Akita University

秋　田　大　学
教養基礎教育研究年報
29 － 43　（2019）

Fuzzy Categories and Dynamic Categorization[1]

Hiroto Hoshi
Akita University

1. Introduction

Hoshi (2018) proposes a 'dynamic categorization' analysis to capture the nature of adjectival nouns (ANs) and verbal nouns (VNs) in Japanese, by adopting the core idea of Dynamic Syntax: namely, underspecified syntactic representation gets updated gradually in the course of left to right processing of a string of words (Kempson et al. 2001, Cann et al 2005; cf. Hawkins 1990, 1994, 2004, 2014, Hoshi 2014, etc.). In this paper, first, I outline the proposed dynamic categorization analysis of ANs and VNs.[2] Then, I explore some of the consequences derived from the dynamic syntactic analysis.

2. Fuzzy Categories and Dynamic Categorization (Hoshi 2014, 2018)

Under the proposed analysis of ANs and VNs, Hoshi (2018) assumes the following:

(1) The morphological parser and the syntactic parser parse a string of words from left to right separately.

Namely, under the proposal, the morphological and syntactic parsers are two distinct parsers, and each parser parses a string of words independently of the other (cf. Jackendoff 1997, Culicover and Jackendoff 2005, Yumoto 2005, among others).

Hoshi (2018) then proposes that a Japanese adjectival noun like *suki* 'fond/fondness' is fuzzy in that the category of an AN like *suki* is underspecified with respect to [+A] or [+N] in the lexicon, as shown in (2a).

(2) a. $[_{\text{A or N}}$ *suki*]
b. $[_{\text{V or N}}$ *kenkyuu*]

Similarly, as illustrated in (2b), a verbal noun in Japanese is fuzzy, because the category of a VN like *kenkyuu* 'researching' is also not fixed regarding [+V] or [+N] in the lexicon.

Furthermore, Hoshi (2018) proposes (3a-b) to account for the nature of Japanese ANs.

1 I thank Jun Abe, Koichi Abe, Takane Ito, Ruth Kempson, Hideki Kishimoto, Masatoshi Koizumi, Yoko Sugioka, Ichiro Yuhara and Yoko Yumoto for their invaluable comments on earlier versions of my dynamic syntactic analysis of fuzzy categories. I am particularly grateful to Ruth Kempson, who has provided us with a tool, called Dynamic Syntax, to help us deepen our understanding of the nature of language. Needless to say, however, all the shortcomings in this paper are strictly my own.

2 The reader is referred to Kuno (1973), Martin (1975), Grimshaw and Mester (1988), Kuroda (1992), Kageyama (1993), Matsumoto (1996), Uehara (1998), Saito and Hoshi (2000), Croft (2001), Ito and Sugioka (2002), Yumoto (2005), Sugioka (2009), among others, for various treatments of ANs and VNs. See Aarts et al. (2004), Fanselow et al. (2006), Aarts (2007), etc. for some issues on fuzzy grammar.

(3) a. Suffixes such as Case markers *select* the [+N] feature of the projection of an adjectival noun like [$_{A\ or\ N}$ *suki*] in syntax, and may turn the fuzzy AN projection into an unambiguous [+N] projection in the syntactic component.

b. Copulas *select* the [+A] feature of the projection of an adjectival noun like [$_{A\ or\ N}$ *suki*] in syntax, and may turn the fuzzy AN projection into an unambiguous [+A] projection in the syntactic component.

That is, in the course of left to right parsing of a string of words in the syntactic component, once a Case marker selects the [+N] feature of the projection of an adjectival noun, the Case particle may turn the fuzzy category into an unambiguous [+N] category by means of its selection. On the other hand, when a copula like *da* or *na* selects the [+A] feature of the projection of an adjectival noun, the copula can turn the ambiguous category into an unambiguous [+A] category due to its selection.

Furthermore, to capture the parallelism between the two types of fuzzy categories, i.e. ANs and VNs, Hoshi (2018) proposes (4a-b) (cf. Hoshi 2014).

(4) a. Suffixes such as Case markers or aspectual nouns such as -[$_{AspN}$ *tyuu*][3] 'middle' *select* the [+N] feature of a verbal noun like [$_{V\ or\ N}$ *kenkyuu*] in syntax, and may turn the fuzzy VN projection into an unambiguous [+N] projection in the syntactic component.

b. Verbs such as the light verb *su* 'do' or aspectual nouns such as -[$_{AspN}$ *tyuu*] 'middle' may *select* the [+V] feature of the projection of a verbal noun like [$_{V\ or\ N}$ *kenkyuu*] in syntax, and may turn the fuzzy VN projection into an unambiguous [+V] projection in the syntactic component.

Namely, in the course of left to right processing of words in syntax, once a Case marker selects the [+N] feature of the projection of a verbal noun, the Case marker can turn the underspecified category into an unambiguous [+N] category (cf. 3a). Once, on the other hand, a verb like the light verb *su* selects the [+V] property of the projection of a VN, it may turn the fuzzy category into an unambiguous [+V] category (cf. 3b).

In short, under the dynamic categorization analysis, adjectival nouns such as *suki* are not simply a [+A] category, are not just a [+N] category, or are not a mixed category of both [+A] and [+N] properties. Under the dynamic syntactic analysis, [$_{AN}$ *suki*] 'fond/fondness' is listed as a fuzzy category in the lexicon as in (5a).

(5) a. [$_{A\ or\ N}$ *suki*] (= 2a)
b. [$_{N}$ *suki*]
c. [$_{A}$ *suki*]

Depending on syntactic environments under the dynamics of language, the adjectival noun *suki* gets updated as noun as in (5b) (see 3a), or gets updated as adjective as in (5c) (see 3b).

In the same way, verbal nouns such as *kenkyuu* 'researching' are not simply a [+V] category, are not just a [+N] category, or are not a dual category of both [+V] and [+N] features. Under the dynamic categorization analysis, the verbal noun *kenkyuu* is listed as an underspecified category in the lexicon as in (6a).

---

[3] Sugioka (2009, p. 92, 27b & 27b) proposes that the aspectual noun head -[$_{AspN}$ *tyuu*] 'middle' may nominalize any part of the projection of a verbal noun through its morphological selection. This insight by Sugioka (2009) is incorporated into dynamic categorization condition (4a).

(6) a. [$_{V\ or\ N}$ *kenkyuu*] (= 2b)
b. [$_{N}$ *kenkyuu*]
c. [$_{V}$ *kenkyuu*]

Depending on syntactic contexts, the VN *kenkyuu* is updated as noun as in (6b) (see 4a), or is turned into verb as in (6c) (see 4b).

Given this, let us now consider exactly how the proposed dynamic categorization analysis captures the nature of ANs and VNs in a uniform way. Consider first the acceptability of (7a-b) below:

(7) a. [$_{ANP}$ anata-no [$_{AN}$ kirei]] -o ooens -i-masu.[4]
you –Gen beauty-Acc support- -Pres
'We will support your beauty.'

b. [$_{VNP}$ John-no nihongo -no [$_{VN}$ kenkyuu]]-ga subarasi-i.
John-Gen Japanese -Gen research -Nom fantastic-Pres
'John's research of Japanese is fantastic.'

