

Fuzzy Categories, Dynamic Labeling and Mixed Category Projections: The Case of Adjectival Nouns and Verbal Nouns¹

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Abstract: In this paper, I propose that (i) in Japanese, i.e. a typical head-final language, adjectival nouns are a FUZZY category with a disjunction of two options: [+A] or [+N]; (ii) verbal nouns are also FUZZY, having a disjunction of two features: [+V] or [+N]. Furthermore, I propose that as predicted by Dynamic Syntax (Kempson et al. 2001, etc.; cf. Sperber & Wilson 1995), a fuzzy category consistently comes first, and then, follows a DYNAMIC CATEGORIZER, i.e. a ‘head,’ which updates the nature of the fuzzy category gradually in the course of left to right processing of a string of words (cf. Phillips 1996, 2003, etc.). Based on this proposal, I claim that if CATEGORIAL LABELING is indeed dynamic and dependent upon on-line processing, a fuzzy category and dynamic categorizers in head-final languages such as Japanese should be able to construct MIXED CATEGORY PROJECTIONS, which are not consistent with X’ Theory (cf. Sugioka 2009; Chomsky’s 2013, 2015 labeling algorithm). Then, I argue that such exocentric phrase structure is indeed created, and helps us reveal the nature of the ‘Japanese light verb construction’ and its related constructions in a novel way (cf. Grimshaw & Mester 1988, Saito & Hoshi 2000, Miyamoto & Kishimoto 2016, etc.).

Keywords: DYNAMIC SYNTAX; FUZZY CATEGORIES; DYNAMIC LABELING; MIXED CATEGORY PROJECTIONS; THETA THEORY; X’ THEORY

1. INTRODUCTION

The central idea of Dynamic Syntax is: underspecified linguistic representation gets updated gradually in the course of left to right parsing of a string of words (Kempson et al. 2001, Cann et al 2005, Kempson 2016, 2017, among others; cf. Sperber & Wilson 1995; cf. Hawkins 1990, 1994, 2004, 2014, Phillips 1996, 2003, Abe 1998, etc.; cf. Chomsky 1965, 1981, 1986, 1995, etc.). Dynamic Syntax thus predicts that some head-final languages should display a distinctive pattern where an underspecified, or fuzzy, category comes first, and then, follows a syntactic updater, i.e. a ‘head,’ which determines the nature of the fuzzy category in the course of left to right sentence processing. In this paper, I aim to argue for the core idea of Dynamic Syntax. To do so, I show that the prediction mentioned above is indeed borne out, by developing Hoshi’s (2014, 2019a-b, 2020a-b) ‘DYNAMIC CATEGORIZATION/LABELING’ analysis of FUZZY CATEGORIES, i.e. adjectival nouns (ANs) and verbal nouns (VNs) in Japanese.

In the following section, I propose that (i) ANs and VNs in Japanese are underspecified, i.e. fuzzy,

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² See Aarts et al. (2004), Fanselow et al. (2006), Aarts (2007), etc. for issues on fuzzy grammar. In Hoshi (in progress), I argue that verbs, adjectives, tenses, etc. are also fuzzy categories in head-final languages such as Japanese. For various

categories;² (ii) in a typical head-final language, i.e. Japanese, a fuzzy category consistently comes first and then, follows a syntactic updater, i.e. a DYNAMIC CATEGORIZER; and (iii) a dynamic categorizer triggers selection twice, not just once, determining the categorial label of each fuzzy category gradually in the course of left to right processing of a string of words. In so doing, I argue for the central idea of Dynamic Syntax, and I propose: CATEGORIAL LABELING is dynamic and depends on syntactic environments, i.e. on-line processing of language.

In Sections 3 and 4, I argue that (i) if categorial labeling is indeed dynamic and context-dependent, head-final languages such as Japanese should be able to form unique phrase structure, created by an interaction among a fuzzy category and dynamic categorizers in the course of left to right sentence processing; (ii) this new type of phrase structure, i.e. MIXED CATEGORY PROJECTIONS, which are not endocentric, could provide us with a novel way to reveal the nature of ‘light verb constructions’ and two types of ‘temporal construction’ in Japanese, which involve a fuzzy VN (cf. Sugioka 2009: 92, (27b–d)). More specifically, based on the dynamic labeling analysis, there, I make this theoretical claim: (i) it is not Theta Theory but X’ Theory that should be revised or eliminated entirely, to account for the nature of the constructions mentioned above adequately (cf. Chomsky 2013, 2015; contra. Grimshaw & Mester 1988, Hoshi 1994, Saito & Hoshi 2000, etc.); and (ii) Japanese is indeed strictly ‘configurational.’³ In Section 5, I conclude the discussion of this paper with a comment on Dynamic Syntax for its further development.

2. FUZZY CATEGORIES AND DYNAMIC LABELING (HOSHI 2014, 2019A–B, 2020A–B)

On the basis of Hoshi (2019a–b, 2020a–b, cf. 2014), here, I propose that ANs and VNs in Japanese are fuzzy, i.e. underspecified, categories in the following sense: ANs such as *suki* ‘fond/fondness’ have a disjunction of two options, [+A] or [+N], as in (1a).

- (1) (a) [$?A$ or $?N$ *suki*] (b) [$?V$ or $?N$ *kenkyuu*]

Similarly, as in (1b), VNs such as *kenkyuu* ‘research’ have a disjunction of two features, [+V] or [+N].

Furthermore, based on Hoshi (2020a–b, cf. 2014, 2019a–b), I propose the following two step selection called ‘dynamic categorization,’ i.e. ‘dynamic labeling’:⁴

- (2) (a) Suffixes such as case markers *first select* the fuzzy projection of an AN like [$?A$ or $?N$ *suki*]; and *then select* the [+N] feature of the projection of the AN, *turning* the AN projection into a [+N] projection.
 (b) Copulas *first select* the fuzzy projection of an AN like [$?A$ or $?N$ *suki*]; and *then select* the [+A] feature of the projection of the AN, *turning* the AN projection into a [+A] projection.

That is, under the dynamic labeling analysis, in the course of left to right parsing of a string of words, once a syntactic updater like a case marker selects the [+N] feature of the projection of an AN, it turns the fuzzy category into a [+N] category by means of dynamic categorization (2a). On the other hand, when a dynamic updater like a copula selects the [+A] feature of the projection of an AN, it turns the ambiguous category into a [+A] category due to dynamic labeling (2b).

treatments of ANs and VNs, the reader is referred to Kuroda (1965, 1978, 1988, 1992), Kuno (1973), Martin (1975), Kageyama (1982, 1993, 2016), Miyagawa (1987, 1989, 1991), Grimshaw & Mester (1988), Murasugi (1988), Shibatani & Kageyama (1988), Terada (1990), Tsujimura (1990), Hasegawa (1991), Manning (1993), Uchida & Nakayama (1993), Hoshi (1994), Matsumoto (1996), Dubinsky (1997), Uehara (1998), Saito & Hoshi (2000), Croft (2001), Ito & Sugioka (2002), Sugioka (2009), Kishimoto & Uehara (2016), Miyamoto & Kishimoto (2016), Ueno (2016), Yuhara (2020), etc.

³ Cf. Kuroda (1965, 1978, 1988, 1992), Kuno (1973), Saito (1985), Hoji (1985), among others; contra. Hale (1980), Farmer (1980), Miyagawa (1980), Grimshaw & Mester (1988), Hoshi (1994), Saito & Hoshi (2000), etc.

⁴ Under Chomsky’s (2013, 2015) labeling algorithm, ϕ -feature agreement plays an important role; whereas under the dynamic categorization analysis I propose for Japanese, c-selection plays a crucial role. This difference might arise, because unlike many other languages, Japanese seems to lack (forced) ϕ -feature agreement (cf. Saito 2016, 2017; cf. Fukui 1986, Kuroda 1988, 1992, etc.). I am grateful to Jun Abe, for bringing to my attention the theoretical relevance of Chomsky’s (2013, 2015) labeling algorithm to the proposed dynamic categorization analysis; I am also grateful to Koichi Abe for drawing my attention to Saito (2016, 2017).

To capture the parallelism between the two types of fuzzy categories, i.e. ANs and VNs, based on Hoshi (2019a–b, 2020a–b, cf. 2014), I propose (3a–b).

- (3) (a) Suffixes such as case markers or aspectual nominal suffixes like $-[AspN\ tyuu]$ ‘middle’ *first select* the fuzzy projection of a VN like $[?V\ or\ ?N\ kenkyuu]$; and *then select* the $[+N]$ feature of the VN, *turning* the VN projection into a $[+N]$ projection.⁵
- (b) Verbs such as the light verb *su* ‘do’ or aspectual head nouns such as $[AspN\ tyuu]$ ‘middle’ *first select* the fuzzy projection of a VN like $[?V\ or\ ?N\ kenkyuu]$; and *then select* the $[+V]$ feature of the projection of the VN, *turning* the VN projection into a $[+V]$ projection.

Namely, once a syntactic updater like a case marker selects the $[+N]$ feature of the projection of a VN, it turns the underspecified category into a $[+N]$ category through dynamic categorization (3a) (cf. (2a)). Once, on the other hand, an updater like the light verb *su* selects the $[+V]$ property of the projection of a VN, it turns the fuzzy category into a $[+V]$ category by means of dynamic labeling (3b) (cf. (2b)).

In short, on the dynamic categorization analysis, ANs such as *suki* are not simply a $[+A]$ category, are not just a $[+N]$ category, or are not a category with a conjunction of $[+A]$ and $[+N]$ properties (cf. Kuno 1973, Martin 1975, Kuroda 1978, 1992, Kageyama 1982, 1993, Miyagawa 1987, Ito & Sugioka 2002, Kishimoto & Uehara 2016, Ueno 2016, among others). Under the proposed analysis, as in (4a), the AN *suki* is listed in the lexicon as a fuzzy category with a disjunction of two options, i.e. $[+A]$ or $[+N]$.

- (4) (a) $[?A\ or\ ?N\ suki]$ (= 1a) (b) $[N\ suki]$
 (c) $[A\ suki]$ (Hoshi 2019a–b, 2020a–b)

Hence, the AN *suki* first emerges as the fuzzy category $[?A\ or\ ?N\ suki]$ in syntax as in (4a=1a). Then, depending on syntactic environments in the course of left to right parsing of a string of words, the fuzzy category $[?A\ or\ ?N\ suki]$ gets updated as the noun $[N\ suki]$ as in (4b) (see (2a)), or is updated as the adjective $[A\ suki]$ as in (4c) (see (2b)).⁶

In the same way, VNs such as *kenkyuu* are not simply a $[+V]$ category, are not just a $[+N]$ category, or are not a category with a union of $[+V]$ and $[+N]$ features (cf. Kuno 1973, Martin 1975, Kageyama 1982, 1993, Miyagawa 1987, Grimshaw & Mester 1988, Shibatani & Kageyama 1988, Hasegawa 1991, Manning 1993, Saito & Hoshi 2000, Ito & Sugioka 2002, Kishimoto & Uehara 2016, Miyamoto & Kishimoto 2016, Ueno 2016, Yuhara 2020, etc.). Under the dynamic labeling analysis, as in (5a), the VN *kenkyuu* is listed in the lexicon as a fuzzy category with a disjunction of two features, i.e. $[+V]$ or $[+N]$.

- (5) (a) $[?V\ or\ ?N\ kenkyuu]$ (= 1b) (b) $[N\ kenkyuu]$
 (c) $[V\ kenkyuu]$ (Hoshi 2014, 2019a–b, 2020a–b)

Thus, the VN *kenkyuu* appears as the underspecified category $[?V\ or\ ?N\ kenkyuu]$ initially in syntax as in (5a=1b). Depending on syntactic contexts, the VN *kenkyuu* is then updated as the noun $[N\ kenkyuu]$ as in (5b) (see (3a)), or turned into the verb $[V\ kenkyuu]$ as in (5c) (see (3b)).^{7,8}

Notice here that Hoshi’s (2014, 2019a–b, 2020a–b) dynamic categorization analysis in (4a–c) and (5a–c) is

⁵ Sugioka (2009: 92, (27b–d)) proposes that the aspectual nominal suffix $-[AspN\ tyuu]$ ‘middle’ can nominalize any part of the projection of a VN through its morphological c-selection. This insight by Sugioka (2009) is incorporated into dynamic labeling (3a).

⁶ I assume that the fuzzy AN $[?A\ or\ ?N\ suki]$ in (4a), the noun $[N\ suki]$ in (4b), and the adjective $[A\ suki]$ in (4c) are semantically the same; (4a–c) differ only in their categorial labels (cf. fn. 7). See Hudson (1998: 5–8) for a discussion of the identical meaning of $[N\ liking]$ and $[V\ like]$; the same meaning of $[N\ knowledge]$ and $[V\ know]$.

⁷ I also assume that the fuzzy VN $[?V\ or\ ?N\ kenkyuu]$ in (5a), the noun $[N\ kenkyuu]$ in (5b), and the verb $[V\ kenkyuu]$ in (5c) are semantically identical; they are different only with respect to their categorial features (cf. fn. 6). This assumption is particularly important in my dynamic categorization analysis in Sections 3 and 4 (cf. Hoshi 2014, 2019b, 2020b). The reader is referred to Kageyama (1993: 22–40), Hudson (1998: 5–8), Huddleston & Pullum (2002: 30–31), etc. for a relevant discussion on category–meaning relationship.

