How to Label {H, H}: A View from Lexical V-V Compounds in Japanese*

Mina Sugimura
(Kyoto Notre Dame University)
Miki Obata
(Hosei University)

1. Introduction

In Chomsky (2013), syntactic objects constructed in the narrow syntax need to be labelled in order to get interpreted at the interfaces. The interfaces can, by assumption, receive from those labels information concerning the grammatical properties of those syntactic objects. Although labels are determined based on a Labeling Algorithm, there are some problematic cases to be considered. Among those problems, this paper focuses on labelling the {H, H} structure, for which Chomsky's algorithm does not work straightforwardly. Specifically, we consider V-V compounds in Japanese. At first glance, Japanese V-V compounds look problematic for Chomsky's algorithm based on minimal search, but we demonstrate that minimal search still plays a crucial role in labelling Japanese V-V compounds by decomposing the compounds into morphological levels. As a consequence, the analysis proposed in this paper supports the postulation of null categorizers in the morphological derivation proposed by Halle and Marantz (1993) among others, in contrast to Borer's (2013) contextual categorization approach.

2. Labelling Algorithm and Saito's (2014) λ-Feature

In Chomsky (2013), the structure-building operation Merge is further simplified in that Merge is just a simple operation to form a set, in contrast to the version in Chomsky (1995) in which labeling of the resulting syntactic object is part of the operation Merge (see Epstein, Kitahara and Seely 2015 for more detailed discussion):

… an operation that takes objects X, Y already constructed and forms a new object Z.

(Chomsky 2013: 40)

While Merge gets simplified, labels are determined based on a Labeling Algorithm (LA) under minimal search applied at the point of Transfer. Also, under this approach, labels have no syntactic status but are required for interface interpretation:

… there is a fixed labeling algorithm LA that licenses syntactic objects so that they can be interpreted at the interfaces, operating at the phase level along with other operations.

(Chomsky 2013: 43)

Let us see how Chomsky's (2013) Labeling Algorithm works. The basic mechanisms are summarized in (1):

(1) a. $[_{\alpha}$ H, XP]: α = H

b. $[_{\alpha}$ XP, YP] → [XP... [α <XP> YP]: α = YP

c. $[_{\alpha}$ $XP_{[F]}$, $YP_{[F]}$]: α = FP

(by the most prominent shared feature F)

d. $[_{\alpha}$ H, H]/$[_{\alpha}$ R(oot), f]: α = f

(f stands for a functional categorizer. Root is invisible to LA.)

In the case of (1a), a computational atom, a head, is selected as a label under the Labeling Algorithm by minimal search:

Suppose SO = {H, XP}, H a head and XP not a head. Then LA will select H as the label, and the usual procedures of interpretation at the interfaces can proceed.

(Chomsky 2013: 43)

In the case of (1b) and (1c), neither of the merged elements are heads. Chomsky (2013) argues that there are two {XP, YP} cases, which correspond to (1b) and (1c):

The interesting case is SO = {XP, YP}, neither a head (we return to the only other possibility, {H, H}). Here minimal search is ambiguous, locating the heads X, Y of XP, YP, respectively. There are, then, two ways in which SO can be labeled: (A) modify SO so that there is only one visible head, or (B) X and Y are identical in a relevant respect, providing the same label, which can be taken as the label of the SO.

(Chomsky 2013: 43)

(A) in the above citation is identical with (1b). By modifying syntactic objects through applying Internal Merge, the resulting set contains only one visible head within either XP or YP since the other element moves out of the set (i.e.

a copy left behind Internal Merge is invisible to the Labeling Algorithm). In (1b), XP moves out of the set α, so that Y is the only visible head and becomes the label. (B) corresponds to (1c). In (1c), XP and YP are identical in that both elements bear the same feature. The identity is ensured by agreement between those elements for the shared features, which become the label in (1c). With respect to the last case, {H, H}, in (1d), Chomsky mentions the set containing a root and a functional categorizer as an example:

If the Marantz-Borer conception is adopted, these will be of the form f-root, where f is one of the functional elements determining category. Suppose that root, like conjunction, does not qualify as a label. In that case these constructions will be labeled f, as intended, because no other element is visible to LA.

(Chomsky 2013: 47)

Since only f is visible to LA in (1d), the set α is labeled as f. (In the later sections, we focus on labelling of the H-H case in Japanese.)

