秋田大学高等教育
グローバルセンター紀要
13 － 26　　(2022)

Fuzzy Syntax: The Flow of Incremental Structure Building and Update[1]

Hiroto Hoshi
Akita University

1. Introduction: Fuzzy syntax

It is truism that HEADS play significant roles in language: predicative heads provide syntax with significant information as to how syntax should construct phrase structure for semantic interpretation; and functional heads, such as case or tense markers, provide important information for syntactic licensing. In strictly HEAD-FINAL languages such as Japanese, however, such phrasal heads necessarily come last. A question thus arises as to how in such head-final languages, syntax parses a string of words, gradually building phrase structure and carrying out syntactic licensing in the course of left to right sentence processing (cf. Kempson et al. 2001, Cann et al. 2005, among others). To attempt to answer this question, in this paper, I wish to propose the FLOW of incremental structure building (1a) and that of incremental update (1b) in head-final languages such as Japanese.

(1) In the course of left to right sentence processing,
   a. syntax FIRST forms fuzzy phrase structure step by step in a TOP-DOWN manner;
   b. THEN, syntax updates by HEADS, such fuzzy phrase structure step by step in a BOTTOM-UP fashion.

To attain this aim, as in Hoshi (2021a–c), here, I adopt (2), which I believe to be the spirit of Dynamic Syntax (cf. Kempson et al. 2001, Cann et al. 2005, etc.; cf. Phillips 1996, 2003, etc.):

(2) While parsing a string of words one by one from left to right, syntax keeps hypothesizing upcoming linguistic representations together with their labels, which must subsequently be licensed.

More specifically, for Japanese, i.e. a typical head-final language, I argue for the hypotheses in (3a–b), where case markers play a central role in building linguistic representation.

(3) In the course of left to right sentence processing,
   a. case markers such as *-ga*, *-o*, or *-no* in Japanese help syntax to hypothesize upcoming phrase structures together with their categorial labels, which must subsequently be updated and licensed (cf. Kempson & Kiaer 2010, etc.; cf. Saito 1985);
   b. such case markers themselves must also be licensed by a variety of phrase-final heads.

To be more precise, as in Hoshi (2021c), I adopt (4a–c) for INCREMENTAL CATEGORIAL LABELING, assuming that

1 I am very grateful to Jun Abe, Koichi Abe, Takane Ito, Hideki Kishimoto, Masatoshi Koizumi, Tohru Seraku, Yoko Sugioka, Ichiro Yuhara, Yoko Yumoto, and especially, Ruth Kempson for their invaluable comments on earlier versions of FUZZY SYNTAX (Hoshi 2014, 2019a–b, 2020a–b, 2021a–d, etc.).

FUZZY phrase structures constructed by case markers in accordance with (4a–c) are UPDATED and LICENSED step by step by phrase-final updaters, i.e. heads, such as a predicate, a case marker, a tense marker, etc. in Japanese:

(4) a. Case markers such as *-ga* or *-o* help syntax to hypothesize that phrases such as NP-*ga* or NP-*o* are immediately dominated by a ?V projection.[2]
b. The genitive case marker *-no* helps syntax to hypothesize that NP-*no* is immediately dominated by a fuzzy [?V or ?N] projection.[3]
c. The genitive case marker *-no* helps syntax to hypothesize that genitive case marked phrases such as PP-*no* or CP-*no* are immediately dominated by a fuzzy ?N projection.

I also adopt (5a–d) for INCREMENTAL CASE LICENSING:

(5) The nominative case *-ga* and the genitive case *-no* are structural Cases in Japanese, whereas (in most cases,)[4] the accusative case *-o* and the dative case *-ni* are inherent cases:
a. a nominative case marked NP, NP-*ga*, is licensed, once it is c-commanded by T or temporal nouns such as [N *ori*] 'occasion';
b. a genitive case marked phrase, XP-*no*, is licensed, once it is immediately dominated by an N projection;
c. either a nominative case marked NP or a genitive case marked NP is licensed, once it is c-commanded by adnominal T (cf. Saito 2001, p. 271)[5] ;
d. the accusative case *-o* and the dative case *-ni* are inherent cases linked to particular semantic arguments of a predicate.[6]