⁸ Manning (1993) proposes an HPSG style bottom-up structure building analysis where VNs are assumed to be

exactly what is predicted by the very core idea of Dynamic Syntax: the nature of underspecified, i.e. fuzzy, linguistic representation is determined gradually in the course of left to right parsing of words in a linguistic string (Kempson et al. 2001, etc., Cann et al. 2005, Kempson 2016, 2017, among others). Furthermore, observe below that the dynamic labeling analysis explains various context-dependent properties of ANs and VNs adequately.

Consider first the acceptability of (6a–b).

- (6) (a) [ANP *anata-no* [AN *nigate*]]-o *kaisyooos-i-masu*.⁹
 you-GEN weakness-ACC help-you-to-overcome-PRS
 ‘We will help you overcome your weak spots.’
- (b) [VNP *John-no* *nihongo-no* [VN *kenkyuu*]]-ga *subarasi-i*.
 John-GEN Japanese-GEN research-NOM fantastic-PRS
 ‘John’s research of Japanese is fantastic.’ (cf. Kageyama 1993: 22–40)

Under the proposed analysis, syntax processes the string of words in (6a), roughly as in (7a–c).

- (7) (a) $?[?AP \text{ or } ?NP \text{ [NP } anata\text{]}\text{-?no } [?A \text{ or } ?N \text{ } nigate\text{}]]$
 (b) $?[?AP \text{ or } ?NP \text{ [NP } anata\text{]}\text{-?no } [?A \text{ or } ?N \text{ } nigate\text{}]\text{-o}$
 (c) $[NP \text{ [NP } anata\text{]}\text{-no } [N \text{ } nigate\text{}]\text{-o}$

At the initial point of left to right parsing, syntax builds structure (7a), where the category of the AN *nigate* ‘weakness’ is underspecified with respect to [+A] or [+N] (see (1a=4a)). Here, the genitive case marker *-no* attached to the NP *anata* ‘you’ is not licensed, because it is not contained within a [+N] projection.¹⁰ At the next point of left to right parsing, the accusative case marker *-o* selects the underspecified projection by $[?A \text{ or } ?N \text{ } nigate]$ (cf. Martin 1975, Kageyama 1982, 1993, Ito & Sugioka 2002, etc.), and syntax constructs structure (7b), where the genitive case marker *-no* is not yet licensed. Then, as shown in (7c), the accusative case marker *-o* triggers selection again, and selects the [+N] feature of the projection of the AN *nigate*, turning the fuzzy category into the projection of a [+N] category, due to dynamic categorization (2a).¹¹ Consequently, at the processing point of (7c), the genitive case *-no* is properly licensed within the [+N] projection.¹²

categorially underspecified; he stipulates that a phrase which ‘precedes’ a VN specify the nature of the VN. See Manning (1993) for his stipulations such as ‘specification,’ ‘selection,’ ‘sort-compatibility,’ etc. Here, I argue for the opposite: a dynamic categorizer, which ‘follows’ a fuzzy category like an AN or a VN, determines the nature of the fuzzy category, as predicted by Dynamic Syntax.

⁹ I thank Mayumi Hoshi for bringing examples such as (6a) to my attention.

¹⁰ In this paper, I assume that (i) the nominative case marker *-ga* is licensed within the projection of a [+V] or [+A] category (cf. Kuno 1973, Fukui 1986, etc.); (ii) the genitive case marker *-no* is licensed within the projection of a [+N] category (Saito 1982, 1985, Fukui 1986, etc.); (iii) the accusative case marker *-o* must be immediately dominated by a transitive [+V] category (cf. Chomsky 1981, Saito 1985, Fukui 1986, etc.).

¹¹ To be more precise, as in (i),

(i) $?[?AP \text{ or } ?NP \text{ [NP } anata\text{]}\text{-?no } [?A \text{ or } ?N \text{ } nigate\text{}]]$ (= 7a) (*bottom-up labeling*) ==>
 syntax first combines $[NP \text{ } anata\text{]}\text{-?no}$ with the AN $[?A \text{ or } ?N \text{ } nigate]$. Here, the whole mother node is based on the fuzzy AN daughter. The mother node thus inherits the categorial label of the daughter head, i.e. [+A] or [+N], in a bottom-up fashion.

As in (ii), at a later stage of left-to-right sentence processing,

(ii) $[NP \text{ [NP } anata\text{]}\text{-no } [?A \text{ or } ?N \text{ } nigate\text{}]\text{-o}$ (*dynamic labeling 2a*) ==>
 the accusative case marker *-o* selects the [+N] feature of the fuzzy mother node, $[?AP \text{ or } ?NP \text{ } nigate]$, in accordance with categorization condition (2a); *-o* turns the fuzzy category into a [+N] category, creating a ‘[+N] domain,’ an NP, in (ii).

Finally, as in (iii),

(iii) $[NP \text{ [NP } anata\text{]}\text{-no } [N \text{ } nigate\text{}]\text{-o}$ (= 7c) (*top-down labeling*)
 within the [+N] domain of the whole mother node, the [+N] feature of the fuzzy daughter head is selected in a top-down fashion. In this paper, I assume these three types of ‘context-dependent labeling’: (i) bottom-up, (ii) dynamic and (iii) top-down (cf. Chomsky’s 2013, 2015 labeling algorithm).

Similarly, syntax parses from left to right the string of words in (6b) as follows:

- (8) (a) $[\text{?VP or ?NP} [\text{NP John}]\text{-?no} [\text{?V' or ?N'} [\text{NP nihongo}]\text{-?no} [\text{?V or ?N kenkyuu}]]]$
 (b) $[\text{?VP or ?NP} [\text{NP John}]\text{-?no} [\text{?V' or ?N'} [\text{NP nihongo}]\text{-?no} [\text{?V or ?N kenkyuu}]]\text{-ga}$
 (c) $[\text{NP} [\text{NP John}]\text{-no} [\text{N'} [\text{NP nihongo}]\text{-no} [\text{N kenkyuu}]]]\text{-ga}$

To form a proposition as efficiently and as quickly as possible (cf. Kempson et al. 2001, Cann et al. 2005, etc.), initially, syntax forms from left to right structure (8a), where both the external argument *John* and the internal argument *nihongo* ‘Japanese’ are marked by the genitive case marker *-no*. The two genitive case markers are not licensed at this stage, however, because they are not contained within the projection of a [+N] category (see (1b=5a); cf. (7a)). Next, as shown in (8b), the nominative case marker *-ga* selects the fuzzy projection by $[\text{?V or ?N kenkyuu}]$ (cf. Martin 1975, Kageyama 1982, 1993, Shibatani & Kageyama 1988, Ito & Sugioka 2002, etc.), where *-no* is not yet licensed properly. Then, the nominative case marker *-ga* triggers selection once again, and selects the [+N] feature of the projection of the VN *kenkyuu*, turning it into a [+N] category as illustrated in (8c), due to dynamic labeling (3a) (cf. (7c)). Consequently, the two genitive case markers are successfully licensed within the [+N] projection at the parsing stage of (8c). The proposed analysis thus accounts for the nominal property of both an AN and a VN by means of dynamic categorization triggered by case markers in a uniform way (see dynamic labeling (2a) and (3a); see (7b–c) and (8b–c)).

The dynamic labeling analysis also captures uniformly the adjectival property of an AN and the verbal property of a VN. Consider the examples in (9a–b).

- (9) (a) *boku-ga suugaku-ga [AN nigate] da.*
 I-NOM math-NOM weak COP
 ‘I am poor at mathematics.’
 (b) *John-ga nihongo-o [VN kenkyuu] si-ta.*
 John-NOM Japanese-ACC researching do-PST
 ‘John studied Japanese.’ (cf. Kageyama 1993: 22–40)

Syntax processes the string of words in (9a) from left to right, basically as shown in (10a–c).

- (10) (a) $[\text{?AP or ?NP} [\text{NP boku}]\text{-?ga} [\text{?A' or ?N'} [\text{NP suugaku}]\text{-?ga} [\text{?A or ?N nigate}]]]$
 (b) $[\text{VP} [\text{?AP or ?NP} [\text{NP boku}]\text{-?ga} [\text{?A' or ?N'} [\text{NP suugaku}]\text{-?ga} [\text{?A or ?N nigate}]]] [\text{V da}]]$
 (c) $[\text{VP} [\text{AP} [\text{NP boku}]\text{-ga} [\text{A' } [\text{NP suugaku}]\text{-ga} [\text{A nigate}]]] [\text{V da}]]$

To form a proposition efficiently, syntax first constructs structure (10a), where the two nominative case markers attached to $[\text{NP boku}]$ ‘I’ and $[\text{NP suugaku}]$ ‘math’ are not licensed, because the nominative case markers are within the projection of an ambiguous category, the AN $[\text{?A or ?N nigate}]$ (see (1a=4a)). Then, syntax builds structure (10b) by means of initial selection by the copula *da* (cf. Martin 1975, Kageyama 1982, 1993, Ito & Sugioka 2002, etc.). As illustrated in (10c), at the subsequent processing stage, the copula $[\text{V da}]$ triggers selection again, and selects the [+A] feature of the projection of $[\text{?A or ?N nigate}]$, turning it into a [+A] category, $[\text{AP} \dots \text{ nigate}]$ (see dynamic categorization (2b)). As a result, the nominative case-marked subject and object, $[\text{NP boku}]\text{-ga}$ and $[\text{NP suugaku}]\text{-ga}$, are both properly licensed within the [+A] projection in (10c).

Similarly, syntax processes the string of words in (9b) as follows:

- (11) (a) $[\text{?VP or ?NP} [\text{NP John}]\text{-?ga} [\text{?V' or ?N'} [\text{NP nihongo}]\text{-?o} [\text{?V or ?N kenkyuu}]]]$
 (b) $[\text{VP} [\text{?VP or ?NP} [\text{NP John}]\text{-?ga} [\text{?V' or ?N'} [\text{NP nihongo}]\text{-?o} [\text{?V or ?N kenkyuu}]]] [\text{V si}]]$

¹² In this paper, I attempt to argue for the central idea of Dynamic Syntax. There is, however, an important difference between the standard dynamic syntactic analysis and my dynamic categorization analysis. That is, the standard dynamic syntactic analysis builds up semantic representations with *no syntactic features* at all, directly from words encountered in a linguistic string (Kempson et al. 2001, Cann et al. 2005, etc.); whereas I propose that syntax constructs representations which necessarily include *syntactic features* such as categorial labels (A, V, N, AN, VN, etc.) (cf. Phillips 1996, 2003, among others). I return to this significant issue in Section 5.

(c) [VP [VP [NP John]-ga [V' [NP nihongo]-o [v kenkyuu]]] [v si]]

As shown in (11a), at the initial point of left to right parsing, neither the nominative case marker *-ga* nor the accusative case marker *-o* is licensed, because those case markers are contained within the projection of the fuzzy VN [$?V$ or $?N$ *kenkyuu*] (see (1b=5a)). Then, the light verb *si* ‘do’ first selects the underspecified projection by [$?V$ or $?N$ *kenkyuu*] as in (11b) (cf. Martin 1975, Kageyama 1982, 1993, Shibatani & Kageyama 1988, Ito & Sugioka 2002, etc.), where neither *-ga* nor *-o* is properly licensed yet. At the next point of left to right processing of words, the light verb *si* triggers selection once again, and selects the [+V] feature of the projection of the ambiguous VN [$?V$ or $?N$ *kenkyuu*], turning it into a [+V] category (see dynamic labeling (3b)). As a result, both the nominative case and the accusative case in (11c) are properly licensed within the VP. In this way, the proposed dynamic categorization analysis captures uniformly the [+A] property of an AN and the [+V] property of a VN, by means of the same two step selection mechanism called dynamic labeling (see dynamic categorization conditions (2b) and (3b); see (10b–c) and (11b–c); cf. (7b–c) and (8b–c)).

Furthermore, the dynamic labeling analysis accounts for the unacceptability of (12a–b) in a uniform manner.

- (12) (a) *John-ga [ANP suugaku-no [AN nigate]] da. (cf. 6a and 9a)
 John-NOM math-GEN weak COP
 ‘John is poor at mathematics.’ (cf. Kuroda 1978, 1992: 236)
- (b) *John-ga [VNP nihongo-no [VN kenkyuu]] si-ta. (cf. 6b and 9b)
 John-NOM Japanese-GEN research do-PST
 ‘John studied Japanese.’ (cf. Kageyama 1993: 10, 22–40, Chapter 5)

Syntax fails to parse the string of words in (12a). Consider (13a–c).

- (13) (a) $?[?AP$ or $?NP$ [NP John]-?ga [$?A'$ or $?N'$ [NP suugaku]-?no [$?A$ or $?N$ nigate]]]
 (b) $?[VP$ [$?AP$ or $?NP$ [NP John]-?ga [$?A'$ or $?N'$ [NP suugaku]-?no [$?A$ or $?N$ nigate]]] [v da]]
 (c) $*[VP$ [AP [NP John]-ga [A' [NP suugaku]-*no [A nigate]]] [v da]]

At the initial point of left to right sentence processing, syntax constructs a proposition by building representation (13a), where neither the nominative case *-ga* nor the genitive marker *-no* is licensed, because those two case particles are contained within the fuzzy projection of the AN [$?A$ or $?N$ *nigate*]. Then, the copula [v *da*] selects initially the underspecified projection by the AN [$?A$ or $?N$ *nigate*], and syntax builds structure (13b) (cf. Martin 1975, Kageyama 1982, 1993, Ito & Sugioka 2002, etc.). As in (13c), the copula *da* then triggers selection again, and selects the [+A] feature of the projection of the AN, turning it into the projection of a [+A] category, due to dynamic labeling (2b). As shown in (13c), there thus turns out to be no possibility that the genitive case marker *-no* attached to [NP *suugaku*] is contained within a [+N] projection, and example (12a) is ruled out.