Due to (1), morphology parses and checks a string of words in (7a-b) from left to right independently of syntax, roughly as shown in (8a-b).

(8) a. [$_{N}$ anata]-no [$_{A\ or\ N}$ kirei]-o [$_{V}$ ooens]-i-[$_{T}$ masu].

b. [$_{N}$ John]-no [$_{N}$ nihongo]-no [$_{V\ or\ N}$ kenkyuu]-ga [$_{A}$ subarasi]-[$_{T}$ i].

In (8a), the noun *anata* 'you' is attached by the Genitive Case marker *–no*; the adjectival noun *kirei* 'beauty/beautiful' by the Accusative Case marker *–o*; the verb *ooens* 'support' by the present tense marker *masu*. In (8b), [$_{N}$ *John*] is attached by the Genitive Case marker *–no*; [$_{N}$ *nihongo*] also by the Genitive Case; [$_{V\ or\ N}$ *kenkyuu*] by the Nominative Case maker *–ga*; [$_{A}$ *subarasi*] by the present tense marker *–i*. There is no morphological violation in either (8a) or (8b).

Independently of morphology, syntax processes a string of words in (7a) as in (9a-b).

(9) a. ?[$_{AP\ or\ NP}$ [$_{NP}$ anata]-?no [$_{A\ or\ N}$ kirei]]

b. [$_{NP}$ [$_{NP}$ anata]-no [$_{N}$ kirei]]-o …..

At the initial point of left to right processing of a string of words, the syntactic parser constructs structure (9a). In (9a), the category of the adjectival noun *kirei* is underspecified with respect to [+A] or [+N] (cf. 2a), and thus, the Genitive Case attached to the NP *anata* is not licensed yet. At the next point of left to right parsing, however, the Accusative Case marker *–o* selects the [+N] feature of the projection of the AN *kirei*, and turns the fuzzy category into the projection of an unambiguous category [+N] (see 3a). Consequently, in (9b), the Genitive Case *–no* is properly licensed (cf. Saito 1982, etc.).

Similarly, syntax parses from left to right a string of words in (7b) as follows:

4 I thank Mayumi Hoshi for bringing examples such as (7a) to my attention.

(10) a. ?[$_{VP\ or\ NP}$ [$_{NP}$ John]-?no [$_{NP}$ nihongo]-?no [$_{V\ or\ N}$ kenkyuu]]

b. [$_{NP}$ [$_{NP}$ John]-no [$_{NP}$ nihongo]-no [$_{N}$ kenkyuu]]-ga …..

At the initial point of left to right parsing, syntax forms structure (10a). In (10a), both the external argument *John* and the internal argument *nihongo* are marked by the Genitive Case marker *–no*. The two Genitive Case markers are not licensed at this stage yet, because they are not contained within the projection of an unambiguous [+N] projection (see 2b; cf. 9a). However, at the next point of left to right parsing, the Nominative Case marker *–ga* selects the [+N] feature of the projection of the verbal noun *kenkyuu*, and turns it into an unambiguous [+N] category as illustrated in (10b) (see 4a; cf. 9b). Consequently, the two Genitive Case markers are successfully licensed in (10b). The proposed dynamic categorization analysis thus accounts for the nominal property of both an AN and a VN in a uniform way (see 9b and 10b).

Let us examine next how the dynamic categorization analysis captures uniformly the adjectival property of an AN and the verbal property of a VN. Consider the examples in (11a-b).

(11) a. boku-ga gengogaku -ga [$_{AN}$ suki]-da.
I -Nom linguistics –Nom fond –Cop
'I like linguistics.'

b. John-ga nihongo -o [$_{VN}$ kenkyuu] -si -ta.
John-Nom Japanese-Acc researching-do-Pst
'John studied Japanese.'

Because of (1), morphology parses a string of words in (11a-b) as in (12a-b), separately from syntax.

(12) a. [$_{N}$ boku]-ga [$_{N}$ gengogaku]-ga [$_{A\ or\ N}$ suki]-[$_{V}$ da].

b. [$_{N}$ John]-ga [$_{N}$ nihongo]-o [$_{V\ or\ N}$ kenkyuu]-[$_{V}$ si]-[$_{T}$ ta].

In (12a), the noun *boku* is attached by the Nominative Case *–ga*; the noun *gengogaku* also by the Nominative Case; the adjectival noun *suki* by the copula *–da*. In (12b), [$_{N}$ *John*] is attached by the Nominative Case *–ga*; [$_{N}$ *nihongo*] by the Accusative Case *–o*; [$_{V\ or\ N}$ *kenkyuu*] by the light verb *si*; [$_{V}$ *si*] by the past tense maker *–ta*. All these words are well-formed, and there is no violation in the morphological component.

Regarding (11a) and (11b), there is no violation in the syntactic component, either. Given (1), independently of morphology, syntax processes a string of words in (11a) from left to right, basically as shown in (13a-b).

(13) a. ?[$_{AP\ or\ NP}$ [$_{NP}$ boku]-?ga [$_{A'\ or\ N'}$ [$_{NP}$ gengogaku]-?ga [$_{A\ or\ N}$ suki]]]

b. [$_{VP}$ [$_{AP}$ [$_{NP}$ boku]-ga [$_{A'}$ [$_{NP}$ gengogaku]-ga [$_{A}$ suki]]] [$_{V}$ da]]

At the initial point of left to right parsing, syntax constructs structure (13a), where the two Nominative Case markers attached to [$_{NP}$ *boku*] and [$_{NP}$ *gengogaku*] are not licensed yet. This is because the two Nominative Case markers are within the projection of an ambiguous category, the adjectival noun [$_{A\ or\ N}$ *suki*] (see 2a). As illustrated in (13b), however, at the next stage of left to right processing, the copula [$_{V}$ *da*] selects the [+A] feature of the projection of [$_{A\ or\ N}$ *suki*], turning it into an unambiguous [+A] category, [$_{AP}$ ….. *suki*] (see 3b). As a result, the two Nominative Case

markers are properly licensed in (13b) (Fukui 1986, among others).

Similarly, syntax processes a string of words in (11b) as follows.

(14) a. ?[$_{VP\ or\ NP}$ [$_{NP}$ John]-?ga [$_{V'\ or\ N'}$ [$_{NP}$ nihongo]-?o [$_{V\ or\ N}$ kenkyuu]]]

b. [$_{VP}$ [$_{VP}$ [$_{NP}$ John]-ga [$_{V'}$ [$_{NP}$ nihongo]-o [$_{V}$ kenkyuu]]] [$_{V}$ si]] …..

