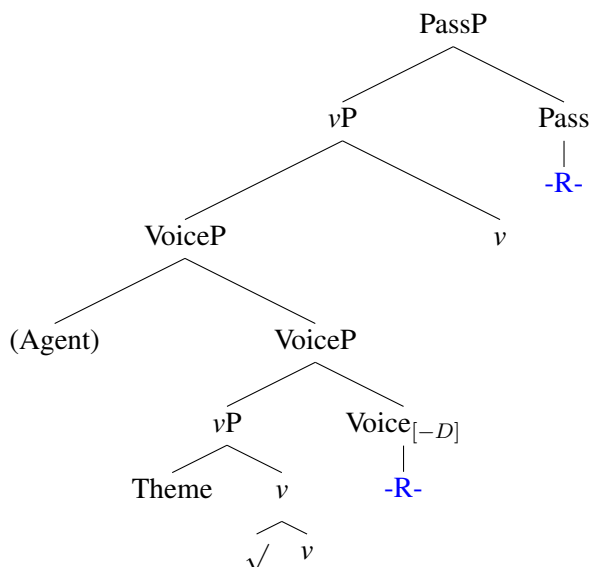
Furthermore, on the assumption that the functional heads which introduce external arguments (e.g. $\text{Voice}_{[+D]}$) are the relevant locality domain (McGinnis, 2001), the long-standing generalization that syntactic causatives, as opposed to lexical causatives (i.e. transitive verbs marked by the transitive morphology), are "biclausal" nicely follows for free (Harley, 2008).

Second, the syntactic passives in Japanese have also drawn attention, and morphologically marked by the passive morphology **-rare-** (Kuroda, 1979; Kitagawa and Kuroda, 1992; Hoshi, 1999):

(50) **Syntactic passives in Japanese:**

- a. Mary-ga ringo-o tabe- \emptyset -ta.
Mary-Nom apple-Acc eat- \emptyset -Past
'Mary ate an apple.'
- b. Ringo-ga (Mary-ni) tabe-**rare**-ta.
apple-Nom Mary-by eat-Passive-Past
'An apple was eaten (by Mary).'

In the same way as syntactic causatives, we suggest that the passive morphology **-rare-** is morphologically decomposed into two instances of the intransitive morphology **-R-**. Specifically, the argument structure of syntactic passives is built from $\text{Voice}_{[-D]}$ and Pass(ive) (Collins, 2005; Bruening, 2013) as follows:

(51) **Argument structure of syntactic passives:**

Pass, like $\text{Voice}_{[-D]}$, obligatorily suppresses DPs in SpecPass , but existentially binds external arguments semantically (Bruening, 2013). In addition, assuming that the functional heads which do not introduce external arguments (e.g. $\text{Voice}_{[-D]}$) can become the relevant locality domain (Legate, 2003), the “biclausal” nature of syntactic passives may also follow. However, the question remains where optional external arguments marked by *-ni* ‘by’ are introduced, because SpecVoice and SpecPass are both unavailable. Here, we simply point out that the passive morphology must be able to introduce some arguments as in adversity passives (Kuroda, 1979).

In this section, we extended the empirical domain to the broader range of Japanese argument structures. Specifically, ditransitive verbs, “figure ditransitive” verbs, and syntactic causatives/passives were explored, in which transitive *-S-* and intransitive *-R-* morphology realize various argument-introducing functional heads such as *Appl*, little *p*, and *Pass*.

5 Theoretical Consequences

In this section, we discuss several theoretical consequences concerning lexical vs. syntactic approaches to argument structure (Section 5.1), the distinctness of *Voice* and little *v* (Section 5.2), and the unification of argument-introducing functional heads (Section 5.3).

5.1 Lexical vs. syntactic approaches to argument structure

In the lexicalist tradition, Miyagawa (1984) influentially proposed the Paradigmatic Structure (PDS) as an organizing principle of verbs in the lexicon. For example, the transitive-intransitive verb pairs like *mawas-u* vs. *mawar-u* ‘turn’ are stored in the PDS as follows:

Intransitive	Transitive	Ditransitive
<i>mawar-u</i> ‘turn _{intr} ’	<i>mawas-u</i> ‘turn _{tr} ’	
	<i>mawar-ase-ru</i> ‘make turn _{intr} ’	

Table 4: Paradigmatic Structure (Miyagawa, 1984)

Miyagawa (1984) then argued that these transitive/intransitive verbs can get the PDS status for free and enter the PDS, while the syntactic causative of the intransitive verb like *mawar-ase-ru* ‘make turn’ is “blocked” from entering the PDS because the transitive verb already fills the “Transitive” slot in the PDS.

However, verb “triplets” examined in this paper pose several problems to the PDS. Given that multiple transitive/intransitive verbs can be derived from the same roots, it is not clear which variant should enter the PDS. For example, the two transitive verbs, unmarked (e.g. *kir-Ø-u/nuk-Ø-u*) and marked (e.g. *kir-as-u/nuk-as-u*), can be built from the same roots (e.g. *kir* ‘cur’/*nuk* ‘pull’), one of which must be outside the PDS. This problem becomes serious when considering empirical predictions of the PDS; e.g. lexical processes such as idioms are only available with the verbs in the PDS. In the examples (7b and 8b), marked transitive verbs can be idioms, which suggests that marked, but not unmarked, transitive verbs are in the PDS. This then predicts that unmarked transitive verbs should not be idioms, contrary to the fact (e.g. *kubi-o kir-Ø-u* ‘fire’, *te-o nuk-Ø-u* ‘scamp’).