Concerning labelling by shared features in (1c), Saito (2014) points out some problematic cases in Japanese. One of the typical examples corresponding to (1c) is labelling by shared phi-features, e.g. in English. Since Chomsky (2000), it has been widely assumed that Case is assigned as a consequence of phi-agreement. Specifically, T agrees with the subject DP for phi-features and assigns nominative Case. That is, a traditional TP is labelled as ϕP (or $<\phi, \phi>$ in Chomsky 2015). In a language like Japanese, however, phi-agreement does not take place between T and the subject DP, so that it is predicted that the set {DP, TP} cannot be labelled in Japanese. In order to solve this cross-linguistic problem, Saito (2014) suggests that Case in Japanese has the function of making a phrase invisible to LA. Under this view, the case at issue is labelled as TP since the subject DP is Case-marked and

invisible to LA. Since Chomsky (2013) assumes that heads such as conjunction and root are invisible to LA, Saito's analysis is along the same lines. Saito comes to the conclusion that heads invisible to LA bear λ-features (anti-labelling features) including Case-features. Saito extends his analysis to inflectional materials, which play crucial roles in V-V compounds in Japanese. We return this extension later in Section 3.2.

3. V-V Compounds in Japanese

In this section, we first introduce V-V compounds in Japanese, traditionally classified into two types: lexical V-V compounds and syntactic V-V compounds. We see how the two differ from each other both syntactically and semantically, presenting Kageyama's (1993) view, where syntactic V-Vs are created in the syntax, while lexical V-Vs are derived in the lexicon. We then present Saito's (2014) view, where both kinds of V-V compounds, whether syntactic or "lexical", are created in the syntax. Since our focus will mainly be on how lexical V-V compounds are labeled, a topic to be explored in Section 4, this section serves to lay out the tools necessary for presenting our alternative view of {H, H} labeling.

3.1. Lexical V-V vs. Syntactic V-V Compounds

Japanese is a language that productively forms V-V compounds, which, according to Kageyama (1993), are roughly classified into two groups called Lexical V-V Compounds (2) and Syntactic V-V Compounds (3):

(2) *Lexical V-V Compounds*
Boku-no- neko-ga itumo kabin-o os-*i*-taos-u.
I-Gen cat-Nom always vase-Acc push-*i*-topple-Pres
'My cat always knocks over the vase.'

(3) *Syntactic V-V Compounds*

Kodomo-ga aruk-*i*-hazime-ta.
child-Nom walk-*i*-begin-Past
'The child began to walk.'

While V-V compounds in both (2) and (3) look similar morphologically on the surface, their syntactic and semantic properties are quite different from each other. On the one hand, they are morphologically similar in the sense that in both types of compounds, the first member of a compound (V_1) takes the form called *renyookei* 'preverbal form' consisting of the stem and the vowel *-i*, and the second member (V_2) inflects for tense. [1] On the other hand, as Kageyama (1993) has pointed out, they are different in that while syntactic V-V compounds show semantic compositionality of the verbs combined, lexical V-Vs often show semantic idiosyncrasy. In addition to their semantic properties, lexical V-Vs and syntactic V-Vs are also different in terms of productivity. While lexical V-Vs are not usually productive and are also subject to the aforementioned semantic idiosyncrasy, syntactic V-Vs are highly productive and do not show such semantic idiosyncrasy.

Furthermore, lexical V-Vs and syntactic V-Vs diverge from each other in terms of their syntactic behaviors: while syntactic V-V compounds allow for syntactic operations to apply exclusively to V_1, lexical V-V compounds disallow it, thus showing rigid lexical integrity. [2] Kageyama (1993) uses *soo s* 'do so', a pro-verb form replacing a VP, as a diagnosis for the internal structure of V-Vs in both types of compounds and points out that *soo s* cannot replace V_1 in lexical V-Vs (4), while it can do so in syntactic V-Vs (5):

(4) *Lexical V-Vs*

a. os-i-taos 'push-topple' → ***soo s**-i-taos (*lit.* 'do so (push) and topple')

b. tatak-i-kowas 'knock-crash' → ***soo s**-i-kowas '(*lit.* 'do so (knock) and crash')

(5) *Syntactic V-Vs*

a. yom-i-hazime 'read-begin (begin to read)'

→ **soo s**-i-hazime 'begin to do so (read)'

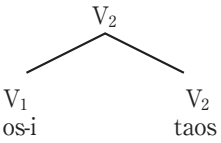
b. kak-i-tuzuke 'write-continue (continue to write)'

→ **soo s**-i-tuzuke 'continue to do so (write)'

Different syntactic behaviors among compounds thus leads Kageyama (1993) to classify them into two types; Kageyama argues that while lexical V-Vs are generated in the lexicon, hence showing lexical integrity, syntactic V-Vs are created in the syntax, with each V projecting to a phrase (i.e. VP), thus allowing for a syntactic operation to target either VP.