As shown in (14a), at the initial point of left to right parsing, neither the Nominative Case marker *–ga* nor the Accusative Case marker *–o* is licensed. This is so, because those Case markers are contained within the projection of the fuzzy category [$_{V\ or\ N}$ *kenkyuu*] (see 2b). At the next point of left to right processing of words, the light verb [$_{V}$ *si*] selects the [+V] feature of the projection of the ambiguous category [$_{V\ or\ N}$ *kenkyuu*], and turns it into an unambiguous [+V] category (see 4b). As a result, both the Nominative Case and the Accusative Case in (14b) are properly licensed as usual. Importantly, in this way, the dynamic syntactic analysis also captures uniformly the [+A] property of an adjectival noun and the [+V] property of a verbal noun (see 13b and 14b; cf. 9b and 10b).

Furthermore, the dynamic categorization analysis accounts for the unacceptability of (15a) and (15b) in a uniform manner.

(15) a. *John-ga [$_{ANP}$ gengogaku-no [$_{AN}$ suki]]-da. (cf. Kuroda 1978)
John-Nom linguistics -Gen fond -Cop
'John likes linguistics.'

b. *John-ga [$_{VNP}$ nihongo -no [$_{VN}$ kenkyuu]]-si -ta. (cf. Kageyama 1993)
John-Nom Japanese-Gen research -do-Pst
'John studied Japanese.'

Due to (1), morphology parses and checks the well-formedness of each word in (15a-b), as in (16a-b).

(16) a. [$_{N}$ John]-ga [$_{N}$ gengogaku]-no [$_{A\ or\ N}$ suki]-[$_{V}$ da].

b. [$_{N}$ John]-ga [$_{N}$ nihongo]-no [$_{V\ or\ N}$ kenkyuu]-[$_{V}$ si]-[$_{T}$ ta].

In (16a-b), all the words are well-formed (cf. 8a-b & 12a-b), and there is no violation in the morphological component.

The syntactic component, however, necessarily fails to parse a string of words in (15a). Consider (17a) and (17b).

(17) a. ?[$_{AP\ or\ NP}$ [$_{NP}$ John]-?ga [$_{A'\ or\ N'}$ [$_{NP}$ gengogaku]-?no [$_{A\ or\ N}$ suki]]]

b. *[$_{VP}$ [$_{AP}$ [$_{NP}$ John]-ga [$_{A'}$ [$_{NP}$ gengogaku]-*no [$_{A}$ suki]]] [$_{V}$ da]]

At the initial point of left to right processing, as in (17a), the syntactic parser constructs representation (17a), where neither the Nominative Case *–ga* nor the Genitive marker *–no* is licensed. This is because those two Case particles are contained within the fuzzy, underspecified category [$_{A\ or\ N}$ *suki*]. As shown in (17b), at the next stage of parsing, the copula *da* selects the [+A] feature of the projection of the adjectival noun, turning it into the projection of an unambiguous [+A] category (see 3b). Here, it then turns out that there is no possibility that the Genitive Case marker *–no* attached to [$_{NP}$ *gengogaku*] is immediately contained within a [+N] projection, and (17b) is correctly ruled out by

the syntactic parser.

Exactly in the same way, the syntactic parser rejects example (15b). Examine now (18a) and (18b).

(18) a. ?[$_{VP\ or\ NP}$ [$_{NP}$ John]-?ga [$_{V'\ or\ N'}$ [$_{NP}$ nihongo]-?no [$_{V\ or\ N}$ kenkyuu]]]

b. *[$_{VP}$ [$_{VP}$ [$_{NP}$ John]-ga [$_{V'}$ [$_{NP}$ nihongo]-*no [$_{V}$ kenkyuu]]] [$_{V}$ si]] …..

Given a string of words in (15b), syntax first forms the underspecified representation in (18a), where the Nominative Case *–ga* and the Genitive Case *–no* within the fuzzy projection of [$_{V\ or\ N}$ *kenkyuu*] are not yet licensed. At the next point of left to right parsing, as shown in (18b), the light verb *si* selects the [+V] feature of the projection of the verbal noun, turning it into the projection of an unambiguous [+V] category (see 4b). Here as well, it thus turns out that there is no possibility that the Genitive Case marked NP, *nihongo-no*, is contained immediately inside the projection of a [+N] category. Hence, syntactic representation (18b) is ruled out by the parser, as desired.

Finally, given (1) and (2a-b), we can account for the acceptability of the following examples in the morphological component:[5] As shown below,

(19) a. [$_{A\ or\ N}$ kirei] -na ko
beautiful-Cop girl ‘a girl who is beautiful’

b.*[$_{N}$ gakusei]-na ko
student -Cop girl ‘a person who is a student’

c.*[$_{A}$ utukusi] -na ko
beautiful-Cop girl ‘a girl who is beautiful’

(19a) is well-formed, while (19b-c) are not. This is because the inflected form of a copula *na* morphologically selects only adjectival nouns such as [$_{A\ or\ N}$ *kirei*], and does not morphologically select a noun like [$_{N}$ *gakusei*] or an adjective like [$_{A}$ *utukusi*].

Similarly, as shown below,

(20) a. [$_{V\ or\ N}$ kenkyuu] -si -ta.
researching-do-Pst ‘Somebody studied something.’

b.*[$_{N}$ tyoosyoku]-si -ta.
breakfast -do-Pst ‘Somebody had breakfast.’

c.*[$_{V}$ tabe]- si -ta.
eat -do -Pst ‘Somebody ate.’

(20a) is well-formed, whereas (20b-c) are ill-formed. This is so because only verbal nouns such as [$_{V\ or\ N}$ *kenkyuu*] can be morphologically selected by the light verb *su*, the potential verbal suffix *–deki* ‘be able to,’ etc.

Consequently, the proposed dynamic categorization analysis captures uniformly the parallelisms between the two types of fuzzy categories in Japanese, i.e. adjectival nouns and verbal nouns, in (7a-b), (11a-b), (15a-b), (19a-

5 I am very grateful to Yoko Sugioka, who brought to my attention the importance of data such as (20a-c) for the dynamic categorization analysis proposed in Hoshi (2014).

c) and (20a-c). In the following section, I attempt to explore some of the consequences derived from the proposed dynamic syntactic analysis (cf. Kempson et al. 2001, Cann et al. 2005, etc.).

3. Consequences

One of the desirable consequences derived from the proposed dynamic categorization analysis is this: given the independently motivated categorization conditions in (4a) and (4b), we can account for the well-known properties of the Japanese light verb construction, without appealing to any special grammatical operations such as argument transfer, LF incorporation, among others (cf. Grimshaw and Mester 1988, Kageyama 1993, Sato 1993, Hoshi 1994, Matsumoto 1996, Saito and Hoshi 2000, among others).[6]

Consider two instances of the light verb construction in (21a-b).

(21) a. John-ga Mary-**kara** hooseki-**no** [$_{VN}$ ryakudatu]-**o** **si** -ta.
John-Nom Mary-from jewelry -Gen stealing -Acc do-Pst
'John stole jewelry from Mary.'

b. ?John-ga Mary-**kara** hooseki-**o** [$_{VN}$ ryakudatu]-**o** **si** -ta.
John-Nom Mary-from jewelry -Acc stealing -Acc do-Pst
'John stole jewelry from Mary.'