In this paper as well, the following proposal concerning categories in Japanese plays an essential role, together with (2), (3a–b), (4a–c), and (5a–d):[7] [8]

		morphological labels	*syntactic labels*
(6) a.	adjective (*utukusi* 'beautiful'):	A	[?V or ?N]
b.	verb *(tabe* 'eat'):	V	[?V or ?N]
c.	adjectival noun (*kirei* 'beautiful'):	AN	[?V or ?N]

2 Kempson & Kiaer (2010) claim that the nominative case maker *-ga* in Japanese necessarily marks the external argument within a predicate phrase. I disagree with this claim, and I adopt (4a), whereby not only an external argument, but also an internal argument can be attached by the nominative case *-ga* in Japanese.

3 The assumption in (4b) is adopted, because in Japanese, a genitive case marked NP can be either c-commanded by a V/T projection (see 5c) or immediately dominated by an N projection (see 5b).

4 The reader is referred to Abe (2015) for this qualification.

5 In this paper, I adopt (5c). It might, however, be the case that T licenses the nominative case *-ga* optionally; and the adnominal feature on T optionally licenses the genitive case *-no*, triggering nominative-genitive conversion in Japanese (cf. Hiraiwa 2001, etc.; cf. Kuroda 1988, 1992, etc.).

6 Given Chomsky (1995) type 'Configurational Theta Theory,' (5d) implies that the semantics of a predicate forces accusative case marked NPs and dative case marked NPs to appear at their fixed structural positions by the end of left to right sentence processing (cf. Saito's 1985 analysis of scrambling in Japanese).

7 For proposals concerning categories in Japanese, the reader is referred to Matsushita (1930), Martin (1975), Kageyama (1982, 1993), Miyagawa (1987), Ito & Sugioka (2002), Kageyama & Kishimoto (2016), Kishimoto & Uehara (2016), Ueno (2016), Yuhara (2021), among others.

8 The proposal in (6a–d) implies that morphology and syntax are separate components of grammar; and morphology cannot be reduced to syntax (cf. Jackendoff 1997, 2003, Culicover & Jackendoff 2005, etc.).

d. verbal noun (*syokuzi* ‘eat’): VN [?V or ?N] (Hoshi 2021a–c)

Under the proposal in (6a–d), the four predicates in Japanese, i.e. adjective, verb, adjectival noun, and verbal noun, have distinct morphological labels, viz. A, V, AN, and VN (cf. Kageyama 1993, Ito & Sugioka 2002, etc.). Importantly, however, all these predicates are categorially FLEXIBLE in syntax; namely, they have the identical FUZZY syntactic label, [?V or ?N].[9]

Here, for syntactic label UPDATE or VALIDATION,[10] I revise Hoshi’s (2021a–c) lexical specifications as in (7a–c).

(7) In the syntactic component,
   a. tense markers, light verbs such as [V *su*] ‘do’ or [V *deki*] ‘can,’ and temporal nouns such as [N *ori*] ‘occasion’ validate V.
   b. nominal suffixes such as -[N *kata*] ‘way’ or -[N *sa*] ‘-ness’ validate N.[11]
   c. case markers validate N *optionally*.
   etc. (cf. Hoshi 2021a–c; cf. Sugioka 2009, p. 92, 27b–d)

Given (2), (3a–b), (4a–c), (5a–d), (6a–d), and (7a–c), in this paper, I wish to propose the flow of incremental

---

9 It must be stressed here that theoretically, the proposed syntactic category with a disjunction of two choices, i.e. [?V or ?N], in (6a–d) is totally different from a ‘categoryless root’ proposed by Distributed Morphology (Halle & Marantz 1993, Harley & Noyer 1999, Harley & Noyer 2000, etc.), by Exo-skeltal Model (Borer 2003, etc.) or by Asymmetrical Morphology (Di Sciullo 2005) (cf. Lieber 2006). Under the proposal in (6a–d), unlike a categoryless root, (i) the four predicates in Japanese are stored with the syntactically underspecified categorial label [?V or ?N] in the lexicon; (ii) the final nature of the fuzzy syntactic category in (6a–d) is not determined by invisible functional categories, *v* or *n*, by means of merge, but is determined by LABEL VALIDATION, triggered by visible SYNTACTIC UPDATERS, i.e. heads, incrementally in the course of left to right processing of a string of words (see 7a–c).