More recently, a framework where word formation is implemented in the syntax has been widely explored (Halle and Marantz 1993, Embick and Noyer 2007, Harley and Noyer 1999, Borer 2013 among others); there, no lexicon is assumed in the grammar, and words as well as phrases and sentences are all created in the syntax. With respect to the current question, such a framework, if adopted, means that 'lexical' V-Vs no longer exist and both lexical and syntactic V-Vs ought to be formed in the syntax. In fact, Saito (2014) explores this possibility and argues that lexical V-Vs are created by merge in the syntax, as in (6):

(6)



While we follow Saito (2014) in assuming that lexical V-Vs are also created in the syntax, we take a further step forward to see if Saito's structure in (6) can further be decomposed, a topic to be explored in Section 3.2; our interest is thus directed towards lexical V-Vs. In the next subsection, we propose that

the structure in (6) is in fact further decomposed and that V_2 in V-V compounds is structurally more complex than V_1. The proposal lays the foundation for our alternative labeling view of {H, H} that hinges on the structural complexity, which will be introduced in Section 4.

3.2. Word-Internal Structure of Lexical V-V Compounds: *Renyoo* as a Syntactic Terminal

Since our speculation spelt out briefly in the previous subsection is based on the assumption that words, as well as phrases and sentences, are formed in the syntax, we first lay out our core assumptions before turning to our decomposed lexical V-V structures. As briefly mentioned in Section 3.1, in some more recent morphological frameworks, it is assumed that all words are derived by the rules of syntax. One such framework is Distributed Morphology (DM) (Halle and Marantz 1993, Embick and Noyer 2007, Harley and Noyer 1999), where Morphology manipulates only syntactic features, and all morphologically complex objects, whether words or phrases, are created syntactically. Another framework, slightly different from DM, is Borer's (2013) Contextual Categorization, where functional categories, or 'functors' in Borer's terminology, define a categorical space (CCS) for their complements. Both agree that roots, traditionally equivalent to lexical "categories," are category-less in nature. However, the two diverge from each other in that DM assumes that roots are categorized by functional elements called category-defining heads (Marantz 2007, Embick and Noyer 2007) such as *v*, *n*, or *a*, which may or may not be realized phonologically, whereas Borer does not assume such phonologically null categorizers; in Borer's view, roots remain category-less and are only regarded as *x*-equivalent objects, where *x* can be V, N, or A. Thus, for example, the root $\sqrt{}$WALK is assigned a category of either a noun or a verb by a null categorizer in DM (7a), whereas the root becomes an N-equivalent object when merged with a D, an extended

projection of N, or it becomes a V-equivalent object when merged with a T, an extended projection of V in Contextual Categorization (7b):

(7) a. DM

$[[_n\sqrt{}\text{walk}]\ \boldsymbol{n}\text{ø}]$ $[[_v\sqrt{}\text{walk}]\ \boldsymbol{v}\text{ø}]$

b. Contextual Categorization

$[\text{D}\ [_{\text{C=N}}\sqrt{}\text{walk}]]$ $[\text{T}\ [_{\text{C=V}}\sqrt{}\text{walk}]]$

(Borer 2013: 324)

(where D & T = any segments within the nominal domain and the verbal domain, respectively)

Thus, it is important to note that Contextual Categorization, in contrast to DM, does not assume merger of an additional head (i.e. a categorizer) that is phonologically unrealized, a point we will return to later.