In (21a), the theme argument of [$_{VN}$ *ryakudatu*], i.e. *hooseki*, is attached by the Genitive Case *–no*, and the source argument, *Mary-kara*, appears without the Genitive Case marker *–no*. This Case fact suggests that only the theme argument, *hooseki-no*, is inside an NP, and the source argument, *Mary-kara*, is not inside a [+N] projection. In (21b), neither the theme argument, *hooseki*, nor the source argument, *Mary-kara*, is attached by the Genitive Case *–no*. This Case information implies that neither of these two internal arguments of [$_{VN}$ *ryakudatu*] is inside a [+N] projection. (21b) is slightly awkward, probably due to the 'surface double-*o* constraint' (cf. Harada 1973, Shibatani 1973, Kuroda 1978, Saito 1985, among others.)

Notice here that dynamic categorization conditions (4a) and (4b) are both relevant in the case of Japanese light verb constructions such as (21a) or (21b), because such constructions involve two 'dynamic categorizers,' i.e. the Accusative Case marker *–o* and the light verb [$_{V}$ *su*], which fix the categorial value of the verbal noun in one way or the other in the course of left to right parsing. Keeping this in mind, consider how syntax parses the string of words in (21a) from left to right under the proposed analysis:

(22) 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 [$_{\mathbf{NP}}$ Mary-?kara [$_{\mathbf{NP}}$ hooseki-**no** [$_{\mathbf{N}}$ ryakudatu]]-**o**]]

c. [$_{VP}$[$_{\mathbf{VP}}$ John-**ga** [$_{\mathbf{V}'}$ Mary-**kara** [$_{\mathbf{NP}}$ hooseki-**no** [$_{\mathbf{N}}$ ryakudatu]]-**o**]] [$_{V}$ **si**]] …..

As shown in (22a), the syntactic parser first builds up the fuzzy projection based on the underspecified category [$_{V\ or\ N}$ *ryakudatu*]; here, none of the three arguments, *John-ga*, *Mary-kara* and *hooseki-no*, is properly licensed due to the fuzziness of the projection. As in (22b), however, at the next point of left to right processing, the Accusative Case marker *–o* attaches to the second lowest projection of [$_{V\ or\ N}$ *ryakudatu*], turning it into an unambiguous [+N] projection thanks to categorization condition (4a), then licensing successfully the Genitive Case *–no* attached to the theme argument *hooseki*. As shown in (22c), the light verb [$_{V}$ *si*] then selects the remaining underspecified projection

6 An earlier version of the dynamic syntactic analysis presented here is proposed in Hoshi (2014).

of the verbal noun *ryakudatu*, updating it as an unambiguous [+V] projection due to categorization condition (4b), finally licensing the Nominative Case marked argument *John-ga* and the source argument *Mary-kara* as usual (cf. Fukui 1986, among others).

Given the string of words in (21b), the syntactic parser runs as follows:

(23) a. ?[$_{\text{VP or NP}}$ John-?ga [$_{\text{V' or N'}}$ Mary-?kara [$_{\text{V' or N'}}$ hooseki-?o [$_{\text{V or N}}$ ryakudatu]]]]

b. ?[$_{\text{VP or NP}}$ John-?ga [$_{\text{V' or N'}}$ Mary-?kara [$_{\text{V' or N'}}$ hooseki-?o [$_{\mathbf{N}}$ ryakudatu]-**o**]]]

c. [$_{\text{VP}}$ [$_{\mathbf{VP}}$ John-**ga** [$_{\text{V'}}$ Mary-**kara** [$_{\text{V'}}$ hooseki-**o** [$_{\mathbf{N}}$ ryakudatu]-**o**]]] [$_{\text{V}}$ **si**]] …..

At the initial point of left to right processing, syntax constructs underspecified respresentation (23a). In (23a) as well, none of the arguments of the verbal noun *ryakudatu* is properly licensed, because all the arguments are inside the projection of the verbal noun *ryakudatu* whose category is not fixed with respect to [+V] or [+N]. At the next point of left to right parsing in (23b), the syntactic parser attaches the Accusative Case marker –o to the lowest fuzzy category of [$_{\text{V or N}}$ *ryakudatu*], turning it into an unambiguous [+N] category thanks to categorization condition (4a). As in (23c), syntax then merges the remaining underspecified projection with the light verb [$_{\text{V}}$ *si*], updating the fuzzy projection as an unambiguous [+V] category because of categorization condition (4b). Consequently, all the arguments, *John-ga*, *Mary-kara* and *hooseki-o*, are licensed within the [+V] projection as usual.

Under the dynamic categorization analysis, it is thus not necessary to appeal to special operations such as argument transfer, LF incorporation, etc. to account for the celebrated properties of Japanese light verb constructions such as (21a-b). Moreover, the dynamic syntactic analysis accounts for the acceptability of examples such as (24a-b) in a straightforward manner.

(24) a. [Mary-**kara** hooseki-**no** ryakudatu]-o John-ga si -ta. (cf. 21a)
Mary-from jewelry -Gen stealing -Acc John-Nom do-Pst
'(Lit.) Stealing jewelry from Mary, John did.'

b. ?[Mary-**kara** hooseki -**o** ryakudatu]-o John-ga si -ta. (cf. 21 b)
Mary-from jewelry -Acc stealing -Acc John-Nom do-Pst
'(Lit.) Stealing jewelry from Mary, John did.' (cf. Sato 1993, Hoshi 2014, etc.)

This is so, because in dynamic syntactic structure (22c), [$_{\text{V}}$, *Mary-kara* [$_{\mathbf{NP}}$ *hooseki-**no*** [$_{\mathbf{N}}$ *ryakudatu*]]-***o***] is a consitituent. Namely, although the theme argument *hooseki-no* is within the [+N] projection and the source argument *Mary-kara* is inside the [+V] projection, these two arguments are still within the single projection of the verbal noun [$_{\text{N}}$ *ryakudatu*] in (22c). Similarly, in (23c), [$_{\text{V}}$, *Mary-kara* [$_{\text{V}}$, *hooseki-**o*** [$_{\text{N}}$ *ryakudatu*]-***o***]] forms a constituent. Here, the two internal arguments of the verbal noun *ryakudatu*, i.e. *Mary-kara* and *hooseki*-o, are not contained inside the nominal projection of [$_{\text{N}}$ *ryakudatu*]. However, these two internal arguments are still contained inside the single projection of the verbal noun [$_{\text{N}}$ *ryakudatu*] in (23c). Under the dynamic syntactic analysis, therefore, there is no surprise in (24a-b), where such constituents, one type of a 'mixed category' projection in the sense of Hoshi (2014), are placed at the clause-initial position (cf. Sugioka's (2009, p. 92, 27b and 27d) 'mixed cagtegory' projection analysis of VN-*tyuu* 'middle' construction[7]; cf. Koizumi 1995, Takano 2002, among others).