10 Sugioka (2009, p. 92, 27b–d) first proposes that a temporal affix in Japanese, i.e. *-tyuu* ‘middle/during,’ turns any part of the projection of a verbal noun into an N projection by means of its c-selection. The proposal in (7a–c) thus heavily relies on her selection-based labeling analysis.

11 As in Hoshi (2021a–c), I claim below for the morphological component:

Morphological labels

(i) a. [N gakusei] -ni b. [VN kenkyuu] -o c. [AN kirei] -o
student -DAT study -ACC beauty -ACC

(ii) [N [V tabe] -[N kata]]
eat way ‘how to eat’

Namely, in morphology, case markers c-select the morphological labels, i.e. N, VN, AN, etc. (see ia–c), whereas the nominal suffix *-kata* c-selects only the morphological label, V (see ii).

As proposed in (7b–c), I suggest below for the syntactic component:

Syntactic labels

(iii) a. [NP gakusee] -ni b. [NP kenkyuu] -o c. [NP kirei] -o
student -DAT study -ACC beauty -ACC

(iv) [NP [NP tabe]-[N kata]]
eat way ‘how to eat’

In syntax, both case markers and nominal suffixes such as -[N *kata*] validate the same syntactic label, N, as illustrated in (iii) and (iv).

structure building (8a) and that of incremental update (8b) in head-final languages such as Japanese (cf. 1a–b).

(8) In the course of left to right sentence processing,
   a. syntax FIRST forms fuzzy phrase structure step by step in a TOP-DOWN manner in accordance with (4a–c);
   b. THEN, syntax updates by HEADS, such fuzzy phrase structure step by step in a BOTTOM-UP fashion by means of (7a–c), (5a–d), etc.

That is, here, I would like to argue that incremental structure building proceeds from top to bottom, and incremental update in a bottom-up fashion in head-final languages such as Japanese. In the following section, I attempt to show how the proposed analysis based on (8a–b) accounts for the nature of incremental structure building and update, concerning a string of words involving a single predicative head. In section 3, I try to demonstrate how the proposed analysis accounts for the properties of a string of words involving multiple predicative heads. In section 4, I conclude the discussion in this paper.

2. Incremental structure building & update: The case of a single predicative head

Various types of Japanese temporal construction are given in (9a–d), each of which involves a single predicative head, [VN *kenkyuu*] 'study.'

(9) a. Sooseki-ga London-de Shakespeare-no kenkyuu-no ori, …..
   Sooseki-NOM London-in Shakespeare-GEN study-GEN occasion, …..
   'When Sooseki studied Shakespeare in London, …..'
   b. Sooseki-ga London-de-no Shakespeare-no kenkyuu-no ori, …..
   Sooseki-NOM London-in-GEN Shakespeare-GEN study-GEN occasion, …..
   c. Sooseki-no London-de-no Shakespeare-no kenkyuu-no ori, …..
   Sooseki-GEN London-in-GEN Shakespeare-GEN study-GEN occasion, …..
   d. Sooseki-ga London-de Shakespeare-o kenkyuu-no ori, …..
   Sooseki-NOM London-in Shakespeare-ACC study-GEN occasion, …..

(cf. Shibatani & Kageyama 1988, Kageyama 1993, etc.)

(9a–d) are all acceptable, and semantically equivalent. (9a–d) are, however, different syntactically. In (9a), only the theme, *Shakespeare*, of the verbal noun *kenkyuu* 'study' is marked by the genitive case *-no*; the agent, *Sooseki*, is marked by the nominative case *-ga*; the locative, *London*, by the postposition *de* 'in.' In (9b), both the theme, *Shakespeare*, and the locative, *London-de*, are attached by the genitive case *-no*; the agent, *Sooseki*, is by the nominative case *-ga*. In (9c), all the arguments of the verbal noun *kenkyuu* are marked by the genitive case *-no*. In (9d), none of the arguments of *kenkyuu* is attached by the genitive case *-no*. Namely, in (9d), the theme, *Shakespeare*, is marked by the accusative case *-o*; the locative, *London*, by the postposition *-de*; the agent, *Sooseki*, by the nominative case. A question thus arises as to why this should be the case, and I try to show below that the data in (9a–d) are indeed expected by the incremental analysis proposed in this paper.