Turning to the formation of lexical V-Vs, recall from Section 3.1 that Saito (2014) assumes that Case has an anti-labeling feature called λ, which has the function of making a phrase invisible to LA. Saito further extends his analysis to lexical V-Vs, noting that not only Case-marked DPs but also phrases headed by inflectional materials never project:

(8) a. sizuka-**na** ongaku 'quiet music'
quiet-**na** music

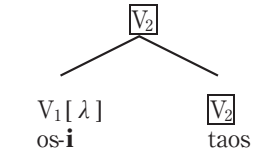
b. sizuka-**ni** saru 'quietly leave'
quiet-**ni** leave

In (8) the adjective *sizuka* 'quiet' is inflected as a pre-nominal form (8a) and as a preverbal form (8b), as shown by the boldfaced inflectional elements *-na* and *-ni*, respectively. In both cases, it is the non-inflected material that projects (i.e. N in (8a) and V in (8b)). Based on this fact, Saito argues that

inflection also has the λ feature that makes a phrase or a head that contains it invisible for labeling.

With that in mind, recall now from Section 3.1 that V_1 in Japanese V-V compounds also shows inflection called *renyookei* (preverbal form), represented by the inflectional material *-i*. In Saito's analysis, this means that V_1 has the λ feature realized as the *renyoo*-inflection, as shown in (9):

(9)



'push-REN' 'topple'

In (9), since V_1 has the λ feature, V_1 becomes invisible for labeling, and thus V_2 instead becomes the label for the whole compound.

The immediate question to be asked here is what exactly this λ-feature is that makes its bearer invisible for labeling. While we agree that the inflection plays a role in labeling, more systematic ways to capture Saito's insight seem to be called for. In fact, note that the distribution of the stem+*-i* form (*renyookei*) is not limited to a V-V compound configuration; *renyoo* forms also appear preverbally in a non-V-V configuration (10a) and also as a noun (10b):

(10) $\sqrt{}$yom + *i* ($\sqrt{}$READ + *i*):

a. *Preverbal*

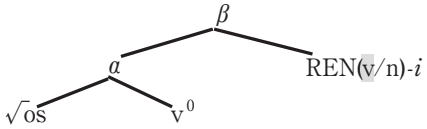
Hana-ga hon-o yom-i (V), hirune-o si-ta.
-Nom book-Acc read-REN nap-Acc do-Past
'Hana read the book and took a nap.'

b. *Nominal*

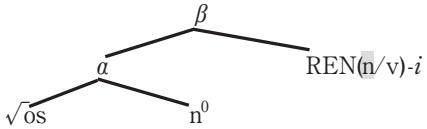
Yahari Haru-no yom-i (N)-ga atat-ta.
after all -Gen read-REN-Nom hit-Past
'Haru's guess was right after all.'

In the previous literature, both V and N forms in (10) are called *renyoo* forms, and the inflectional element *-i* is assumed to be an epenthetic vowel. Tagawa (2012), on the one hand, attempts to capture the distribution of *renyoo* forms within the framework of Distributed Morphology (Halle and Marantz 1993, Embick and Noyer 2007, Harley and Noyer 1999) and specifies the environment in which *-i* appears. Volpe (2005), on the other hand, assumes that the *-i* is a syntactic terminal called Part(icle) that is situated below categorizing heads. We assume with Volpe (2005) that the *-i* is a syntactic terminal and is thus a phonological realization of the head; however, we depart from his analysis and instead propose that the *-i* is a *renyoo* head REN^0 situated above categorizing heads and that the REN head needs to be categorially specified either as a *v* or an *n*. We propose the following structures for V- and N- *renyoo* forms, accordingly. (The labels α and β in (11) will be discussed in the next section.)[3]

(11) a. *Renyoo* as a Verb



b. *Renyoo* as a Noun



In (11), we assume that the root is first selected by a categorizer (i.e. *v* or *n*). The root plus its categorizer complex in turn merges with the REN head, which is categorially unspecified in nature. We argue that the assumption that REN is a syntactic terminal and that it is categorially unspecified provides ways to label V-V compounds. In the next section, we turn to our analysis of {H, H} labeling that utilizes the decomposed V-V structures in (11).

4. On {H, H} labelling: How to Label V-V compounds in Japanese

In Section 2, we overviewed Chomsky's (2013) Labeling Algorithm (LA). The basic mechanism is that LA detects heads through minimal search and those heads provide labels for syntactic objects constructed by applying Merge. The question tackled in this section is how labels are determined by LA if multiple heads exist within the minimal search domain. Recall from Section 2 how a traditional TP (i.e. {Subj DP, TP}) e.g. in English is labelled as ϕP or $<\phi, \phi>$. LA finds two heads D and T within the minimal search domain and does not choose one of the heads. Rather, LA finds a shared feature (i.e. phi-features) between them and it becomes the label. What happens in the case of Japanese V-V compounds? First, consider how the *renyoo* form for V and N is derived and also labelled. Returning to the

derivations in (11), labels need to be determined for α and β.