In the same way, syntax fails to parse example (12b). Examine now (14a–c).

- (14) (a) $?[?VP$ or $?NP$ [NP John]-?ga [$?V'$ or $?N'$ [NP nihongo]-?no [$?V$ or $?N$ kenkyuu]]]
 (b) $?[VP$ [$?VP$ or $?NP$ [NP John]-?ga [$?V'$ or $?N'$ [NP nihongo]-?no [$?V$ or $?N$ kenkyuu]]] [v si]]
 (c) $*[VP$ [VP [NP John]-ga [V' [NP nihongo]-*no [v kenkyuu]]] [v si]]

Given the string of words in (12b), syntax first forms a proposition by constructing the underspecified representation in (14a), where the nominative case *-ga* and the genitive case *-no* within the fuzzy projection of the VN [$?V$ or $?N$ *kenkyuu*] are not properly licensed. At the next point of left to right parsing, as in (14b), the light verb *si* first selects the fuzzy projection by the VN [$?V$ or $?N$ *kenkyuu*] (cf. Martin 1975, Kageyama 1982, 1993, Shibatani & Kageyama 1988, Ito & Sugioka 2002, among others). Finally, the light verb *si* triggers selection again, and selects the [+V] feature of the projection of the VN, turning it into the projection of a [+V] category because of dynamic categorization (3b). Here as well, there thus turns out to be no possibility that the genitive case marked NP, *nihongo-no*, is within the projection of a [+N] category. Hence, representation (14c) is also ruled out. Note that to account for the unacceptability of (12a–b), the proposed dynamic categorization analysis appeals to the two step on-line labeling process, (2b) or (3b), in the same way (see (13b–c) and (14b–c); cf. (7b–c) and (8b–c); cf. (10b–c) and (11b–c)).

The dynamic labeling analysis, which appeals to the two step selection mechanism, also accounts for the data in (15a–c) adequately.¹³

- (15) (a) [ANP *kirei*] [V *na*] *ko* ‘a girl who is beautiful’
 beautiful COP girl
 (b) *[NP *gakusei*] [V *na*] *ko* ‘a person who is a student’
 student COP girl
 (c) *[AP *utukusi*] [V *na*] *ko* ‘a girl who is beautiful’
 beautiful COP girl (cf. Martin 1975, Kageyama 1993: 22–40, etc.)

As illustrated in (15b–c), one type of copula verb in Japanese *na* cannot take *gakusei* ‘student’ or *utukusi* ‘beautiful.’ As in (15a), however, the copula verb *na* is allowed to select *kirei* ‘beautiful.’ Given that *utukusi* and *kirei* are basically the same semantically, (15a–c) are highly likely to show that i) *kirei* is indeed an independent, unique category, i.e. an AN, which is distinct from a noun like [N *gakusei*] or from an adjective like [A *utukusi*]; ii) the copula *na* c-selects only an AN (Martin 1975, Kageyama 1982, 1993, Ito & Sugioka 2002, etc.).

Under the assumption that the Japanese copula *na* triggers dynamic categorization (2b) obligatorily, the proposed analysis explains the well-formedness of (15a) by the two step selection mechanism as follows:

- (16) (a) ?[VP [?AP or ?NP *kirei*] [V *na*]] (b) [VP [AP *kirei*] [V *na*]]

As in (16a), at the initial point of processing of the string of words in (15a), the copula *na* first selects the underspecified category, i.e. the AN phrase [?AP or ?NP *kirei*] (cf. Martin 1975, Kageyama 1982, 1993, Ito & Sugioka 2002, etc.), and constructs its own [+V] projection. Then, as in (16b), the copula *na* triggers selection again, and selects the [+A] feature of the AN, turning the fuzzy category into a [+A] projection, [AP *kirei*], due to dynamic categorization (2b). Consequently, the fuzzy AN, i.e. [?A or ?N *kirei*], disappears at the processing stage of (16b). (15b) and (15c) are ruled out, because the obligatory syntactic categorizer *na* does not c-select a [+N] category (see (15b)) or cannot c-select a [+A] category directly (see (15c)).

Exactly in the same way, the dynamic, two-step categorization analysis accounts for the acceptability of the data in (17a–c).

- (17) (a) [VNP *byooki*] [V *si*]-ta. ‘Somebody was ill.’
 illness do-PST
 (b) *[NP *sippe*] [V *si*]-ta. ‘Somebody was ill.’
 illness do-PST
 (c) *[VP *tabe*] [V *si*]-ta. ‘Somebody ate.’
 eat do-PST (cf. Martin 1975, Kageyama 1993: 22–40, etc.)

Observe that as in (17a), the light verb *si* can select *byooki* ‘illness.’ As shown in (17b–c), however, *si* cannot select *sippe* ‘illness’ or *tabe* ‘eat.’ As Kageyama (1993: 26) points out, *byooki* and *sippe* have basically the same meaning, ‘illness/disease.’ (17a–c) are thus likely to imply that i) *byooki* is indeed another distinctive category in Japanese, i.e. a VN, which is different from a noun like [N *sippe*] or from a verb like [V *tabe*]; the light verb *si* c-selects only a VN (Martin 1975, Kageyama 1982, 1993, Shibatani & Kageyama 1988, Ito & Sugioka 2002, among others).

Suppose that the light verb *si* triggers dynamic categorization (3b) obligatorily. The dynamic labeling analysis accounts for the acceptability of (17a) as follows:

- (18) (a) ?[VP [?VP or ?NP *byooki*] [V *si*]] (b) [VP [VP *byooki*] [V *si*]]

As in (18a), at the initial point of left to right processing, the light verb *si* first selects the fuzzy VN projection, i.e. [?VP or ?NP *kenkyuu*], satisfying its initial selectional requirement (cf. Martin 1975, Kageyama 1982, 1993, Shibatani & Kageyama 1988, Ito & Sugioka 2002, etc.). As in (18b), the light verb *si* then triggers selection once again, and

¹³ I am grateful to Yoko Sugioka, who brought to my attention the importance of data such as (15a–c) and (17a–c) for the dynamic categorization analysis proposed in Hoshi (2014, 2019a–b, 2020a–b).

selects the [+V] feature of the VN, turning it into the unambiguous projection [VP *byooki*] by means of dynamic categorization (3b). (17b) and (17c) are rejected, because the light verb *si* does not c-select an NP (see (17b)) or cannot c-select a VP directly (see (17c)).

To summarize, I have argued in this section that ANs and VNs in Japanese are fuzzy categories: (i) in the lexicon, ANs such as *suki* have a disjunction of two options, [+A] or [+N], as in (1a=4a); (ii) VNs such as *kenkyuu* have a disjunction of two features, [+V] or [+N], as in (1b=5a). The AN *suki* and the VN *kenkyuu* thus appear in syntax initially as the fuzzy categories, [?A or ?N *suki*] and [?V or ?N *kenkyuu*], respectively. Under the dynamics of language processing, (i) dynamic labeling (2a) may turn the fuzzy category [?A or ?N *suki*] into the noun [N *suki*] as in (4b); (ii) dynamic categorization (3a) may turn [?V or ?N *kenkyuu*] into the noun [N *kenkyuu*] as in (5b). Depending on syntactic environments, (i) dynamic labeling (2b) may turn the underspecified category [?A or ?N *suki*] into the adjective [A *suki*] as shown in (4c); (ii) dynamic categorization (3b) may turn the fuzzy category [?V or ?N *kenkyuu*] into the verb [V *kenkyuu*] as in (5c).

Here, I have also attempted to clarify the nature of the two step selection triggered by dynamic categorizers. That is, I have tried to show that dynamic categorizers such as case markers or the light verb *si* initially select an underspecified category like an AN, [?A or ?N ...], or a VN, [?V or ?N ...] (see (7b), (8b), (10b), (11b), (13b), (14b), (16a), and (18a)), and then, select an unambiguous feature like [+N], [+A] or [+V] for dynamic labeling (see (7c), (8c), (10c), (11c), (13c), (14c), (16b) and (18b)). Such syntactic categorizers thus trigger selection twice, not just once, dynamically in the course of left to right processing of a string of words; as a consequence, the result of initial selection vanishes at a later stage of sentence processing (see, for example, (16a–b) and (18a–b); cf. Kempson et al. 2001, Cann et al. 2005, Kempson 2016, 2017, among others).

If correct, the dynamic categorization analysis of fuzzy categories in Japanese implies that (i) categorial labeling is dynamic and dependent upon syntactic configurations; (ii) in the course of left to right sentence processing, head-final languages such as Japanese should be able to build some unique phrase structure as a result of an interaction of a fuzzy category and dynamic categorizers. In Sections 3 and 4, I argue that this new type of phrase structure, i.e. ‘mixed category projections,’ which are not endocentric, is indeed formed in Japanese, and such exocentric phrase structure could shed a new light on the nature of ‘light verb construction’ and two different types of ‘temporal construction’ in Japanese (cf. Sugioka 2009: 92, (27b–d)). In so doing, there, I make the following theoretical claim: it is not Theta Theory, but X’ Theory that should be revised or eliminated entirely, in order to account for the properties of such constructions properly (cf. Chomsky’s 2013, 2015 labeling algorithm; contra. Grimshaw & Mester 1988, Hoshi 1994, Saito & Hoshi 2000, etc.).

3. THETA THEORY AND X’ THEORY: JAPANESE LIGHT VERB CONSTRUCTIONS

(19a–b) are two instances of the light verb construction in Japanese¹⁴; (19a–b) are considered to be semantically identical.

- (19) (a) John-ga Mary-kara hooseki-no [VN ryakudatu]-o [V si]-ta.
 John-NOM Mary-from jewelry-GEN stealing-ACC do-PST
 ‘John stole jewelry from Mary.’
 (b) ?John-ga Mary-kara hooseki-o(-sae) [VN ryakudatu]-o [V si]-ta.

¹⁴ For various analyses of the Japanese light verb construction, see Katgeyama (1982, 1993), Grimshaw & Mester (1988), Miyagawa (1989), Terada (1990), Tsujimura (1990), Hasegawa (1991), Sato (1993), Uchida and Nakayama (1993), Hoshi (1994), Matsumoto (1996), Dubinsky (1997), Saito & Hoshi (2000), Miyamoto & Kishimoto (2016), Yuhara (2020), among others. Example (19b) is slightly awkward, probably because of a violation of the ‘surface double-*o*’ constraint (see Harada 1973, Shibatani 1973, Kuroda 1978, 1992, Saito 1985, among others). As well-known, if we attach an adverbial particle like *sae* ‘even’ to the internal argument *hooseki-o* ‘jewelry-ACC,’ (19b) improves, cancelling the surface double-*o* constraint violation to some extent.

John-NOM Mary-from jewelry-ACC(-even) stealing-ACC do-PST
 ‘John stole (even) jewelry from Mary.’ (cf. Grimshaw & Mester 1988, etc.)

Notice that (19a–b) are similar in two significant respects: i) both (19a–b) involve a fuzzy VN, i.e. *ryakudatu* ‘stealing’ (see (1b=5a)); ii) both (19a–b) involve the same two dynamic categorizers, i.e. the accusative case marker *-o* attached to the VN and the light verb *si* (see (3a–b)). The difference between (19a–b) is: in (19a), the theme argument, *hoseeki* ‘jewelry,’ is marked by the genitive case *-no*; in (19b), on the other hand, none of the arguments required by [VN *ryakudatu*] is marked by the genitive case.

Given the important similarities between (19a–b), in this section, I present a novel analysis, i.e. a dynamic categorization analysis, of the Japanese light verb construction, based on Hoshi (2014, 2019b, 2020b). To highlight the theoretical importance of the dynamic labeling analysis, however, I wish (i) to review first Saito & Hoshi’s (2000) LF incorporation analysis of the light verb construction, where Theta Theory is modified in a significant way, and (ii) to point out potential problems for their style of bottom-up structure building account.¹⁵

3.1 Revising Theta Theory: Saito & Hoshi’s (2000) LF Incorporation Analysis

Developing Grimshaw & Mester’s (1988) ARGUMENT TRANSFER analysis in Chomsky’s (1995) Minimalist Program, Saito & Hoshi (2000) suggest an LF incorporation analysis of the Japanese light verb construction. Consider the following derivation Saito & Hoshi (2000: 268, (23)) assign to examples such as (19a):

- (20) (a) [TP [VP John-ga [V’ Mary-kara [NP *hoseeki-no* [N *ryakudatu*]]-o [V *si*]]] ta
 (b) [TP [VP John-ga [V’ Mary-kara [NP *hoseeki-no* *t_N*]-o [V [N *ryakudatu*] [V *si*]]]] ta]

At the initial point of the derivation in (20a), the nominal θ -marker [N *ryakudatu*] assigns its theme θ -role to *hoseeki* within its own [+N] projection in its base position. Importantly, Saito & Hoshi (2000) revise Theta Theory so that a predicate may assign a θ -role even after movement (cf. Chomsky 1965, 1981, 1986, 1995), and suggest that as in (20b), the nominal θ -marker [N *ryakudatu*] undergoes head movement, adjoins to the light verb *si*, and then, assigns a source role to *Mary-kara* ‘from Mary’ and an agent role to *John-ga* within the [+V] projection of the light verb in LF¹⁶.