7 Putting aside irrelevant details, Sugioka's (2009, p. 92, 27b & 27d) structure is the same as the proposed structure in (22c). This is a direct consequence of dynamic categorization condition (4a), which incorporates Sugioka's (2009) insight (see footnote 3).

Examples such as (24a-b), however, could pose a potential problem for an argument transfer analysis or an LF incorporation analysis of the Japanese light verb construction, because such analyses assign structures such as (25a-b) to (21a-b) (see Grimshaw and Mester 1988, Saito and Hoshi 2000, among others).

(25) a. John-ga [$_{VP}$ Mary-kara [$_{NP}$ hooseki-no [$_{N}$ ryakudatu]]-o [$_{V}$ si]]-ta. (for 21a)

b. John-ga [$_{VP}$ Mary-kara hooseki-o [$_{NP}$ [$_{N}$ ryakudatu]]-o [$_{V}$ si]]-ta. (for 21b)

In (25a), the theme argument *hooseki-no* and the theta role assigning noun, *ryakudatu*, forms an NP constituent. However, the source argument *Mary-kara* is outside the NP, and is contained only within the V projection of the light verb *si*. In (25b), the theta marking noun *ryakudatu* projects its NP projection without having any of its arguments inside its own N projection. That is, in (25b), both the theme argument *hooseki* and the source *Mary-kara* are not inside the N projection of *ryakudatu*, and those two arguments are only contained within the V projection of the light verb. Thus, in (25a), the source argument *Mary-kara* does not form a constituent with [$_{NP}$ *hooseki-no* [$_{N}$ *ryakudatu*]]-*o*; in (25b), the source *Mary-kara* and the theme *hooseki-o* do not form a constituent with the N projection of *ryakudatu*, [$_{NP}$ [$_{N}$ *ryakudatu*]]-*o*. As a consequence, it does not seem to be entirely clear under the argument transfer analysis or the LF incorporation analysis why [*Mary-kara hooseki-no ryakudatu*]-*o* could be preposed to the clause-initial position as a single constituent in (25a), and why [*Mary-kara hooseki-o ryakudatu*]-*o* could be put at the sentence-initial position as a single unit in (24b).

Furthermore, because as indicated in the representations in (25a) and (25b), both Grimshaw and Mester's argument transfer analysis and Saito and Hoshi's LF incorporation analysis assume that a verbal noun like *ryakudatu* is simply a noun, such analyses do not seem to be able to account for either the unacceptability of (15b) or the data in (20a-c) in an adequate way. The proposed dynamic categorization analysis, on the other hand, does not suffer from any of such drawbacks, and if correct, the proposed analysis implies that the light verb construction in Japanese, in fact, might not have to involve any kind of complex predicate formation (cf. Grimashaw and Mester 1988, Kageyama 1993, Sato 1993, Hoshi 1994, Matsumoto 1996, Saito and Hoshi 2000, among others).

The proposed dynamic syntactic analysis also seems to be able to provide us with a direct way to capture the similarity between (26a) and (27a) on the one hand, and the parallelism between (26b) and (27b) on the other. Observe first the examples in (26a-b).

(26) a. boku-ga /-*no hon –o /-*no [$_{V}$ yomi]-[$_{A}$ ta] -[$_{T}$ i].
I -Nom/-*Gen book-Acc/-*Gen read want- Pres
'I want to read a book.'

b. boku-*ga /-no hon -*o /-no [$_{V}$ yomi]-[$_{N}$ kata]
I -*Nom/-Gen book-*Acc/-Gen read way
'a way of my reading a book' (cf. Sugioka 1992, Ito and Sugioka 2002, etc.)

(26a) contains the complex predicate [*yomi*]-[*ta*] 'read-want,' which consists of the verb [$_{V}$ *yomi*] and the adjective [$_{A}$ *ta*]; in (26a), the subject *boku* 'I' is marked by the Nominative Case marker *–ga*, and cannot be marked by the Genitive Case marker *–no*; the object *hon* 'book' is marked by the Accusative Case *–o*, and may not be marked by the Genitive Case *–no*. (26b), on the other hand, contains the V-N complex, [$_{V}$ *yomi*]-[$_{N}$ *kata*] 'read-way'; in (26b), both the external argument and the internal argument of the verb *yomi* are required to be marked by the Genitive Case marker *–no* (cf. Sugioka 1992, Ito and Sugioka 2002, among others).

With this in mind, examine now the examples in (27a-b), both of which involve the adjectival nominal suffix –[$_{AN}$

gati] ‘tend to’ (cf. Martin 1975, among others).

(27) a. John-ga /-*no zyugyoo-o /-*no [$_{V}$ yasumi]-[$_{\mathbf{AN}}$ gati] **da**.
John-Nom/-*Gen class -Acc/-*Gen miss - tend to Cop
‘John tends to miss classes.’

b. John-*ga /-no zyugyoo -*o /-no [$_{V}$ yasumi]-[$_{\mathbf{AN}}$ gati] **-ga** girons -are -ta.
John-*Nom/-Gen class -*Acc/-Gen miss tend to -Nom discuss-Pass-Pst
‘(Lit.) John’s tending to miss classes was discussed.’

With respect to the distribution of Case markers, (27a) parallels (26a), whereas (27b) behaves exactly in the same way as (26b). Observe below that under the dynamic categorization analysis, given the strings of words in (27a-b), the syntactic parser first constructs underspecified structures such as (28a) or (28b).

(28) a. ?[$_{\text{AP or NP}}$ [$_{\text{VP}}$ John-?ga [$_{\text{V'}}$ zyugyoo-?o [$_{\text{V}}$ yasumi]]] [$_{\text{A or N}}$ gati]]

b. ?[$_{\text{AP or NP}}$ [$_{\text{VP}}$ John-?no [$_{\text{V'}}$ zyugyoo-?no [$_{\text{V}}$ yasumi]]] [$_{\text{A or N}}$ gati]]

In (28a), the external argument of the verb *yasumi*, *John*, is marked by the Nominative Case marker *-ga*, and the internal argument, *zyugyoo*, is marked by the Accusative Case marker *-o*. Due to the fuzziness of the projection of the adjectival noun [$_{\text{A or N}}$ *gati*], these two case particles are not yet licensed at this stage. In (28b), on the other hand, the external argument and the internal argument are both marked by the Genitive Case *–no*. Again, because of the underspecified properties of the projection of [$_{\text{A or N}}$ *gati*], the two Genitive Case markers are not yet licensed.

At the subsequent stage of left to right parsing, if as shown in (29a-b), the copula [$_{\text{V}}$ *da*] selects the [+A] feature of the projection of the adjectival noun [$_{\text{A or N}}$ *gati*],

(29) a. [$_{\text{VP}}$ [$_{\mathbf{AP}}$ [$_{\text{VP}}$ John-ga [$_{\text{V'}}$ zyugyoo-o [$_{\text{V}}$ yasumi]]] [$_{\mathbf{A}}$ gati]] [$_{\text{V}}$ **da**]]

b. *[$_{\text{VP}}$ [$_{\mathbf{AP}}$ [$_{\text{VP}}$ John-*no [$_{\text{V'}}$ zyugyoo-*no [$_{\text{V}}$ yasumi]]] [$_{\mathbf{A}}$ gati]] [$_{\text{V}}$ **da**]]

the fuzzy projection of [$_{\text{A or N}}$ *gati*] gets updated as the unambiguous category [$_{\text{AP}}$ ….. *gati*] due to (3b). Consequently, syntax constructs basically the same clausal structure for (26a) and (27a), and we can account for the Case fact in (27a) in the same way as we do for that in (26a).