(12) Labelling of *Renyoo* for V (→ (11a))

a. [$_{\alpha}$root ($\sqrt{}$os), v^0]: $\alpha = v^0$ (=V)

b. [$_{\beta}$$v^0$, REN(n/v)]: $\beta = v^0$ (=V)

In (12a), a root is category-less, so that no label can be provided (i.e. a root is not visible to LA), as summarized in (1). The other member v^0, which is a categorizer, can be the label. In (12b), v^0 (i.e. α in (12a)) and REN are merged. As demonstrated in the last section, REN's category is unspecified between V and N since REN can be either V or N, so that it cannot be a label and is invisible to LA, like a root. LA keeps searching for another visible head. The only visible head under minimal search is the categorizer v^0. Therefore, β is labelled as v^0. The same mechanism is true of *Renyoo* for Noun as follows:[4]

(13) Labelling of *Renyoo* for N (→ (11b))

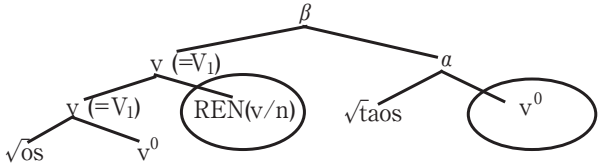
a. [$_{\alpha}$root ($\sqrt{}$os), n^0]: $\alpha = n^0$ (=N)

b. [$_{\beta}$$n^0$, REN(n/v)]: $\beta = n^0$ (=N)

Again, neither a root nor REN becomes a label, so that n^0 is the only head visible to LA in both (13a) and (13b). The proposed system can determine labels for syntactic objects including REN by utilizing REN's unspecified categorial properties.

Let us extend the above analysis to labelling of V-V compounds in Japanese. The points we need to capture are the following two things: (A) The same effects as Saito's (2014) λ-feature on V inflected to the *renyoo* form need to be captured; and (B) the second V provides a label of the whole V-V compound, since it is the main verb. The detailed derivation of V-V compounds in Japanese is illustrated in (14), where the first V inflected to the *renyoo* form and the second V (i.e. the main verb) are merged:

(14) V-V Compounds: *os-i-taos* (push-REN-topple)



a. [$_{\alpha}$ root ($\sqrt{}$ taos), v^0]: $\alpha = v^0$ ($=V_2$)

b. [$_{\beta}$ V_1, V_2]: $\beta = V_2$

First, let us consider the labelling of α, which is the syntactic object constructed through merging the root of the second V and the categorizer v^0. As discussed in (12a), a root is not visible to LA, so that the categorizer v^0 becomes the label, as in (14a). Next, concerning the labelling of β, LA detects two heads, REN and v^0 ($=V_2$), within the minimal search domain as circled in the structure (14). Since REN provides no labels because of its unspecified categorial status, β is labelled as v^0 ($=V_2$). The proposed system can capture the two points (A) and (B). With respect to (A), Saito's λ-feature is now explained by appeal to REN's unspecified categorial properties. Also, the whole compound is labelled as V_2, the main verb, in (14), so that (B) is guaranteed under the proposed system. We have thus demonstrated that labelling/derivation of V-V compounds in Japanese can be captured by further decomposing lexical items, without appeal to Saito's λ-feature.

5. Consequences and Conclusion

A theoretical consequence obtained from the current proposal is: although Borer (2013) is against the postulation of phonologically null categorizers such as *n* or *v* (in English word formation), the embedding of verbal roots inside the REN head (see (12), (13), (14)) necessarily assumes such zero categorizers (at the root-attaching x level), at least in Japanese word formation, thus favoring DM-type root-categorization as discussed in Marantz

(2007) and Embick and Noyer (2007).

Although Saito's (2014) λ-feature is not a concept limited to the *renyoo* form but part of an overarching theory of Japanese syntax, our analysis can deduce at least one aspect of the properties captured under λ-features from minimal search alone (which has higher generality and is a third factor, as discussed in Chomsky 2005, 2013) by decomposing lexical items into morphological levels.