Similarly, Saito & Hoshi (2000: 269, (24b)) assign derivation (21a–b) to light verb constructions such as (19b).

- (21) (a) [TP [VP John-ga [V’ Mary-kara [V’ *hoseeki-o* [NP [N *ryakudatu*]]-o [V *si*]]]] ta
 (b) [TP [VP John-ga [V’ Mary-kara [V’ *hoseeki-o* [NP *t_N*]-o [V [N *ryakudatu*] [V *si*]]]]]] ta]

At the initial point of the derivation in (21a), the nominal θ -marker [N *ryakudatu*] does not assign any θ -role to any of its arguments within its own [+N] projection in its base position. As shown in (21b), after the LF head-adjunction to the light verb *si*, the nominal θ -marker [N *ryakudatu*] discharges a theme role to *hoseeki-o*, a source role to *Mary-kara*, and an agent role to *John-ga* within the [+V] projection of the light verb *si*.

In brief, Saito & Hoshi (2000) attempt to account for the properties of the Japanese light verb construction

¹⁵ Since the publication of Grimshaw & Mester (1988), numerous analyses of Japanese light verb construction have been proposed (see fn. 14; references cited in Miyamoto & Kishimoto 2016). Here, I review Saito & Hoshi’s (2000) LF incorporation analysis, because it contrasts with the proposed dynamic categorization analysis particularly sharply in terms of the treatment of Theta Theory and X’ Theory.

¹⁶ Grimshaw & Mester (1988: 213) propose: in Japanese light verb constructions such as (19a–b), a nominal θ -marker like [N *ryakudatu*] may TRANSFER arguments to the light verb *su* in the lexicon, because *su* has an incomplete or skeletal argument structure—one with “space” for the addition of arguments. On Grimshaw & Mester’s (1988) account, it is thus the complete lack of semantic features of the light verb that licenses the ‘lexical’ complex predicate formation, called argument transfer. Developing this idea by Grimshaw & Mester (1988) in Chomsky’s (1995) minimalism, Saito & Hoshi (2000) propose a ‘predicate raising’ analysis as in (20a–b) and (21a–b), and imply that the absence of semantic content of the Japanese light verb allows a nominal θ -marker like [N *ryakudatu*] to carry out θ -marking within its V projection.

by adopting X' Theory rigidly, while relaxing Theta Theory (cf. Chomsky 1965, 1981, 1986, 1995, etc.). That is, Saito & Hoshi propose that nominal θ -markers such as [N *ryakudatu*] construct a [+N] projection strictly in accordance with X' Theory, whereas a predicate may assign θ -roles not only in its base position, but also after movement. For Saito & Hoshi (2000), the Japanese light verb construction is thus a construction which shows quite clearly that a predicate may assign θ -roles even after movement (cf. Chomsky's 1981 Move α ; Saito's 1985 scrambling analysis of the free word order phenomenon; Lasnik and Saito's 1992 Affect α).

Though it seems plausible, Saito & Hoshi's LF incorporation analysis is not free from problems. First, there does not seem to be much independent evidence yet for Saito & Hoshi's (2000) main claim that a predicate can assign θ -roles even after movement (cf. Frege's principle of compositionality; Chomsky 1965, 1981, 1986, 1995, etc.). Second, it is not entirely clear how Saito & Hoshi (2000) explain that (19a–b) are semantically the same. Their LF representation for (19a) is (20b), and their LF for (19b) is (21b). Apparently, (20b) and (21b) are significantly different. A question thus arises as to what kind of meaning-calculation mechanism we need besides those two distinct LF representations to capture the semantic identity of (19a–b).

Third, like Grimshaw & Mester (1988), Saito & Hoshi (2000) consider a nominal θ -marker like *ryakudatu* to be just a [+N] category (see structures (20a–b) and (21a–b)). That is, Saito & Hoshi do not recognize a VN as a unique category in Japanese, and overlook the fuzziness of a VN. Hence, the unacceptability of (12b), repeated here as (22), could pose a potential problem for Saito & Hoshi (2000).

(22) * John-ga [VNP nihongo-no [VN kenkyuu]] si-ta. (= 12b)

John-NOM Japanese-GEN research do-PST

'John studied Japanese.'

(cf. Kageyama 1993: 10, 22–40, Chapter 5)

Consider below the derivation in (23a–b), which Saito & Hoshi (2000) are likely to suggest for (22).

(23) (a) [TP [VP John-ga [NP nihongo-no [N kenkyuu]] [V si] ta]

(b) [TP [VP John-ga [NP nihongo-no t_N][V [N kenkyuu] [V si]]ta]

As in (23a), the nominal θ -marker [N *kenkyuu*] first assigns a theme role to *nihongo-no* 'Japanese-GEN' within its own [+N] projection (cf. (20a)). As shown in (23b), after adjoining to the light verb *si*, [N *kenkyuu*] assigns an agent role to *John-ga* within the [+V] projection of the light verb (cf. (20b)). Given that the genitive case marked theme argument *hooseki-no* 'jewelry-GEN' is well-formed in structure (20b) on Saito & Hoshi's (2000) account, there does not seem to be any obvious reason why the genitive case marked theme *nihongo-no* is disallowed in (23b) (cf. Baker 1988: 96–105); the ill-formedness of (22) thus constitutes a potential problem for Saito & Hoshi (2000). Likewise, precisely because Saito & Hoshi (2000) consider the nominal θ -marker *ryakudatu* to be just an N, and do not regard a VN as a distinctive category which is different from an N or from a V, it is not clear how they explain the contrast in (17a–b). Recall that the light verb *si* can select *byooki* 'illness' (see (17a)), whereas the light verb cannot select *sippe* 'illness' (see (17b)). As Kageyama (1993: 26) argues, *byooki* and *sippe* mean the same thing. It thus seems to be the different categorial labels for *byooki* and *sippe*, i.e. VN and N, that do yield the contrast between (17a) and (17b).

Fourth, it is not clear, either, how Saito & Hoshi (2000) type complex predicate formation analysis accounts for the following data:¹⁷

(24) (a) [Mary-kara hooseki-no ryakudatu-o]i John-ga ei si-ta.

Mary-from jewelry-GEN stealing-ACC John-NOM do-PST

'[VP Steal jewelry from Mary]i, John did ei.'

(b) ?[Mary-kara hooseki-o(-sae) ryakudatu-o]i John-ga ei si-ta.

Mary-from jewelry-ACC(-even) stealing-ACC John-NOM do-PST

(cf. Kageyama 1993: 313–315; Sato 1993: 103, (14a), etc.)

In Saito & Hoshi's (2000) structure (20a) for (19a), crucially, [*Mary-kara hooseki-no ryakudatu-o*] is not a

¹⁷ See Kempson & Kiaer (2010) for a dynamic syntactic analysis of the free word order phenomenon in Japanese.

constituent; but it is displaced as a constituent to the sentence-initial position in (24a). In their structure (21a) for (19b), crucially again, [*Mary-kara hooseki-o(-sae) ryakudatu-o*] does not form a constituent, either; but it is placed as a constituent at the sentence-initial position in (24b). Hence, [*Mary-kara hooseki-no ryakudatu-o*] in (19a/24a) and [*Mary-kara hooseki-o(-sae) ryakudatu-o*] in (19b/24b) are truly SURPRISING CONSTITUENTS for Saito & Hoshi (2000) (cf. Koizumi 1995, Takano 2002).¹⁸ A question thus arises as to if Saito & Hoshi (2000) can account for the nature of these displaced constituents adequately. The well-formedness of (24a–b) could be rather serious for Saito & Hoshi, because if it turns out that these displaced constituents are not at all surprising, but standard constituents, it in turn implies that there is nothing peculiar about θ -marking by the VN *ryakudatu* in Japanese light verb constructions (19a–b) and (24a–b), denying the very core of their incorporation account (cf. Grimshaw & Mester 1988, Kageyama 1993, Sato 1993, etc.).¹⁹

Fifth, only head-final languages such as Japanese and Korean with a fuzzy category, i.e. a VN, seem to have the type of light verb construction like (19a–b) and (24a–b) (cf. O’Grady 1991, etc.). Saito & Hoshi do not comment on this observation, and thus, it is not clear how their type of incorporation analysis explains it.²⁰

There is certainly a possibility that these five potential problems indicate that we should find an adequate way to revise and improve Saito & Hoshi (2000) style analysis, which modifies Theta Theory in a significant way. There is also a possibility, however, that the five problems mentioned above imply that it is indeed Saito & Hoshi’s (2000) main claim about θ -marking that is really problematic²¹ (cf. Grimshaw & Mester 1988, etc.), and thus, we need a fundamentally different approach to the Japanese light verb construction.

Below, based on Hoshi (2014, 2019b, 2020b), I explore the latter possibility from a dynamic syntactic

¹⁸ Koizumi (1995) accounts for the nature of ‘surprising constituents’ in Japanese by verb raising, and Takano (2002) does so by means of scrambling (cf. Saito 1985). See Takano (2002), Kempson & Kiaer (2010), etc. for arguments against Koizumi’s verb raising analysis. Saito & Hoshi (2000) cannot apply Takano’s (2002) analysis to ‘surprising constituents’ in (24a–b), for a VN can never be scrambled as shown below:

(i) *[_{VN} ryakudatu]_i-o John-ga Mary-kara hooseki-o e_i si-ta.
stealing-ACC John-NOM Mary-from jewelry-ACC do-PST
‘John stole jewelry from Mary.’ (cf. Grimshaw & Mester 1988, etc.)

¹⁹ Under Kageyama’s (1993: 313–315) analysis of the Japanese light verb construction, both [*Mary-kara hooseki-no ryakudatu*]-o in (19a) and [*Mary-kara hooseki-o(-sae) ryakudatu*]-o in (19b) are analyzed as standard constituents. However, the well-formedness of (24a–b) is not expected by his analysis. This is because to account for the nature of Japanese light verb constructions, Kageyama (1993: 313–315) proposes that a VN like *ryakudatu* undergoes ‘abstract incorporation’ (in the sense of Baker 1988: 96–105, etc.), and forms a complex predicate with the light verb *su*. Hence, on his account, the displacement operations in (24a–b), which separate [_{VN} *ryakudatu*] from the light verb, should make such complex predicate formation impossible (cf. Baker 1988, etc.).

Sato (1993: 103, (14a)) observes examples similar to (24a–b), and proposes an LF inheritance analysis of the Japanese light verb construction (cf. O’Grady’s 1991 categorial grammatical analysis). Under Sato’s (1993) analysis as well, the displaced elements in (24a–b) are ‘surprising constituents’; to account for the acceptability of such examples, Sato (1993: 103–104) is forced to apply scrambling to a nominal θ -marker like *ryakudatu* (see, however, *(i) in fn. 18) and to stipulate that the scrambled nominal θ -marker and the light verb *su* may form a ‘discontinuous complex predicate.’

²⁰ Japanese light verb construction (ia) contrasts with the English counterpart in (ib).

(i) (a) John-ga [_{NP} sore]-o katakunani [_{VN} syutyoo]-o si-ta.
John-NOM it-ACC stubbornly claim-ACC do-PST
‘John claimed it stubbornly.’
(b) *John made a [_N claim] [_{DP} it] stubbornly.

(ia) is acceptable, whereas (ib) is totally out. The striking difference between (ia–b) seems to suggest that the Japanese light verb construction is distinct from the English one; these two constructions should be analyzed differently.

²¹ Hoshi (1994) is based on Saito & Hoshi’s (2000) main claim about θ -marking, and encounters various problems like the ones in the text. See Yumoto (2005: 142, 173–174, 180, 298) for more criticisms of Saito & Hoshi (2000) type θ -marking analysis.

perspective, by paying special attention to i) one type of fuzzy category in Japanese, i.e. a VN; and ii) two dynamic categorizers, i.e. a case marker and the light verb *su*. Importantly, contrary to Saito & Hoshi (2000), on the proposed dynamic categorization analysis, I maintain Chomsky (1995) type Configurational Theta Theory strictly as it is, and propose that we should rather eliminate X' Theory entirely (cf. Chomsky 2013, 2015).