After constructing underspecified structures such as (28a-b), if on the other hand, the Nominative Case marker *–ga* selects the [+N] feature of the projection of [$_{\text{A or N}}$ *gati*] as illustrated in (30a-b),

(30) a. *[$_{\mathbf{NP}}$ [$_{\text{VP}}$ John-*ga [$_{\text{V'}}$ zyugyoo-*o [$_{\text{V}}$ yasumi]]] [$_{\mathbf{N}}$ gati]]-**ga**

b. [$_{\mathbf{NP}}$ [$_{\text{VP}}$ John-no [$_{\text{V'}}$ zyugyoo-no [$_{\text{V}}$ yasumi]]] [$_{\mathbf{N}}$ gati]]-**ga**

the fuzzy projection of the adjectival noun [$_{\text{A or N}}$ *gati*] is turned into the unambiguous [+N] projection, [$_{\text{NP}}$ ….. *gati*], due to (3a), as illustrated in (30a-b). As a result, the syntactic parser generates the same structure for both (26b) and (27b). We can thus account for the Case fact in (27b) exactly in the same way as we explain the Case properties of (26b).

The third pleasing consequence derived from the proposed dynamic syntactic analysis is that it might be able

to shed a new light on the nature of VN plus aspectual noun constructions in Japanese (cf. Iida 1987, Shibatani and Kageyama 1988, Miyagawa 1991, Hoshi 1994, Sugioka 2009, among others). Consider first two instances of such constructions below:

(31) a. John-ga ronbun-o [$_{VN}$ sippitu]-[$_{AspN}$ tyuu] da.
John-Nom paper -Acc writing - Prog/middle Cop
'John is writing a paper.'

b. John-ga ronbun-o [$_{VN}$ sippitu]-[$_{AspN}$ zumi] da.
John-Nom paper -Acc writing Perf/finish Cop
'John has written a paper.' (cf. Sugioka 2009)

Under the assumption that not only adjectival nouns (ANs) and verbal nouns (VNs), but also aspectual nouns (AspNs) are fuzzy categories in Japanese, both (31a) and (31b) involve two fuzzy categories. In (31a), the fuzzy category -[$_{AspN}$ *tyuu*] 'Prog/middle' selects another fuzzy category [$_{VN}$ *sippitu*] 'writing.' In (31b), on the other hand, the fuzzy aspectual head -[$_{AspN}$ *zumi*] 'Perf/finish' selects another fuzzy category [$_{VN}$ *sippitu*].

To capture the similarities between ANs/VNs and AspNs, here, I would like to suggest the following dynamic categorization conditions for AspNs:

(32) a. Case markers *select* the [+N] feature of the projection of an aspectual noun like -[$_{AspN}$ *tyuu*] in syntax, and may turn the fuzzy AspN projection into an unambiguous [+N] projection in the syntactic component.

b. A copula *selects* the [+Asp] feature of the projection of an aspectual noun like -[$_{AspN}$ *tyuu*] in syntax, and may turn the fuzzy AspN projection into an unambiguous [+Asp] projection in the syntactic component.

I, therefore, propose that an aspectual noun head like -[$_{AspN}$ *tyuu*] is listed as a fuzzy category in the lexicon as in (33a).

(33) a. -[$_{Asp\ or\ N}$ *tyuu*]
b. [$_{Asp}$ *tyuu*]
c. [$_{N}$ *tyuu*]

Under the dynamics of left to right parsing of a string of words, the fuzzy category [$_{Asp\ or\ N}$ *tyuu*] may get updated as an unambiguous [+Asp] category as in (33b) or may get updated as an unambiguous [+N] category, depending on the nature of on-line syntactic structure building.

Under the dynamic syntactic analysis, the acceptability of (31a-b) is accounted for as below. First, syntax parses the first part of a string of words in (31a-b), building the underspecified structure in (34).

(34) ?[$_{VP\ or\ NP}$ John-?ga [$_{V'\ or\ N'}$ ronbun-?o [$_{V\ or\ N}$ sippitu]]]

Here, neither the Nominative Case marker *–ga* nor the Accusative Case marker *–o* is licensed, because these two Case makers are contained inside the projection of the fuzzy category VN *sipputu*, whose category is not fixed with respect to [+V] or [+N].

At the next point of left to right parsing of a string of words, the progressive aspectual nominal head [$_{Asp\ or\ N}$ *tyuu*] selects the [+V] feature of the projection of [$_{V\ or\ N}$ *sipputu*] as in (35), turning the VN into an unambiguous [+V]

projection due to on-line categorization condition (4b).

(35) ?[[$_{\mathbf{VP}}$ John-ga [$_{\mathbf{V'}}$ ronbun-o [$_{\mathbf{V}}$ sippitu]]] [$_{\text{Asp or N}}$ **tyuu**]]

In (36), on the other hand,

(36) ?[$_{\mathbf{VP}}$ John-ga [$_{\mathbf{V'}}$ ronbun-o [$_{\mathbf{V}}$ sippitu]]] [$_{\text{Asp or N}}$ **zumi**]]

the perfect aspectual nominal head [$_{\text{Asp or N}}$ *zumi*] selects the [+V] feature of the projection of [$_{\text{V or N}}$ *sipputu*], updating the VN into an unambiguous [+V] projection due to dynamic categorization condition (4b). Probably, the Nominative Case marker *–ga* and the Accusative Case marker *–o* are both successfully licensed at this stage.

Finally, the syntactic parser builds structures (37a) and (37b) for (31a) and (31b), respectively.

(37) a. [$_{\text{VP}}$ [[$_{\text{VP}}$ John-ga [$_{\text{V'}}$ ronbun-o [$_{\text{V}}$ sippitu]]] [$_{\mathbf{Asp}}$ tyuu]] [$_{\text{V}}$ **da**]]

b. [$_{\text{VP}}$ [[$_{\text{VP}}$ John-ga [$_{\text{V'}}$ ronbun-o [$_{\text{V}}$ sippitu]]] [$_{\mathbf{Asp}}$ zumi]] [$_{\text{V}}$ **da**]] (Sugioka 2009, p. 94, (38); p. 97, (61))

In structure (37a), the copula [$_{\text{V}}$ *da*] selects the [+Asp] feature of the projection of [$_{\text{Asp or N}}$ *tyuu*], turning it into an unambiguous [+Asp] category; in (37b), exactly in the same way, [$_{\text{V}}$ *da*] selects the [+Asp] feature of the projection of the perfect aspect noun [$_{\text{Asp or N}}$ *zumi*], updating it as an unambiguous [+Asp] category. Under the proposed dynamic syntactic analysis, at this stage, all the fuzzy categories have disappeared successfully. In this way, the proposed dynamic categorization analysis yields in a systematic manner the structures in (37a-b), which are basically identical with the structures Sugioka (2009) proposes for examples (31a-b).