Furthermore, verb “triplets” also suggest that lexical semantic approaches to argument structure are not tenable. Kageyama (1996) proposed several lexical operations on verbs in the lexicon. For instance, transitivity triggered by the transitive morphology *-S-* operates on unmarked intransitive verbs to derive transitive verbs, while intransitivity associated with the intransitive morphology *-R-* works in the opposite direction. Derivational directionality of these lexical operations implicitly assumes transitive-intransitive verb pairs, but this assumption does not hold for verb “triplets”. Specifically, if marked intransitive verbs are derived from unmarked transitive verbs via intransitivity, then marked transitive verbs are also derived from unmarked transitive verbs via transitivity, overgenerating impossible ditransitive verbs.

Additionally, verb “triplets” effectively revealed the division of labor between lexical roots and functional heads, as debated between Kageyama (1996) and Matsumoto (2000). Notice that verb “triplets” allow us to keep lexical roots constant and vary functional heads, generating bona fide minimal pairs to isolate the unique contribution of functional heads. The observations that multiple transitive/intransitive verbs sharing the same roots behave differently regarding external arguments strongly suggest that argument structures are syntactically “constructed” of functional heads, not lexically “projected” from roots. Specifically, roots must be severed from external arguments and their thematic roles, corroborating the syntactic approach to argument structure.

Taken together, these points may indicate that more weight should be put on functional heads, rather than lexical roots, concluding that argument structures are best analyzed with the syntactic “constructionist” approach.

5.2 On the distinctness of Voice and little v

It has been widely accepted that the traditional VP is decomposed into the lexical layer and the functional layer (i.e. the split VP hypothesis), as argued by Kratzer (1996) and Marantz (1997). Pylkkänen (2002, 2008) originally argued that the functional layer consists of (at least) two functional heads: Voice and little v . Voice specifies the presence/absence of external arguments, while little v introduces different types of events (e.g. causative, inchoative, etc.), as well as verbalizes roots. This so-called split Voice/ v hypothesis, Root- v -Voice, has been further supported crosslinguistically by Harley (2013) and Legate (2014).

Our proposal that transitivity morphology such as **-S-** and **-R-** is Voice morphology, combined with overt realizations of little v in deadjectival (30) and denominal (32) verbs between roots and Voice, further corroborates the distinctness of Voice and little v . In addition, although the transitivity morphology has been previously analyzed as “causative” and “inchoative” flavors of little v (Harley, 2008; Marantz, 2013a), there are several reasons to doubt this analysis. First, in the examples (34 and 35), the transitive morphology **-S-** was attached to unmarked transitive verbs to generate marked ditransitive verbs. Since the unmarked transitive verbs are already “causative”, the transitive morphology **-S-** should not signal the “causative” event. Second, in the examples (40 and 41), the intransitive morphology **-R-** was added to unmarked ditransitive verbs to derive marked transitive verbs. Because the marked transitive verbs are not merely “inchoative”, but “causative” in nature, the intransitive morphology **-R-** should not mark the “inchoative” event, either.

5.3 The unification of argument-introducing functional heads

Now the resultant inventory of argument-introducing functional heads can be summarized below:

Transitive morphology -S-	Intransitive morphology -R-
Voice _[+D]	Voice _[-D]
Little p _[+D]	Little p _[-D]
Appl _{low}	Pass
Appl _{high}	

Table 5: Inventory of argument-introducing functional heads

Now one important theoretical question arises whether these functional heads can be unified. We would like to suggest that, following Wood and Marantz (2017), these argument-introducing heads can be unified under the abstract functional head i^* :

(52) **Argument-introducing functional heads:**

- a. $i^*_{[+D]}$: **-S-**
- b. $i^*_{[-D]}$: **-R-**
- c. i^* : **-E-**

There are three types of i^* : $i^*_{[+D]}$, $i^*_{[-D]}$, and the default i^* underspecified regarding external arguments. Consequently, the traditionally proposed functional heads like Voice, Appl, etc. are mere descriptive labels and their semantic denotations are determined contextually based on syntactic categories of complements, leading to the substantial simplification of theories of argument structures. Inversely speaking, the fact that Japanese morphologically draws the overt distinction between the obligatory presence/absence of external arguments show that this unification is in the right direction.

6 Conclusion

In this paper, we first reviewed transitivity alternations in Japanese with special focus on transitive-intransitive verb “pairs” documented by Jacobsen (1992) and pointed out that the contributions of lexical roots and functional heads cannot be distinguished based exclusively on verb pairs. In order to resolve this problem, we closely examined hitherto unexplored verb “triplets” and made generalizations about transitivity morphology concerning (i) the interpretation of external arguments and (ii) unaccusativity. Then, following the “constructionist” approach to argument structure couched within Distributed Morphology, we proposed that transitivity morphology in Japanese is best analyzed as Voice morphology differently specified regarding the presence/absence of external arguments and explained the generalizations about transitivity morphology. The proposed Voice system was further extended to the broader domain of Japanese argument structures such as ditransitive verbs, “figure ditransitive” verbs, and syntactic causatives/passives. Several theoretical consequences were also discussed.

One crosslinguistic implication of this paper is that Japanese overtly realizes different variants of Voice, even though the functional heads themselves remained covert in German (Schafer, 2008) and Icelandic (Wood, 2015). In this respect, Japanese is more similar to Greek and Hebrew (Alexiadou and Doron, 2012; Spathas et al., 2015; Kastner, 2016) in that the space of Voice is morphologically carved out. This converging result from typologically unrelated languages supports the trivalency of Voice. Moreover, to the extent that the constructionist approach to argument structure is successful and the analyses presented in this paper are on the right track, the syntactic approach to morphology should be correct, where there is only one computational engine to build complex “words” and phrases/sentences (Koopman and Szabolcsi, 2000; Koopman, 2005).

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