3.2 Eliminating X' Theory: A Dynamic Labeling Analysis

Given dynamic categorization conditions (3a–b), the dynamic labeling analysis may assign roughly the following parsing process to light verb construction (19a):²²

- (25) (a) $?$ [$?$ VP or $?$ NP John- $?$ ga [$?$ V' or $?$ N' Mary- $?$ kara [$?$ V' or $?$ N' hooseki- $?$ no [$?$ V or $?$ N ryakudatu]]]]]
 (b) $?$ [$?$ VP or $?$ NP John- $?$ ga [$?$ V' or $?$ N' Mary- $?$ kara [$?$ V' or $?$ N' hooseki- $?$ no [$?$ V or $?$ N ryakudatu]]-o]]]
 (c) $?$ [$?$ VP or $?$ NP John- $?$ ga [$?$ V' or $?$ N' Mary- $?$ kara [N' hooseki-no [N ryakudatu]]-o]]
 (d) $?$ [VP [$?$ VP or $?$ NP John- $?$ ga [$?$ V' or $?$ N' Mary- $?$ kara [N' hooseki-no [N ryakudatu]]-o]] [v si]]
 (e) [VP [VP John-ga [v' Mary-kara [N' hooseki-no [N ryakudatu]]-o]]] [v si]]

To form a propositional unit as efficiently and as quickly as possible (cf. Kempson et al. 2001, Cann et al. 2005, etc.), first, syntax processes the string of words in (19a) from left to right, and builds the fuzzy projection in (25a), the head of which is the fuzzy VN, [$?$ V or $?$ N ryakudatu]. Here, neither the nominative case *-ga*, the postposition *-kara*, nor the genitive case *-no* is licensed, because they are within the projection underspecified with respect to [+V] or [+N] (see (1b=5a)). As shown in (25b), at the next processing stage, the accusative case marker *-o*, a morphological dynamic categorizer, comes, and attaches to the second lowest projection, selecting initially the fuzzy [$?$ V' or $?$ N' ...] projection. As in (25c), the accusative case marker then selects the [+N] feature of the VN projection, turning it into a [+N] projection by means of dynamic categorization (3a). At this stage, the genitive case marker *-no* turns out to be within the projection of a [+N] category, and is successfully licensed. After that, as in (25d), the light verb *si*, a syntactic updater, comes, and selects first the whole fuzzy projection by the VN ryakudatu, satisfying its initial selectional requirement. Then, as illustrated in (25e), the light verb *si* triggers selection again, and selects the [+V] feature of the whole fuzzy projection, turning the underspecified projection into a [+V] projection through dynamic categorization (3b). Consequently, in (25e), exocentric phrase structure, i.e. one type of mixed category projection, [VP John-ga [v' Mary-kara [N' hooseki-no [N ryakudatu]]-o]], is formed; the nominative case marker *-ga* and the postposition *-kara* are properly licensed within the [+V] projection, and the acceptability of (19a) is accounted for (cf. Saito & Hoshi's 2000 LF representation (20b) for (19a)).

The dynamic categorization analysis can assign the following parsing process to the Japanese light verb construction in (19b), accounting for its well-formedness:

- (26) (a) $?$ [$?$ VP or $?$ NP John- $?$ ga [$?$ V' or $?$ N' Mary- $?$ kara [$?$ V' or $?$ N' hooseki- $?$ o [$?$ V or $?$ N ryakudatu]]]]]
 (b) $?$ [$?$ VP or $?$ NP John- $?$ ga [$?$ V' or $?$ N' Mary- $?$ kara [$?$ V' or $?$ N' hooseki- $?$ o [$?$ V or $?$ N ryakudatu]]-o]]
 (c) $?$ [$?$ VP or $?$ NP John- $?$ ga [$?$ V' or $?$ N' Mary- $?$ kara [$?$ V' or $?$ N' hooseki- $?$ o [N ryakudatu]]-o]]
 (d) $?$ [VP [$?$ VP or $?$ NP John- $?$ ga [$?$ V' or $?$ N' Mary- $?$ kara [$?$ V' or $?$ N' hooseki- $?$ o [N ryakudatu]]-o]] [v si]]
 (e) [VP [VP John-ga [v' Mary-kara [v' hooseki-o [N ryakudatu]]-o]]] [v si]]

²² Following Grimshaw & Mester (1988), here, I assume that the Japanese light verb does not have any θ -role (see fn. 16), but may license the accusative case *-o*. Kageyama (1993: 280) observes, however, that there are two types of native speakers of Japanese. According to Kageyama (1993: 280), one type of speakers accepts consistently examples like the one below, as expected by Grimshaw & Mester (1988), but the other type of speakers rejects such examples.

(i) (*) mizu-ga [VN zyoohatu]-o [v si]-ta.
 water-NOM evaporation-ACC do-PST 'Water evaporated.' (Kageyama 1993)

It seems that for those who reject examples such as (i), the light verb with the accusative case licensing capability is a control predicate with an external θ -role (cf. Miyagawa 1989, Tsujimura 1990, Terada 1990, Uchida & Nakayama 1993, Yuhara 2000, etc.).

As shown in (26a), to construct a proposition as efficiently as possible (cf. Kempson et al. 2001, Cann et al. 2005, etc.), syntax first parses the string of words in (19b) from left to right, and constructs the fuzzy projection whose head is the VN [$?V$ or $?N$ *ryakudatu*]. At this stage, neither the nominative case *-ga*, the postposition *-kara*, nor the accusative case *-o* is licensed, because they are within the projection of the underspecified category. As shown in (26b), at the next stage, the accusative case marker *-o* comes, and then, attaches to the lowest fuzzy category, satisfying its initial selectional requirement. As illustrated in (26c), the accusative case marker then triggers selection once again, and selects the [+N] feature of the VN *ryakudatu* as a dynamic categorizer. Because of this two step selection, the lowest fuzzy category is turned into a [+N] category, [N *ryakudatu*] (see morphological labeling (3a)). As in (26d), then, another dynamic categorizer, the light verb *si*, comes, and selects the whole fuzzy projection of the VN *ryakudatu*, satisfying its first selectional requirement. Last, as in (26e), the light verb then selects the [+V] feature of the underspecified projection by [VN *ryakudatu*] (see syntactic labeling (3b)). At this final stage, distinctive phrase structure, i.e. [VP *John-ga* [V' *Mary-kara* [V' *hooseki-o* [N *ryakudatu*]-*o*]]], which is not endocentric, is constructed; the nominative case *-ga*, the postposition *-kara*, and the accusative case *-o* attached to the theme argument, *hooseki*, are all successfully licensed within the newly created [+V] projection. The well-formedness of light verb construction (19b) is thus also accounted for (cf. Saito & Hoshi's 2000 LF representation in (21b) for (19b)).

Notice here that under the proposed analysis with dynamic, context-dependent categorial labeling, there is nothing special about θ -marking by a VN like [$?V$ or $?N$ *ryakudatu*] (contra. Grimshaw & Mester 1988, Hoshi 1994, Saito & Hoshi 2000, etc.). That is, under the proposed analysis, a predicate always projects its semantic representation in its 'base' position (Frege's principle of compositionality; Chomsky 1965, 1981, 1986, 1995, etc.). Consequently, we can obtain the same representation like the one in (27) for Japanese light verb constructions (19a–b), putting aside formal features such as categorial or case features.

(27) [John ... [Mary-kara ... [hooseki ...[ryakudatu]]]] (*proposition*)

In the simplified representation in (27) for both (19a) and (19b), the predicate, [VN *ryakudatu*], and its arguments form a 'proposition'; they are structurally arranged in a usual manner. Namely, the theme *hooseki* is the closest to the predicate *ryakudatu*; the source *Mary-kara* is the second closest to the predicate; the agent *John* is the least closest to the predicate, *ryakudatu* (cf. Chomsky's 2000 'phases'). The representation in (27) thus allows us to capture directly the semantic identity of light verb constructions in (19a–b) (cf. Saito & Hoshi's 2000 LF structures (20b) and (21b)).

Precisely because of this reason, on the proposed dynamic labeling analysis, the displaced constituents in (24a–b), [*Mary-kara hooseki-no ryakudatu*]-*o* and [*Mary-kara hooseki-o(-sae) ryakudatu*]-*o*, turn out to be just normal constituents which are part of mixed category projections (28a–b), respectively; and the acceptability of (24a–b) is also accounted for.

(28) (a) [VP John-ga [V' Mary-kara [N' hooseki-no [N ryakudatu]]-o]]

(b) [VP John-ga [V' Mary-kara [V' hooseki-o(-sae) [N ryakudatu]-o]]]

Examine structures (28a–b) formed by two different types of dynamic categorization conditions (3a) and (3b). ((28a) and (28b) are mixed category projections taken from (25e) and (26e), respectively.) In (28a–b), the lower part of the projection of the fuzzy VN [$?V$ or $?N$ *ryakudatu*] is updated as a [+N] projection by (3a), whereas the upper part is updated as a [+V] projection by (3b) (cf. Sugioka's (2009: 92, (27b–d)) analysis of a related construction). The dislocated constituent in (24a) corresponds to [V' *Mary-kara* [N' *hooseki-no* [N *ryakudatu*]]-*o*] in (28a); the displaced constituent in (24b) is regarded as [V' *Mary-kara* [V' *hooseki-o(-sae)* [N *ryakudatu*]-*o*] in (28b). Under the proposed analysis, the two constituents in (24a–b) are significantly different with respect to their categorial labels, dynamically determined by (3a) and (3b) in the course of left to right sentence processing. Importantly, however, these two constituents in (24a–b) are identical from a semantic perspective. That is, in (28a–b), the displaced constituents in (24a–b) are analyzed as the same standard 'predicate phrase,' which contains all the internal arguments required by the VN *ryakudatu*, configurationally arranged exactly in the same way (see also (27); cf. Kageyama 1993: 313–315). This is why those constituents in (24a–b) are allowed to be placed at the sentence initial position in the same way.

Consequently, both the well-formedness and the semantic identity of (24a–b) are successfully accounted for, by appealing to the exocentric phrase structures, i.e. the mixed category projections, in (28a–b) under the dynamic, two-step categorization analysis.

On the other hand, as I point out above, for Saito & Hoshi (2000) type complex predicate formation analysis, the displaced constituents in (24a–b) are truly ‘surprising constituents’ (see Saito & Hoshi’s 2000 structures (20a–b) and (21a–b)). Furthermore, it does not seem to be possible for Saito & Hoshi (2000) type bottom-up structure building analysis to assign mixed category projections like the ones in (28a–b) to the displaced constituents in (24a–b). This is because the representations in (28a–b) are not endocentric, and thus, in violation of X’ Theory (Chomsky 1981, 1986, etc.), which is indeed the basis of Saito & Hoshi’s LF incorporation analysis.

In summary, I have tried to argue in this section that not complex predicate formation (Grimshaw & Mester 1988, Hoshi 1994, Saito & Hoshi 2000, among many others), but the interaction among a fuzzy VN (see (1b=5a)) and two different types of dynamic categorizers that displays the intriguing properties of Japanese light verb construction (see (3a–b); Hoshi 2014, 2019b, 2020b). Namely, I have proposed here that in the course of left to right parsing of a string of words, a VN first forms a fuzzy projection (see (25a) and (26a)). Then, the lower part of the fuzzy projection gets updated by the accusative case marker *-o* in accordance with morphological dynamic labeling condition (3a) (see (25c) and (26c)). Finally, the upper part gets updated by the light verb *si* by means of syntactic labeling condition (3b). Consequently, mixed category projections such as (28a–b), which are not endocentric, are formed (see also (25e) and (26e)). An important claim here is: i) the fuzzy VN [$?_V$ or $?_N$ *ryakudatu*], the noun [$_N$ *ryakudatu*], and the verb [$_V$ *ryakudatu*] differ significantly with respect to their categorial features; however, ii) these three lexical items with such distinct categorial labels are semantically equivalent (see fn. 6 and fn. 7; cf. Hudson 1998: 5–8, Huddleston and Pullum 2002: 30–31, etc.); hence, (iii) mixed category projections, which are not consistent with the X’ schema (cf. Chomsky 1981, 1986, etc.), are semantically coherent within their projections (see (27)).

The proposed dynamic labeling analysis predicts the existence of another kind of light verb construction in (29).

- (29) John-ga Mary-kara-no hooseki-no [VN ryakudatu]-o [v si]-ta.
 John-NOM Mary-from-GEN jewelry-GEN stealing-ACC do-PST
 ‘John stole jewelry from Mary.’ (cf. Kageyama 1993, Chapter 5)

In (29), the source and the theme of the VN *ryakudatu* are both marked by the genitive case *-no* (cf. (19a–b)); the agent argument of [$_N$ *ryakudatu*] is marked by the nominative case *-ga*.²³

Under the proposed analysis, the presence of the following three parsing stages is suggested for (29):

- (30) (a) $?[?_{VP}$ or $?_{NP}$ John- $?_{ga}$ [$?_V$ ’ or $?_N$ ’ Mary-kara- $?_{no}$ [$?_V$ ’ or $?_N$ ’ hooseki- $?_{no}$ [$?_V$ or $?_N$ *ryakudatu*]]]
 (b) $?[?_{VP}$ or $?_{NP}$ John- $?_{ga}$ [$_N$ ’ Mary-kara-no [$_N$ ’ hooseki-no [$_N$ *ryakudatu*]]]-o]
 (c) [$_VP$ [$_VP$ John-ga [$_N$ ’ Mary-kara-no [$_N$ ’ hooseki-no [$_N$ *ryakudatu*]]]-o] [$_V$ si]]

As in (30a), at the initial stage of left to right sentence processing, the VN *ryakudatu* builds a fuzzy projection (cf. (25a) and (26a)). Then, as illustrated in (30b), a morphological dynamic categorizer, i.e. the accusative case marker *-o*, comes, and first selects the second highest fuzzy projection by [$_N$ *ryakudatu*]. The accusative case marker then selects the [$+N$] feature of the fuzzy projection, turning it into a [$+N$] projection in accordance with categorization condition (3a) (cf. (25c) and (26c)). At the parsing stage of (30b), the two genitive case markers are thus licensed

²³ Grimshaw & Mester (1988) claim that examples such as (29) are unacceptable. To account for the unacceptability of such examples, Grimshaw & Mester (1988: 215) stipulate that at least one internal argument of a nominal θ -marker like [$_N$ *ryakudatu*] must be ‘transferred’ to the light verb *su* in the lexicon, and must appear at the sentential level. This account together with the factual observation is, however, challenged by Kageyama (1993: 296–297), etc. Here, I assume that examples such as (29) are acceptable, following Kageyama (1993), among others.

within the [+N] projection. As in (30c), a syntactic updater, i.e. the light verb *si*, then follows, and selects the highest fuzzy [$?V$ or $?N$...] projection initially. Finally, the light verb *si* selects the [+V] feature of the fuzzy projection of [VN *ryakudatu*], turning the upper, fuzzy projection into a [+V] projection by dynamic labeling condition (3b) (cf. (25e) and (26e)); in (30c), the nominative case *-ga* is licensed within the [+V] projection. Consequently, as below, there emerges another type of mixed category projection where (i) the lower part of the fuzzy VN category gets updated as a [+N] projection due to (3a); (ii) the highest part gets updated as a [+V] category because of (3b):

(31) [VP John-ga [N' Mary-kara-no [N' hooseki-no [N ryakudatu]]]-o] (cf. (28a–b))

Last, the dynamic categorization analysis also accounts for the nature of the following ill-formedness adequately:²⁴

(32) *John-no Mary-kara-no hooseki-no [VN ryakudatu]-o [V si]-ta.
 John-GEN Mary-from-GEN jewelry-GEN stealing-ACC do-PST
 ‘John stole jewelry from Mary.’ (cf. Grimshaw & Mester 1988, etc.)