Keeping in mind categorization conditions (32a-b) and hypothesis (33a-c), examine next the nature of examples (38a-b).

(38) a. John-no ronbun-no [$_{\text{VN}}$ sippitu]-[$_{\text{AspN}}$ tyuu] -ga i -i.
John-Gen paper -Gen writing - Prog/middle-Nom good-Prs
‘(Lit.) In the middle of John’s writing a paper is good.’

b. gakusei-no syuwa -no [$_{\text{VN}}$ syuutoku]-[$_{\text{AspN}}$ zumi] -ga takaku hyookas-are -ta.
student -Gen sign language-Gen master - Perf/finish-Nom highly praise -Pass-Pst
‘(Lit.) Students’ having mastered a sign language was highly valued.’

Observe that in (38b), both the external and internal arguments of the verbal noun [$_{\text{V or N}}$ *sippitu*], i.e. *John* and *ronbun*, are marked by the Genitive Case marker *–no*; similarly, in (38b), the external and internal arguments of [$_{\text{V or N}}$ *syuutoku*], i.e. *gakusei* and *syuwa*, are also both marked by the Genitive Case marker *–no* (cf. 31a-b).

The acceptability of these examples is also expected under the proposed analysis. This is because syntax parses a string of words in (38a-b) and first builds up the representations below:

(39) a. ?[$_{\text{AspP or NP}}$ [$_{\mathbf{VP}}$ John-?no [$_{\mathbf{V'}}$ ronbun-?no [$_{\mathbf{V}}$ sippitu]]] [$_{\text{Asp or N}}$ **tyuu**]]

b. ?[$_{\text{AspP or NP}}$ [$_{\mathbf{VP}}$ gakusei-?no [$_{\mathbf{V'}}$ syuwa-?no [$_{\mathbf{V}}$ syuutoku]]] [$_{\text{Asp or N}}$ **zumi**]]

In structure (39a), due to categorization condition (4b), the aspectual noun *-tyuu* updates the fuzzy verbal noun [$_{\text{V or N}}$

sippitu] as an unambiguous [+V] category; in (39b) as well, thanks to condition (4b), the aspectual noun head *-zumi* turns the ambiguous category [$_{V\ or\ N}$ *syuutoku*] into an unambiguous [+V] category. The verbal noun is therefore indicated as [$_{V}$ *sippitu*] in (39a), and as [$_{V}$ *syuutoku*] in (39b). Notice, however, that the Genitive Case markers in (39a-b) are not yet licensed properly, because there isn't any [+N] projection which contains any of the Genitive Case markers in (39a-b).

As illustrated in (40a-b), at the next stage of left to right processing of a string of words,

(40) a. [$_{\mathbf{NP}}$ [$_{VP}$ John-no [$_{V'}$ ronbun-no [$_{V}$ sippitu]]] [$_{N}$ tyuu]]-**ga**

b. [$_{\mathbf{NP}}$ [$_{VP}$ gakusei-no [$_{V'}$ syuwa-no [$_{V}$ syuutoku]]] [$_{N}$ zumi]]-**ga**

the Nominative Case marker *–ga* attaches to the projection of the fuzzy progressive aspectual noun *tyuu* 'middle' in (40a) and to that of the underspecified perfect aspectual noun *zumi* 'finish' in (40b). Then, due to categorization condition (32a), the projections of such fuzzy categories are updated as an unambiguous [+N] category. Consequently, the syntactic parser constructs basically the same structure for (26b), (27b), and (38a-b), allowing us to explain the Case properties of such examples in a uniform way.

Before concluding the discussion of the nature of the VN plus aspectual noun construction, let us consider a potential problem for the proposed dynamic categorization analysis.

(41) a. doosookai -o suru-nara, [minna **-ga** kisei -[$_{\mathbf{AspN}}$ **tyuu**]]-**ga** i -i.
class reunion-Acc hold-If, everyone-Nom back home-Prog/middle-Nom good-Prs
'(Lit.) If we hold a class reunion, in the middle of everybody's being back hom is good.'
(Sugioka 2009, p. 88, (15b))

b. [hunin **-mae -ni** syuwa **-o** syuutoku-[$_{\mathbf{AspN}}$ **zumi**]] -ga nozomasi-i.[8]
leaving for a new position-before- sign language-Acc master - Perf/finish -Nom desirable -Prs
'(Lit.) [Having finished mastering a sign language before leaving for a new position] is desirable.'

As shown in (41a-b), Sugioka (2009) and others observe that even if a Case marker like *–ga* attaches to the projection of a fuzzy aspectual noun like -[$_{AspN}$ *tyuu*] or -[$_{AspN}$ *zumi*], the projection of such a fuzzy category can license and contain the Nominative Case marked NP, *minna-ga*, as in (41a), and the Accusative Case marked NP, *syuwa-o*, and even the adverbial phrase *hunin-mae-ni* 'before leaving for a new position' as in (41b).

The data in (41a-b) thus seem to show that the structures for (41a-b) relevant in this discussion cannot be (42a-b), but they should be something like (43a-b) (cf. Sugioka 2009, p. 97, (60)).

(42) a. *[$_{\mathbf{NP}}$ minna-**ga** kisei-[$_{\mathbf{N}}$ **tyuu**]]-**ga**

b. *[$_{\mathbf{NP}}$ [$_{\mathbf{AdvP}}$ hunin-**mae-ni**] syuwa-**o** syuutoku-[$_{\mathbf{N}}$ **zumi**]]-**ga**

(43) a. [$_{\mathbf{AspP}}$ minna-**ga** kisei-[$_{\mathbf{AsP}}$ **tyuu**]]-**ga**

b. [$_{\mathbf{AspP}}$ [$_{\mathbf{AdvP}}$ hunin-**mae-ni**] syuwa-**o** syuutoku-[$_{\mathbf{AsP}}$ **zumi**]]-**ga**

Given this consideration, I therefore revise dynamic categorization condition (32a) slightly as follows:

8 I am grateful to Mayumi Hoshi, who brought examples such as (41b) to my attention.

(44) Case markers *select* either the [+N] feature or the [+Asp] feature of the projection of an aspectual noun like -[$_{\text{AspN}}$ *tyuu*] in syntax, and may turn the fuzzy AspN projection into an unambiguous [+N] or [+Asp] projection in the syntactic component.

The revised dynamic categorization condition in (44) then allows the syntactic parser to build up structures such as (43a-b) for (41a-b), implying that we may be able to use Case markers such as the Nominative Case marker *–ga* as a 'clause(AspP)-final' particle in modern Japanese. Perhaps, this conclusion is surprising, but I hope that it could be an interesting consequence.