Notes

* This work is supported by JSPS KAKENHI Grant Number JP17K02823. An earlier version of this work was presented at Theoretical East Asian Linguistics Conference (TEAL) 2014 and Fukuoka Linguistics Circle 2015; aspects of this work also appear in Sugimura and Obata (2016). We are very grateful to Marlyse Baptista, Noam Chomsky, Samuel Epstein, Koji Fujita, Nobu Goto, Masayuki Ikeuchi, Ezra Keshet, Hisatsugu Kitahara, Yoichi Miyamoto, Will Nediger, Masao Ochi, Daniel Seely, Takumi Tagawa and Shoichi Takahashi for their constructive comments and suggestion.

1 When the stem ends with a vowel as in √tabe (√eat), the inflection on the verb is phonologically unrealized (e.g. tabe-ø-aruk (eat-ø-walk)).

2 Other diagnoses Kageyama (1993) uses include passivization and honorification of V1. WhileV1 in syntactic V-Vs can be passivized or marked for honorification, lexical V-Vs cannot be.

3, 4 See Sugimura and Obata (2016) for a different approach to *renyoo* nouns.

References

Borer, H. (2013) *Taking Form*. Oxford University Press.

Chomsky, N. (1995) Bare phrase structure, In G. Webelhuth ed., *Government and Binding Theory and the Minimalist Program*, 285-439. Oxford: Blackwell.

Chomsky, N. (2005) Three factors in language design. *Linguistic Inquiry* 36: 1-22.

Chomsky, N. (2013) Problems of projection. *Lingua* 130: 33-49.

Chomsky, N. (2015) Problems of projection extensions. In E. D. Dommenico, C. Hamann and S. Matteini eds., *Structures, Strategies and beyond Studies in Honor of Adriana Belletti*, 3-16. John Benjamins.

Embick, D. & A. Marantz. (2008) Architecture and blocking. *Linguistic Inquiry* 39: 1-53.

Embick, D. & R. Noyer. (2007) Distributed morphology and the syntax/morphology interface. In G. Ramchand and C. Reiss eds., *The Oxford Handbook of Linguistic Interfaces*, 289-324. Oxford: Oxford University Press.

Epstein, S., H. Kitahara and D. Seely. (2015) From aspects 'daughterless mothers' (aka delta nodes) to POP's 'motherless'-sets (aka non-projection): A selective history of the evolution of simplest Merge. *MIT Working Papers in Linguistics* 77: 99-112.

Halle, M., and A. Marantz. (1993) Distributed Morphology and the pieces of inflection. In K. Hale and S. J. Keyser eds., *The View from Building 20*, 111-176. Cambridge, MA: MIT Press.

Harley, H. and R. Noyer. (1999) State-of-the-article: Distributed Morphology. *Glot International* 4: 3-9.

Kageyama, T. (1993) *Bunpoo-to Gokeisei* [Grammar and Word Formation]. Hituzi Syobo Publishing.

Marantz, A. (2007) Words and Phases. Unpublished manuscript, New York University.

Saito, M. (2014) Case and Labeling in a Language without ϕ-feature agreement. In A. Cardinaletti, G. Cinque, and Y. Endo eds., *On Peripheries: Exploring Clause Initial and Clause Final Positions*, 269-297. Tokyo: Hituzi Syobo Publishing.

Sugimura, M. and M. Obata. (2016) Outer/inner morphology: The dichotomy of Japanese *renyoo* verbs and nouns. *Proceedings of the 90th Linguistic Society of America (LSA) Annual Meeting* 1-6: 1-10.

Tagawa, T. (2012) Bunsan-keitairon-o mochiita doosi-katsuyoo-no kenkyuu-ni mukete: Renyookei-no bunseki-ni okeru keitai-toogoron-teki mondai [Towards the Distributed Morphology-based study of verbal conjugation: Morpho-syntactic problems in analyzing *Renyookei*]. In K. Mihara and Y. Nitta eds., *Katsuyooron-no Zensen* [The Frontier of the Theory of Conjugation], 191-216. Tokyo: Kuroshio Press.

Volpe, M. (2005) Japanese morphology and its theoretical consequences: Derivational morphology in Distributed Morphology. Ph.D. dissertation, Stony Brook University.