Three important processing stages suggested for (32) by the proposed analysis are given below:

(33) (a) $?[?VP$ or $?NP$ John- $?no$ [$?V'$ or $?N'$ Mary- $ara-?no$ [$?V'$ or $?N'$ hooseki- $?no$ [$?V$ or $?N$ ryakudatu]]]
 (b) [NP John-no [N' Mary-kara-no [N' hooseki-no [N ryakudatu]]]]-o
 (c) *[VP [NP John-no [N' Mary-kara-no [N' hooseki-no [N ryakudatu]]]]-o [V si]]

As in (33a), the VN *ryakudatu*, i.e. a fuzzy category, first builds up an underspecified projection (cf. (25a), (26a) and (30a)). Then, as shown in (33b), the accusative case *-o* comes, and selects initially the whole fuzzy projection by [VN *ryakudatu*]. The accusative case marker then selects the [+N] feature of the fuzzy projection, turning the entire fuzzy projection into a [+N] projection due to dynamic labeling condition (3a) (cf. (25c), (26c) and (30b)). As illustrated in (33c), finally, there comes the light verb *si*, i.e. an obligatory dynamic categorizer. The light verb *si* cannot, however, select a fuzzy [$?V$ or $?N$...] category at the parsing point of (33c) in accordance with dynamic categorization condition (3b). This is because the whole fuzzy projection has already been turned into a [+N] category, and has disappeared (see the parsing stage of (33b)). Recall that the Japanese light verb *si* cannot select a [+N] category (see the contrast between (17a–b)). Representation (33c) thus turns out to be illicit like (17b) (cf. (25e), (26e), and (30c)).

If successful, the proposed dynamic categorization analysis suggests that (i) categorial labeling is indeed dependent upon on-line processing; (ii) in the course of left to right processing of a string of words, a head-final language like Japanese necessarily forms in the light verb construction, exocentric phrase structure, i.e. mixed category projections, constructed by an interaction of a fuzzy VN and dynamic categorizers; (iii) to account for the nature of Japanese light verb construction adequately, we should rather eliminate X' Theory entirely, while maintaining Chomsky (1995) type Theta Theory strictly as it is (contra. Grimshaw & Mester 1988, Hoshi 1994, Saito & Hoshi 2000, among others).

4. MIXED CATEGORY PROJECTIONS AND ON-LINE, CONTEXT-DEPENDENT COMPOUNDING

In this section, I argue that the proposed dynamic categorization analysis of the light verb construction is directly applicable to two different types of ‘temporal construction’ in Japanese; that it reveals a variety of intriguing properties of those constructions. Here, I argue, in particular, that Japanese, i.e. a head-final language with a fuzzy VN, may form not only MIXED CATEGORY PHRASES but also MIXED CATEGORY WORDS on-line.

Consider now (34a–b), called ‘temporal constructions’ in Japanese (cf. Iida 1987, Shibatani & Kageyama 1988, Kageyama & Shibatani 1989, Miyagawa 1991, Kageyama 1993, Sugioka 2009, among others).

(34) (a) John-ga Mary-kara hooseki-no [VN ryakudatu]-no [N ori],
 John-NOM Mary-from jewelry-GEN stealing-GEN occasion,
 ‘When John steals/stole jewelry from Mary,’

²⁴ Importantly, native speakers who consistently accept examples such as (i) in fn. 22 also reject examples such as (32).

- (b) John-ga Mary-kara hooseki-o [VN ryakudatu]-no [N ori],
 John-NOM Mary-from jewelry-ACC stealing-GEN occasion,

(cf. Kageyama 1993: 38, (57), etc.)

Temporal constructions (34a–b) are very much similar to light verb constructions (19a–b). As in (19a–b), in (34a–b), (i) the fuzzy category [VN *ryakudatu*] is used; (ii) one type of dynamic categorizer, i.e. the genitive case marker *-no*, is attached to the fuzzy VN. Exactly like (19a–b), the difference between (34a–b) is: only the theme argument of the VN *ryakudatu* is marked by the genitive case *-no* in (34a); none of the arguments of [VN *ryakudatu*] is marked by the genitive case in (34b).

Significantly, however, there is an important difference between (19a–b) and (34a–b): temporal constructions (34a–b) lack the light verb *su*; and this difference could pose a potential problem for various types of complex predicate formation analysis of the Japanese light verb construction (cf. Grimshaw & Mester 1988, Hoshi 1994, Saito & Hoshi 2000, among many others). This is so, because on such accounts, it is a special, semantic property of the light verb *su*, i.e. complete lack of semantic content, which permits complex predicate formation, displaying the above mentioned properties of Japanese light verb constructions (see (20b) and (21b); fn. 16). Thus, for such complex predicate formation analyses, a question arises as to why temporal constructions (34a–b) without the light verb *su* display the properties that light verb constructions (19a–b) do; the absence of the light verb *su* in (34a–b) might in turn imply that such intriguing properties of the Japanese light verb construction do not have anything to do with the skeletal argument structure of the light verb *su* (contra. Grimshaw & Mester 1988, Hoshi 1994, Saito & Hoshi 2000, among many others).

However, if we suppose that like the light verb *su*, temporal head nouns such as *ori* ‘occasion’ update a fuzzy VN as a dynamic categorizer in accordance with (3b), it turns out that exactly like light verb constructions (19a–b), temporal constructions (34a–b) have (i) one fuzzy category, i.e. a VN, (see (1b=5a)) and (ii) two dynamic categorizers: the genitive case marker *-no* (see (3a)) and the temporal head noun *ori* (see (3b)). Furthermore, in both (19a–b) and (34a–b), these three types of lexical items appear in the same linear order: as predicted by Dynamic Syntax, a fuzzy VN comes first; then, follows a morphological dynamic categorizer, i.e. a case marker (see (3a)); finally, there comes a syntactic categorizer, i.e. the light verb *su* or the temporal noun *ori* (see (3b)). Consequently, under the proposed dynamic labeling analysis, the properties of (34a–b) are accounted for exactly in the same way as those of (19a–b).

With this in mind, examine below the parsing process suggested for the temporal construction in (34a) by the dynamic categorization analysis (cf. (25a–e)):

- (35) (a) $?[?VP \text{ or } ?NP \text{ John-?ga } [?V' \text{ or } ?N' \text{ Mary-?kara } [?V' \text{ or } ?N' \text{ hooseki-?no } [?V \text{ or } ?N \text{ ryakudatu}]]]]$
 (b) $?[?VP \text{ or } ?NP \text{ John-?ga } [?V' \text{ or } ?N' \text{ Mary-?kara } [?V' \text{ or } ?N' \text{ hooseki-?no } [?V \text{ or } ?N \text{ ryakudatu}]]\text{-no }]]$
 (c) $?[?VP \text{ or } ?NP \text{ John-?ga } [?V' \text{ or } ?N' \text{ Mary-?kara } [N' \text{ hooseki-no } [N \text{ ryakudatu}]]\text{-no }]]$
 (d) $?[NP [?VP \text{ or } ?NP \text{ John-?ga } [?V' \text{ or } ?N' \text{ Mary-?kara } [N' \text{ hooseki-no } [N \text{ ryakudatu}]]\text{-no }]] [N \text{ ori}]$
 (e) $[NP [\underline{VP \text{ John-ga } [v' \text{ Mary-kara } [N' \text{ hooseki-no } [N \text{ ryakudatu}]]\text{-no }]}] [N \text{ ori}]$

To form a propositional unit as efficiently and as quickly as possible, at the initial stage of left to right sentence processing, syntax builds the fuzzy projection in (35a) whose head is the fuzzy VN [?V or ?N *ryakudatu*]. At this point, neither the nominative case *-ga*, the postposition *-kara*, nor the genitive case marker *-no* is licensed, because they are within the fuzzy projection (cf. (25a)). At the next stage, as in (35b), the genitive case marker *-no* comes, and selects the second lowest fuzzy projection, satisfying its initial c-selectional requirement (cf. (25b)). As shown in (35c), the genitive case *-no* then selects the [+N] feature of the underspecified projection like the accusative case *-o* in (25c), and turns it into a [+N] projection due to morphological labeling condition (3a) (cf. Sugioka 2009: 92, (27b–d)). At this point, the genitive case *-no* attached to [NP *hooseki*] is properly licensed within the unambiguous [+N] projection (cf. (19a); cf. *(12b)=*(22)). As illustrated in (35d), there then follows the temporal head noun *ori*, and selects the whole fuzzy projection by [VN *ryakudatu*] (cf. (25d)). Then, as shown in (35e), the temporal head

noun *ori* triggers selection once again, and does c-select the [+V] feature of the fuzzy projection like the light verb *su* in (25e), turning it into a [+V] projection due to syntactic labeling condition (3b) (cf. Kageyama 1993: 37, Sugioka 2009: 90). Consequently, the nominative case marker *-ga* and the postposition *-kara* are properly licensed within the [+V] projection at this final stage, and as a result, one type of mixed category projection is constructed, as illustrated in (35e) (cf. (28a)).²⁵

Under the proposed dynamic categorization analysis, structure (36) is assigned to the other temporal construction in (34b) as the finally fixed representation; and the well-formedness of temporal construction (34b) is accounted for exactly in the same way as light verb construction (19b) (cf. (26a–e)).

(36) [NP [VP John-ga [v' Mary-kara [v' hooseki-o [N ryakudatu]-no]]] [N ori]]

As shown in (36) for (34b), the genitive case marker *-no* selects the lowest projection of the fuzzy VN [*?V* or *?N ryakudatu*], and ‘nominalizes’ it by means of dynamic labeling (3a) (cf. (26c)). The temporal head noun *ori* then selects the highest projection of the fuzzy VN, and ‘verbalizes’ the entire projection by syntactic categorization condition (3b) (cf. (26e)). As a consequence, another type of mixed category projection, which is not endocentric, is created as illustrated in (36), through on-line, context-dependent labeling (cf. (28b); Kageyama 1993: 38, (57)); the nominative case *-ga*, the postposition *-kara*, and the accusative case *-o* are all properly licensed within the VP.

The dynamic labeling analysis also predicts correctly the acceptability of (37) (cf. (29)), assigning representation (38) as the final structure for (37) (cf. (30c)).

(37) John-ga Mary-kara-no hooseki-no [VN ryakudatu]-no [N ori],
 John-NOM Mary-from-GEN jewelry-GEN stealing-GEN occasion,
 ‘When John steals/stole jewelry from Mary,’

(38) [NP [VP John-ga [N' Mary-kara-no [N' hooseki-no [N ryakudatu]]]-no] [N ori]]

As illustrated in (38) for temporal construction (37), the genitive case marker *-no* selects the second highest projection of the fuzzy VN [*?V* or *?N ryakudatu*], and ‘nominalizes’ the projection by means of categorization condition (3a). Subsequently, the temporal head noun *ori* selects the highest fuzzy projection of [*?V* or *?N ryakudatu*], and ‘verbalizes’ it by dynamic categorization (3b), building another type of mixed category projection, i.e. an exocentric projection, in (38) (cf. (31)).

Notice here that the mixed category projections in (35e), (36), and (38) are very different with respect to how they are assigned categorial labels (cf. (28a–b); (31)). In all the exocentric projections in (35e), (36), and (38), however, there are important similarities: first, the lower part of the fuzzy projection by [VN *ryakudatu*] gets updated as a [+N] category by categorization condition (3a), whereas the upper part is updated as a [+V] category by means

²⁵ Sugioka (2009: 92, (27b–d)) first proposes a ‘mixed category projection’ analysis for the aspectual *-[N tyuu]* ‘middle’ construction like the one below:

(i) John-ga Mary-kara hooseki-no [VN ryakudatu]-[N tyuu],
 John-NOM Mary-from jewelry-GEN stealing middle,
 ‘While John was stealing jewelry from Mary,’

In (i), the aspectual nominal suffix *-[N tyuu]* attaches to the VN *ryakudatu*. As in (34a), in (i), the theme argument of the VN is marked by the genitive case marker *-no*; the agent is marked by the nominative case marker *-ga*, and the source by *-kara*.