4. Conclusion

If the proposed dynamic categorization analysis of fuzzy categories in Japanese is indeed on the right track, it could imply that the dynamic pressure of language might have helped the Japanese language develop both 1) very efficient grammatical conventions (see 3a-b, 4a-b, 32b, and 44) and 2) highly flexible categories, i.e. fuzzy categories, stored in the lexicon (cf. head-initial languages such as English). The proposal could thus provide evidence for Hawkins' (2004, 2014, etc.) Performance-Grammar Correspondence Hypothesis: grammars are profoundly shaped by performance factors such as language processing (cf. Kempson et al. 2001, Cann et al. 2005; cf. Chomsky 1965, 1981, 1986, 1995, among others).

References

Aarts, B., D. Denison, E. Keizer, and G. Popova (2004) *Fuzzy Grammar: A Reader*, Oxford University Press.

Aarts, B. (2007) *Syntactic Gradience: The Nature of Grammatical Indeterminacy*, Oxford University Press.

Cann, R., R. Kempson, and L. Marten (2005) *The Dynamics of Language: An Introduction*, Syntax and Semantics volume 35, Elsevier/Academic Press.

Chomsky, N. (1965) *Aspects of the Theory of Synta*x, MIT Press.

Chomsky, N. (1981) *Lectures on Government and Binding*, Foris, Dordrecht.

Chomsky, N. (1986) *Knowledge of Language: Its Nature, Origin, and Use*, Praeger, New York.

Chomsky, N. (1995) *The Minimalist Program*, MIT Press.

Croft, W. (2001) *Radical Construction Grammar: Syntactic Theory in Typological Perspective*, Oxford University Press.

Culicover, P. and R. Jackendoff (2005) *Simpler Syntax*, Oxford University Press.

Fanselow, G. C. Féry, R. Vogel, and M. Schlesewsky (2006) *Gradience in Grammar: Generative Perspectives*, Oxford University Press.

Fukui, N. (1986) *A Theory of Category Projection and its Application*, PhD dissertation, MIT.

Grimshaw, J. and A. Mester (1988) 'Light Verbs and θ-marking,' *Linguistic Inquiry* 19, 205-232.

Harada, S.-I. (1973) 'Counter-Equi NP Deletion,' *Annual Bulletin*, Research Institute of Logopedics and Phoniatrics, University of Toky, 7, 113-147.

Hawkins, J. A. (1990) 'A Parsing Theory of Word Order Universals,' *Linguistic Inquiry* 21, 223-61.

Hawkins, J. A. (1994) *A Performance Theory of Order and Constituency*, Cambridge University Press.

Hawkins, J. A. (2004) *Efficiency and Complexity in Grammars*, Oxford University Press.

Hawkins, J. A. (2014) *Cross-linguistic Variation and Efficiency*, Oxford University Press.

Hoshi, H. (1994) *Passive, Causative and Light Verbs: A Study of Theta Role Assignment*, PhD dissertation, University of Connecticut.

Hoshi, H. (2014) 'Case, Tense and Light Verb Constructions: A Dynamic Property of Language,' in Kishimoto, H. and Y. Yumoto (eds.), *Hukuzatu-zyutugo-kenkyuu-no Genzai*, Hituzi Syobo.

Hoshi, H. (2018) 'Dynamic Categorization of Adjectival Nouns and Verbal Nouns: A Study of Fuzzy Categories,' ms., Akita University.

Akita University

Iida, Y. (1987) 'Case Assignment in Nominals in Japanese' in Iida, M., S. Wechsler and D. Zec (eds.), *Working Papers in Grammatical Theories and Discourse Structure*, CSLI, 93-138.

Ito, T. and Y. Sugioka (2002) *Go-no Sikumi-to Gokeisei* [Structure of Words and Word Formation], Kenkyusha.

Jackendoff, R. (1997) *The Architecture of the Language Faculty*, MIT Press.

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

Kempson, R., W. Meyer-Viol, and D. Gabbay (2001) *Dynamic Syntax: The Flow of Language Understanding*, Blackwell Publishers.

Kishimoto, H. and Y. Yumoto (2014) *Hukuzatu-zyutugo-kenkyuu-no* Genzai, Hituzi Syobo.

Koizumi, M. (1995) *Phrase Structure in Minimalist Syntax*, PhD dissertation, MIT.

Kuno, S. (1973) *The Structure of the Japanese Language*, MIT Press.

Kuroda, S.-Y. (1978) 'Case-marking, Canonical Sentence Patterns and Counter Equi in Japanese, in Hinds, J. and Irwin Howard (eds.), *Problems in Japanese Syntax and Semantics*, Kaitakusha, Tokyo.

Kuroda, S.-Y. (1992) *Japanese Syntax and Semantics*, Kluwer Academic Publishers.

Martin, S. (1975) *A Reference Grammar of Japanese*, Yale University Press.

Matsumoto, Y. (1996) Complex Predicates in Japanese: A Syntactic and Semantic Study of the Notion 'Word,' Kurosio Publishers.

Miyagawa, S. (1991) 'Case Realization and Scrambling,' ms., Ohio State University.

Saito, M. (1982) 'Case Marking in Japanese,' ms., MIT.

Saito, M. (1985) *Some Asymmetries in Japanese and their Theoretical Implications*, PhD dissertation, MIT.

Saito, M. and H. Hoshi (2000) 'The Japanese Light Verb Construction and the Minimalist Program,' in Martin, R., D. Michaels and J. Uriagereka (eds.), *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*, MIT Press.

Sato, Y. (1993) 'Argument Structure: All or Nothing,' *Gengo Kenkyu* 103, 92-127, The Linguistic Society of Japan.

Shibatani, K. (1973) 'Semantics of Japanese Causativization,' *Foundations of Language* 9, 323-373.

Shibatani, K. and T. Kageyama (1988) 'Word Formation in a Modular Theory of Grammar: Postsyntactic Compounds in Japanese,' *Language* 64-3, 451-484.

Sugioka, Y. (1992) 'On the Role of Argument Structure in Nominalization,' *Hiyosi-kiyoo Gengo Bunka Communication* 10, 53-80, Keio University.

Sugioka, Y. (2009) '"-*Tyuu*"*-no Tagisei: Zikan-o Arawasu Setuzi-o Meguru Koosatu,*' in Yumoto, Y. and H. Kishimoto (eds.), *Goi-no Imi-to Bunpoo*, Kurosio Publishers.

Takano, Y. (2002) 'Surprising Constituents,' *Journal of East Asian Linguistics* 11-3, 243-301.

Uehara, S. (1998) *Syntactic Categories in Japanese: A Cognitive and Typological Introduction*, Kurosio Publishers.

Yumoto, Y. (2005) *Fukugoo-doosi Hasei-doosi-no Imi-to Toogo: Module-keitairon-kara Mita Nichieigo-no Doosi-keisei*, Hituzi Syobo.

Yumoto, Y. and H. Kishimoto (2009) *Goi-no Imi-to Bunpoo*, Kurosio Publishers.