First, consider the proposed incremental process in (10a–f) for example (9a). As in (10a), syntax first parses the nominative case marked NP, *Sooseki-ga*,

(10) a. [?VP Sooseki-?ga [*e*]]
   b. [?VP Sooseki-?ga [?V' London-?de [*e*]]]
   c. [?VP Sooseki-?ga [?V' London-?de [?V' or ?N' Shakespeare-?no [*e*]]]]
   d. [?VP Sooseki-?ga [?V' London-?de [?V' or ?N' Shakespeare-?no [?V or ?N kenkyuu]]]][12]

e. [?VP Sooseki-?ga [?V' London-?de [**N'** Shakespeare-**no** [**N** kenkyuu]]-?no]]

f. [NP [**VP** Sooseki-**ga** [**V'** London-**de** [**N'** Shakespeare-**no** [**N** kenkyuu]]-**no**]] [N **ori**]]

(agent (locative-**DE** (theme)))

(i) constructing a Larsonian ?VP shell-like structure, and (ii) accommodating the nominative NP within the ?V projection in accordance with (4a). Syntax then parses the locative PP, [PP *London*-[P *de*]]; as illustrated in (10b), syntax includes the locative argument as the second highest argument within the ?VP shell structure by (4a). Subsequently, syntax parses the third argument, *Shakespeare*, attached by the genitive case *-no*; as shown in (10c), syntax accommodates it within the fuzzy ?V or ?N projection within the ?VP, by means of (4b) (cf. Koizumi 1995, Takano 2002, etc.). Syntax then parses the verbal noun *kenkyuu*, which has the fuzzy ?V or ?N categorial label (see 6d); as in (10d), it inserts the flexible predicate, i.e. *kenkyuu*, into the empty head position of the ?VP. As top-down incremental structure building has finished, incremental update starts in a bottom-up fashion (see 8a–b). As illustrated in (10e), after parsing the genitive case *-no* attached to *kenkyuu*, syntax attaches it to the second lowest fuzzy projection, validating it as an N projection by (7c). Consequently, in (10e), the genitive NP, *Shakespeare-no*, is properly licensed by (5b). Finally, syntax parses the temporal noun *ori* 'occasion'; as shown in (10f), the noun validates the largest fuzzy projection as a V projection by (7a), consequently licensing the nominative NP (see 5a) and the postpositional PP (see 5d). In (10f), the genitive case *-no*, which validates [N' *Shakespeare-no* [N *kenkyuu*]] as an N projection, is properly licensed by (5b), because [N' *Shakespeare-no* [N *kenkyuu*]]-?*no* is part of the V projection based on *kenkyuu*; and the VP is immediately dominated by the NP based on *ori* 'occasion.' Importantly, in (10a–f) all the requirements indicated by ? are created in a top-down manner (see 8a); all of them are satisfied and erased in a bottom-up fashion (see 8b).

Consider next the suggested parsing process in (11a–f) for (9b).

(11) a. [?VP Sooseki-?ga [*e*]]

b. [?VP Sooseki-?ga [?N' London-de-?no [*e*]]]

c. [?VP Sooseki-?ga [?N' London-de-?no [?V' or ?N' Shakespeare-?no [*e*]]]]

d. [?VP Sooseki-?ga [?N' London-de-?no [?V' or ?N' Shakespeare-?no [?V or ?N kenkyuu]]]]

e. [?VP Sooseki-?ga [**N'** London-de-**no** [**N'** Shakespeare-**no** [**N** kenkyuu]]]-?no]

f. [NP [**VP** Sooseki-**ga** [**N'** London-de-**no** [**N'** Shakespeare-**no** [**N** kenkyuu]]]-**no**] [N *ori*]]

(agent (locative-**DE** (theme)))