For examples such as (i), Sugioka (2009) proposes the derivation in (iia–b).

(ii) (a) [NP [VNP John-ga [VN' Mary-kara [VN' hooseki-no [VN ryakudatu]]]] [N tyuu]]
 (b) [NP [VNP John-ga [VN' Mary-kara [N' hooseki-no [N ryakudatu]]]-[N tyuu]]]]

As in (iia), first, phrase structure is built bottom-up, and the aspectual head noun [N *tyuu*] takes the entire projection of the VN *ryakudatu*, i.e. VNP, for both s-selection and c-selection (cf. dynamic categorization (3b) in (35e)). Then, structure (iia) undergoes ‘reanalysis,’ and as in (iib), *-[N tyuu]* ‘nominalizes’ the lower part of the VNP by means of its morphological c-selection, creating a mixed category projection, which is not consistent with X' Theory (cf. dynamic categorization (3a) in (35c)).

of dynamic labeling condition (3b). Second, the VN *ryakudatu* and its arguments, i.e. [NP *hooseki*], [PP *Mary-kara*] and [NP *John*], are structurally arranged in the same way in all those mixed category projections. Namely, the theme, *hooseki*, is the closest to the VN; the source, *Mary-kara*, is the second closest to the VN; the agent, *John*, is the least closest to the VN (see (27)) (cf. Chomsky's 1995 Configurational Theta Theory). The well-formedness and the semantic identity of temporal constructions (34a), (34b), and (37) are thus captured under the proposed dynamic categorization analysis.

Furthermore, the proposed dynamic labeling analysis accounts for adequately parallelisms and contrasts between two different types of temporal construction in Japanese. Consider first a parallelism between the two kinds of temporal construction in (39a–b), which are both acceptable.

- (39) (a) *hensinyoo-huutoo-o* [VN *doohuu*]-no [N *ori*], *kare-ga ki-ta*.
 return-envelope-ACC enclosing-GEN occasion, he-NOM come-PST
 'When we enclosed a return envelope, he came.'
 (b) *hensinyoo-huutoo-o* [VN *doohuu*]-no [N *ue*], *o-moosikomi kudasai*.
 return-envelope-ACC enclosing-GEN top, apply please
 'After enclosing a return envelope, please make an application.'

(cf. Shibatani & Kageyama 1988, Kageyama 1993: 211, Chapter 4, etc.)

In (39a), the head of the temporal construction is the noun *ori* as in (34a–b), whereas in (39b), the temporal head noun is *ue* 'top.' In both (39a–b), the internal theme argument taken by the fuzzy VN [$?V$ or $?N$ *doohuu*] 'enclosing' is marked by the accusative case marker *-o*; the VN is marked by the genitive case *-no* (cf. (34b)).

The proposed dynamic categorization analysis assigns finally fixed representations (40a–b) to temporal constructions (39a–b), respectively, accounting for the well-formedness of (39a–b) in the same way as follows (cf. (36)):

- (40) (a) [NP [VP *hensinyoo-huutoo-o* [N *doohuu*]-no] [N *ori*]]
 (b) [NP [VP *hensinyoo-huutoo-o* [N *doohuu*]-no] [N *ue*]]

As in structures (40a–b) for (39a–b), the genitive case marker *-no* first 'nominalizes' the lowest projection of the VN [$?V$ or $?N$ *doohuu*] by dynamic labeling condition (3a), and then, the temporal head [N *ori*] or [N *ue*] 'verbalizes' the upper part of the fuzzy VN projection through dynamic labeling (3b). As illustrated in (40a–b), as a result, a mixed category, exocentric projection is constructed similarly for (39a–b) (cf. (36)); the accusative case *-o* is successfully licensed within the VP.

Examine now a novel contrast discovered between the two types of temporal construction in (41a–b).

- (41) (a) *hensinyoo-huutoo-no* [VN *doohuu*]-no [N *ori*], *kare-ga ki-ta*.
 return-envelope-GEN enclosing-GEN occasion, he-NOM come-PST
 'When we enclosed a return envelope, he came.'
 (b) **hensinyoo-huutoo-no* [VN *doohuu*]-no [N *ue*], *o-moosikomi kudasai*.
 return-envelope-GEN enclosing-GEN top, apply please
 'After enclosing a return envelope, please make an application.'

(41a) is an instance of the temporal [N *ori*] construction, and (41b) an example of the [N *ue*] construction. (41a–b) are similar in that: (i) the fuzzy VN [$?V$ or $?N$ *doohuu*] is attached by the genitive case marker *-no*; (ii) the internal argument of the VN, i.e. [NP *hensinyoo-huutoo*] 'return envelope,' is marked by the genitive case marker *-no* (cf. (39a–b)). A sharp contrast, however, exists between (41a–b). (41a) is acceptable, whereas (41b) is unacceptable.

Given an independent contrast between the [N *ori*] and [N *ue*] constructions below, the proposed dynamic categorization analysis provides a natural account for the contrast between (41a–b). Observe now the contrast in (42a–b).

- (42) (a) [NP *tyoosyoku*]-no [N *ori*], *kare-ga ki-ta*.
 breakfast-GEN occasion, he-NOM come-PST

‘When we had breakfast, he came.’

- (b) *[NP tyoosyoku]-no [N ue], kite kudasai.
breakfast-GEN top, come please

‘After (having) breakfast, please come.’

The [N *ori*] construction in (42a) is well-formed, but the [N *ue*] construction in (42b) is ill-formed. The contrast between (42a–b) seems to imply that (i) the temporal head noun *ori* may c-select not only a VN as in (35d) and (40a), but may also c-select a [+N] category (see (42a)); (ii) on the other hand, the temporal head [N *ue*] c-selects a VN as in (40b), but cannot c-select an N (see *(42b)). In this respect, the temporal head noun *ue* seems to parallel the light verb *su*, i.e. an obligatory dynamic categorizer selecting a VN (see (17a) vs. *(17b); (19a–b), (29) vs. *(32)).

Given the observation in (42a–b), the contrast between (41a–b) is accounted for naturally under the dynamic categorization analysis as follows: namely, given the string of words in (41a–b), first, syntax forms the fuzzy projection in (43) whose head is the VN [$?V$ or $?N$ *doohuu*] for both (41a–b).

- (43) [$?VP$ or $?NP$ *hensinyoo-huutoo-?no* [$?V$ or $?N$ *doohuu*]]

As shown in structure (44) for both (41a–b), there then comes the genitive case marker *-no*, selecting initially the whole fuzzy VN projection in accordance with (3a).

- (44) [$?VP$ or $?NP$ *hensinyoo-huutoo-?no* [$?V$ or $?N$ *doohuu*]]-no

Then, as shown in representation (45) for both (41a–b),

- (45) [NP *hesinyoo-huutoo-no* [N *doohuu*]]-no

the genitive case marker *-no* triggers selection once again, and c-selects the [+N] feature of the fuzzy VN, turning the entire fuzzy category into a [+N] category by dynamic categorization (3a). Consequently, at the parsing stage of (45), the fuzzy VN projection disappears, and the genitive case-marked internal argument, i.e. [*hensinyoo-huutoo-no*] ‘return-envelope-GEN,’ is successfully licensed.

As illustrated in structure (46a) for temporal [N *ori*] construction (41a),

- (46) (a) [NP [NP *hensinyoo-huutoo-no* [N *doohuu*]]-no [N *ori*]],
(b) *[NP [NP *hensinyoo-huutoo-no* [N *doohuu*]]-no [N *ue*]],]

there then comes the temporal head [N *ori*], and [N *ori*] c-selects successfully the [+N] category, i.e. [NP *hesinyoo-huutoo-no* [N *doohuu*]]-no. This is so, because the temporal head noun *ori* is not an obligatory dynamic categorizer selecting a VN, and may take an NP as its complement (see (42a)).

In contrast, representation (46b) for (41b) is problematic, for the temporal head [N *ue*] must trigger dynamic labeling (3b) obligatorily like the light verb *su* (see *(42b)). As shown in (46b), however, at the time when the temporal head [N *ue*] needs to c-select its complement, there remains no fuzzy [$?V$ or $?N$...] category (see (45); cf. *(33c)). Hence, in contrast with structure (46a), representation (46b) results in unacceptability.

Provided with the dynamic labeling analysis of the two different types of temporal construction in Japanese, finally, in this section, I attempt to show that the proposed analysis could shed a new light on the nature of Shibatani & Kageyama’s (1988) ‘postsyntactic’ compounds as well. In so doing, here, I argue that head-final languages such as Japanese may construct either ENDOCENTRIC COMPOUNDS or EXOCENTRIC COMPOUNDS on-line, depending on syntactic configurations (cf. (25e), (26e), (28a–b), (30c), (31), (35e), (36), (38), (40a–b) and (46a)).

Observe first Shibatani & Kageyama’s (1988: 459–460) discovery that there are two types of compounds in Japanese: ‘lexical’ and ‘postsyntactic.’ As in (47), a ‘lexical’ compound, formed in the lexicon, is pronounced with one accentual peak.

- (47) [N *Amerika*]-[VN *hoomon*] (*lexical*)
America- visit

In contrast, as in (48), a ‘postsyntactic’ compound exhibits a completely different pitch pattern:

- (48) [N Amerika] : [VN hoomon] -no [N ori] / [N ue], (*postsyntactic*)
 America : visit -GEN occasion / top ,
 ‘On the occasion of visiting America/After visiting America,’

Namely, a ‘postsyntactic’ compound keeps the inherent pitch patterns of the individual members intact, having a slight pause after the first member. (The symbol ‘:’ in (48) indicates a special phonological boundary between an N and a VN.) In other words, ‘postsyntactic’ compounds are pronounced as if their members were independent words, and are yet pronounced as one unit.

To see further properties of ‘postsyntactic’ compounds, examine next the temporal constructions in (49a–b), cited from Shibatani and Kageyama (1988: 455–460). (49a–b) are semantically identical and phonologically quite similar (cf. (48)).

- (49) (a) [NP kanai]-ga [NP Amerika]-o [VN hoomon]-no [N ori] / [N ue],
 wife-NOM America-ACC visit-GEN occasion / top,
 ‘When my wife visited America/After my wife visited America,’
 (b) [NP kanai]-ga [[N Amerika] : [VN hoomon]] -no [N ori] / [N ue],
 wife-NOM America : visit -GEN occasion / top,

(49a–b) are, however, different. In (49a), both the external argument and the internal argument of the VN *hoomon* ‘visit’ are case-marked. In (49b), on the other hand, only the external argument is case-marked; the internal argument and the VN form the ‘postsyntactic’ compound, [[N Amerika] : [VN hoomon]] ‘[[America] : [visit]].’

To account for the similarities between (49a–b), Shibatani & Kageyama (1988: 455–460) propose that (49a–b) share the syntactic structure in (50a),

- (50) (a) [NP [PP [NP [S [NP kanai]-ga [VP [NP Amerika]-o [VN hoomon]]]]] [P no]] [N ori/ue]
 (b) [NP [PP [NP [S [NP kanai]-ga [VP [VN [N Amerika] [VN hoomon]]]]]] [P no]] [N ori/ue]

where the head of the clause, i.e. S, is the VN *hoomon*; [VN hoomon] selects and case-marks the external and internal arguments, *kanai* ‘wife’ and *Amerika* ‘America.’ To capture the differences between (49a–b), Shibatani & Kageyama (1988: 458, Figure 3) propose that as in (50b), ‘postsyntactic’ compounding takes place optionally in the complement clauses, selected by the time head nouns such as *ori* or *ue*, postsyntactically—i.e. after a syntactic structure has undergone phonological rules.

Shibatani & Kageyama’s (1988) discovery that ‘postsyntactic’ compounding depends on syntactic environments, I believe, is significant. A question, however, arises as to why ‘postsyntactic’ compounds are formed in the complement clauses selected by time head nouns such as *ori* ‘occasion,’ *sai* ‘occasion,’ *ue* ‘upon ...ing,’ *-tyuu* ‘middle,’ *-go* ‘after,’ *-sidai* ‘as soon as,’ etc. (see Shibatani & Kageyama 1988: 456, (7) and (8)). In fact, Kageyama & Shibatani (1989: 141, (1a–c)) and Kageyama (1993, Chapter 4.2.2) point out that the condition mentioned above for ‘postsyntactic’ compounding has a problem, because examples such as the one below are acceptable.

- (51) [[N *sin-kuukoo*] : [VN *kensetu*]] -ni [VN *hantai*] su-ru.
 new-airport : construction-DAT opposing do-PRS
 ‘We oppose to the construction of a new airport.’

The ‘postsyntactic’ compound, [[N *sin-kuukoo*] : [VN *kensetu*]] ‘[[new-airport] : [construction]],’ in (51) is well-formed, but it is not contained within a clause selected by temporal head nouns such as *ori* (cf. (48), (49b) and (50b)).

To explain the nature of ‘postsyntactic’ compounds, here, I wish to hint at the following novel possibility under the dynamic categorization analysis: that is, VNs in Japanese may form a proposition through N-N compounding dynamically in the course of left to right sentence processing. To see how this hypothesis captures the similarities between (48; cf. 49b) and (51), consider first a parsing process proposed for (48; cf. 49b) with the temporal head noun *ori* below:

- (52) (a) [_V or _N [N Amerika] : [_V or _N hoomon]] (b) [NP [N Amerika] : [N hoomon]]-no

- (c) [NP [NP [N Amerika] : [N hoomon]]-no [N ori]]

As in (52a), given the special pitch pattern for [[*Amerika*] : [*hoomon*]], syntax allows the VN [$?V$ or $?N$ *hoomon*] to form a proposition through compounding. Subsequently, as in (52b), the genitive case maker *-no*, i.e. a morphological dynamic categorizer, comes, and selects the whole fuzzy VN compound initially; and then, the genitive case marker selects the [+N] feature of the fuzzy category again, turning the fuzzy VN into a [+N] category by means of dynamic labeling (3a). Hence, at the parsing stage of (52b), the standard, endocentric N-N compound, [N [N *Amerika*] : [N *hoomon*]]-no, is constructed. Finally, as in (52c), the time head noun *ori* c-selects a [+N] projection, i.e. the second highest NP (cf. (42a) and (46a)).

Alternatively, syntax parses the string of words with [N *ori*] in (48; cf. 49b) as below:

- (53) (a) [$?V$ or $?N$ [N *Amerika*] : [$?V$ or $?N$ *hoomon*]]
 (b) [$?V$ or $?N$ [N *Amerika*] : [N *hoomon*]-no]
 (c) [NP [VP [N *Amerika*] : [N *hoomon*]]-no [N *ori*]]

After the fuzzy compound, [$?V$ or $?N$ [N *Amerika*] : [$?V$ or $?N$ *hoomon*]], is formed as in (53a), the genitive case marker *-no* comes and selects the lowest fuzzy category, as in (53b). As illustrated in (53b), the genitive case marker *-no* then triggers selection once again, and selects the [+N] feature of the VN, turning it into a [+N] category by dynamic labeling (3a). Next, as in (53c), the time head noun *ori* selects the highest fuzzy VN projection initially; and then selects the [+V] feature of the top of the VN compound, turning it into a [+V] projection by means of dynamic categorization (3b). Consequently, at the processing stage of (53c), the exocentric N-N compound, [V [N *Amerika*] : [N *hoomon*]]-no, is formed. Namely, in (53a–c), dynamic labeling (3a–b) create a unique compound, i.e. the mixed category compound, [V [N *Amerika*] : [N *hoomon*]]-no, which is an N-N compound with a [+V] mother node (cf. (40a)).

Under the proposed dynamic categorization analysis, syntax parses the string of words in (48; cf. 49b) with the temporal head noun *ue* as in (53a–c), not as in (52a–c). Hence, representation (54b), not structure (54a), is assigned to (48; cf. 49b) with [N *ue*].

- (54) a. *[NP [NP [N *Amerika*] : [N *hoomon*]]-no [N *ue*]]
 b. [NP [VP [N *Amerika*] : [N *hoomon*]]-no [N *ue*]]

In (54a), the genitive case marker *-no* selects and ‘nominalizes’ the entire compound by categorization condition (3a); and the temporal head noun *ue* is required to select a [+N] category, the second highest NP. However, [N *ue*] must c-select a VN, triggering dynamic categorization (3b) obligatorily like the light verb *su*; [N *ue*] cannot take an NP (see *42b, *46b; cf. *33c). Hence, (54a) results in unacceptability. In (54b), on the other hand, the genitive case maker *-no* selects and ‘nominalizes’ the lowest projection of the fuzzy VN compound; and the time head noun *ue* successfully selects and ‘verbalizes’ the highest projection of the VN compound by means of dynamic labeling (3b). Consequently, the exocentric compound, [V [N *Amerika*] : [N *hoomon*]]-no, which is an N-N compound with a [+V] mother node, is created (cf. 53c; 40b).

Under the assumption that lexical items such as [VN *hantai*] ‘opposing’ do not select a fuzzy VN, and thus, cannot trigger dynamic categorization (3b), syntax parses the string of words in (51), as in (52a–c), not as in (53a–c). Hence, structure (55a), not structure (55b), turns out to be the correct representation for (51) (cf. (54a–b)).

- (55) (a) [NP [NP [N *sin-kuukoo*] : [N *kensetu*]]-ni [$?V$ or $?N$ *hantai*]]
 (b) *[NP [VP [N *sin-kuukoo*] : [N *kensetu*]]-ni [$?V$ or $?N$ *hantai*]]

In (55a), the dative marker *-ni* selects the highest fuzzy projection by [$?V$ or $?N$ *kensetu*] ‘construction,’ and triggers dynamic labeling (3a), forming the standard, endocentric N-N compound with a [+N] mother node, i.e. [N [N *sin-kuukoo*] : [N *kensetu*]]-ni; and the VN *hantai* selects successfully a [+N] category, i.e. the second highest NP. Structure (55b) is the structure where the dative marker selects and ‘nominalizes’ the lowest projection of the VN *kensetu* by dynamic categorization (3a); but in (55b), [$?V$ or $?N$ *hantai*] cannot select and ‘verbalize’ the highest projection of the fuzzy VN by means of dynamic labeling (3b). Hence, representation (55b) for (51) turns out to be illicit.

In short, under the proposed dynamic labeling analysis, the compound in temporal [N *ori*] construction (48; cf. 49b) can be either the standard, endocentric N-N compound, [N [N *Amerika*] [N *hoomon*]]-*no* (see (52c)), or the mixed category, exocentric compound, [V [N *Amerika*] [N *hoomon*]]-*no* (see (53c)). The compound in the temporal [N *ue*] construction in (48; cf. 49b) is required to be the mixed category compound, [V [N *Amerika*] [N *hoomon*]]-*no* (see (54b)). The compound in (51) is necessarily the endocentric compound, [N [N *sin-kuukoo*] [N *kensetu*]]-*ni* (see (55a)). Significantly, all types of compound formation proposed for (48; cf. 49b) and (51) are identical in that they all involve an N-N compound, dynamically formed in the course of left to right processing of a string of words (cf. Shibatani & Kageyama 1988, Kageyama & Shibatani 1989, Kageyama 1993, among others).

Furthermore, under the dynamic categorization analysis, it is correctly predicted that the following ‘postsyntactic’ compound, which Shibatani & Kageyama (1988: 461, (19b), etc.) discover, is unacceptable, because (56) *[N *Tyuugoku*] : [VN *hoomon*] *su-ru*.

China : visit do-PRS ‘Somebody will visit China.’

the compound in (56) results in ill-formedness as follows:

(57) (a) [?V or ?N [N *Tyuugoku*] : [?V or ?N *hoomon*]]

(b) *[VP [VP [N *Tyuugoku*] : [V *hoomon*]] [V *su*]]

Given the special pitch pattern with the pause marked by : in (56), as shown in (57a), the fuzzy VN [?V or ?N *hoomon*] forms a compound with the preceding noun [N *Tyuugoku*] ‘China,’ forming a proposition. After this compounding, as in (57b), there comes the obligatory dynamic categorizer, i.e. the light verb *su*, selecting initially the projection of the fuzzy compound; and the light verb then triggers selection once again, and selects the [+V] feature of the VN compound, turning it into a [+V] category by dynamic labeling (3b). However, the endocentric N-V compound formed in (57b), [V [N *Tyuugoku*] : [V *hoomon*]] ‘[[China] : [visit]],’ is illicit, for under the proposed dynamic labeling analysis, VNs in Japanese may form a proposition by means of N-N compounding, not by N-V compounding. Consequently, the contrast between (48; cf. 49b) and (51) on the one hand, and (56) on the other, is accounted for.^{26 27 28}

5. CONCLUSION

In this paper, I have proposed that ANs and VNs in Japanese are fuzzy categories: (i) an AN has a disjunction of two features: [+A] or [+N] (see (1a=4a)); (ii) a VN has a disjunction of two options: [+V] or [+N] (see (1b=5a)). Furthermore, I have argued that as predicted by Dynamic Syntax (Kempson et al. 2001), Japanese, i.e. a typical head-final language, displays a unique pattern where a fuzzy category comes first and then, follows a syntactic updater, i.e. a head, which determines the categorial label of the fuzzy category by the two step selection, called dynamic categorization (see (2a–b) and (3a–b)), step by step in the course of left to right processing of a string of words. If successful, the proposed dynamic labeling analysis suggests this: in natural language, categorial labels are determined dynamically, depending on syntactic environments (cf. Chomsky’s 1981, 1986, etc. X’ Theory).

Importantly, if categorial labeling is indeed dependent upon on-line processing, there arises a possibility that

²⁶ The suggested possibility that VNs in Japanese may form a proposition through N-N compounding, not by N-V compounding, might receive some justification from Kageyama’s (1993: 179-181) observation that N-V compounding is extremely rare in modern Japanese (cf. N-N compounds; V-V compounds).

²⁷ Kageyama (1993: 250) speculates that ‘postsyntactic’ compounding is a grammatical operation which creates a ‘nominal’ concept; there might be a significant link between his intuition and the N-N compounding analysis suggested in this paper.

²⁸ Shibatani & Kageyama (1988: 480, (52)) and Kageyama (1993: 249–250, (156)) reject examples such as (i).

(i) [N *hooritu*] : [VN *kaisee*] -o(-sae) *su-ru*.

law : changing-ACC(-even) do-PRS ‘Somebody will change the law.’

Such examples, however, do not sound so bad to me or to any of my informants.

head-final languages such as Japanese should be able to form unique phrase structure, i.e. mixed category phrases and words, where categorial labels are not consistent with the X' schema (cf. Chomsky 1981, 1986, etc.), but are semantically coherent. I have attempted to show in this paper that this is indeed the case, and that given certain syntactic environments, head-final languages such as Japanese do form such distinctive, exocentric phrase structure, created by a fuzzy category and dynamic categorizers in the course of left to right sentence processing (see (25e), (26e), (28a–b), (30c), (31), (35e), (36), (38), (40a–b), (53c) and (54b)) (cf. Sugioka 2009: 92, (27b–d); see fn. 25). By doing so, I have argued that (i) to account for the nature of light verb constructions and temporal constructions in Japanese, we should rather eliminate X' Theory entirely (cf. Chomsky's 2013, 2015 labeling algorithm), while maintaining Chomsky (1995) type Configurational Theta Theory strictly as it is; and (ii) Japanese is indeed rigidly configurational (see (25e), (26e), (27), (28a–b), (30c), (31), (35e), (36), (38), (40a–b), (46a), (52c), (53c), (54b) and (55a)).

Hawkins (1990, 1994, 2004, 2014, etc.) argues against Chomsky's (1965, 1981, 1986, 1995, etc.) complete dissociation of competence from performance, and proposes the Performance-Grammar Correspondence Hypothesis (PCGH): grammars are profoundly shaped by performance factors such as language processing, etc. (see Hawkins 2004: 3, etc.). A significant part of the PCGH follows from Dynamic Syntax (Kempson et al. 2001, etc.; cf. Phillips 1996, 2003, etc.), for Dynamic Syntax incorporates on-line processing of language directly into grammar; and the dynamic labeling analysis supports a general view provided by the PCGH: grammar–performance relationship should be reconsidered (Hawkins 1990, 1994, 2004, 2014, Phillips 1996, 2003, Abe 1998, Kempson et al. 2001, Cann et al. 2005, etc.).

To finish the discussion of this paper, I would like to return to the important issue regarding Dynamic Syntax that I pointed out in fn. 12. That is, in this paper, I have argued for the very spirit of Dynamic Syntax (Kempson et al. 2001, Cann et al. 2005, etc.; cf. Sperber & Wilson 1995), and have attempted to demonstrate that Dynamic Syntax could provide an important insight into the nature of syntax and morphology in head-final languages such as Japanese. Significantly, however, the proposed dynamic labeling analysis is in fact technically disallowed under the current version of Dynamic Syntax (Kempson et al. 2001, Cann et al. 2005, Kempson 2016, 2017, etc.), for under the standard dynamic syntactic analysis, syntax must build up semantic representations with no *syntactic features* at all, directly from words encountered in a linguistic string (see Cann et al. 2005: 32, (2.1) vs. (2.2)).²⁹

Since the birth of Dynamic Syntax (Kempson et al. 2001), almost twenty years have passed. It might be a right time for Dynamic Syntax to get upgraded to still more advanced and even more versatile a framework which can accommodate extremely important *syntactic* analyses proposed by Hawkins (1990, 1994, 2004, 2014, etc.), Phillips (1996, 2003, etc.), Abe (1998), etc. together with the proposed dynamic categorization analysis, all of which take seriously significant correlations between grammar and the dynamics of language performance (cf. Cann et al. 2005: 13, para. 1; Borsley & Börjars 2011; Smith & Allott 2016: 153–154, etc.; contra. Chomsky 1965, 1981, 1986, 1995, etc.).

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²⁹ While comparing Dynamic Syntax with other frameworks, Cann et al. (2005: 223, para. 2) maintain that '[T]he first thing, and in many ways most significant, difference is the lack of any *syntactic* vocabulary distinct from that of the semantic representations under construction.' I thank Tohru Seraku for calling my attention to this claim.

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