As in (11a), syntax first accommodates the nominative NP, *Sooseki-ga*, within the ?VP shell by (4a). As in (11b), syntax then includes the genitive PP, [PP *London*-[P *de*]]-*no*, within the fuzzy ?N projection in accordance with (4c). As in (11c), syntax then accommodates the genitive NP, *Shakespeare-no*, within the ?V or ?N projection by (4b). As in (11d), syntax then inserts the flexible ?V or ?N category, *kenkyuu*, into the empty head position of the ?VP (see 6d). As top-down incremental structure building has finished at this stage, bottom-up incremental update begins (see 8a–b). As illustrated in (10e), after parsing the genitive case marker *-no*, syntax attaches it to the second highest fuzzy ?V or ?N projection, validating it as an N projection by (7c). As a result, the genitive PP, [PP *London*-[P *de*]]-*no*, and the genitive NP, *Shakespeare-no*, are both properly licensed within the N projection by (5b) at the processing stage of (11e). Last, in (11f), the temporal noun *ori* validates the largest fuzzy projection as a V projection in accordance with (7a); the nominative NP, *Sooseki-ga*, is properly licensed by the temporal head [N *ori*] by means of c-command (see

12 Representations such as (13d) proposed in this paper are radically fuzzy in that such structures contain multiple 'underspecified' nodes. Under the strict version of Dynamic Syntax, however, there can be only one 'unfixed' tree node of a type at a time in any process of tree growth (Kempson & Kiaer 2010, p. 161, among others). This very strict restriction imposed by Dynamic Syntax is, obviously, incompatible with Fuzzy Syntax proposed in this paper.

5a). In (11f), the genitive case marked NP, i.e. [N' *London-de-no* [N' *Shakespeare-no* [N *kenkyuu*]]]-?*no*, is properly licensed by (5b), because the genitive NP is part of the VP which is immediately dominated by the N projection of *ori* (cf. 10f). Again, in (11a–f), all the requirements indicated by ? are created in a top-down fashion (see 8a); all the requirements are satisfied step by step in a bottom-up manner (see 8b).

Consider next the proposed parsing process in (12a–f) for example (9c).

(12) a. [?VP or ?NP Sooseki-?no [*e*]]
b. [?VP or ?NP Sooseki-?no [?N' London-de-?no [*e*]]]
c. [?VP or ?NP Sooseki-?no [?N' London-de-?no [?V' or ?N' Shakespeare-?no [*e*]]]]
d. [?VP or ?NP Sooseki-?no [?N' London-de-?no [?V' or ?N' Shakespeare-?no [?V or ?N kenkyuu]]]]
e. [**NP** Sooseki-**no** [**N'** London-de-**no** [**N'** Shakespeare-**no** [**N** kenkyuu]]]]-?no
f. [**NP** [**NP** Sooseki-**no** [**N'** London-de-**no** [**N'** Shakespeare-**no** [**N** kenkyuu]]]]-**no** [N **ori**]]
(agent (locative-DE (theme)))

As in (12a), syntax first parses the genitive NP, *Sooseki-?no*, and accommodates it within the fuzzy ?VP or ?NP shell structure by means of (4b). As in (12b), syntax then includes the genitive PP, [PP *London-*[P *de*]]-?*no*, within the fuzzy ?N projection, by (4c). As in (12c), subsequently, syntax accommodates the genitive theme NP, *Shakespeare-no*, within the fuzzy ?V or ?N structure by (4b). Next, as in (12d), syntax inserts the flexible ?V or ?N predicate, *kenkyuu*, into the empty head position of the shell (see 6d). As top-down incremental structure building has finished at this stage, bottom-up update starts (see 8a–b). As in (12e), after parsing the genitive case *-no*, syntax attaches the genitive case to the highest fuzzy ?V or ?N projection, validating it as an N projection by means of (7c). Consequently, the three genitive case marked phrases in (12e) are licensed simultaneously by (5b). Finally, as in (12f), the temporal noun, *ori*, c-selects the N projection; and the genitive case *-no* which is attached to the entire NP, [NP *Sooseki-no* [N' *London-de-no* [N' *Shakespeare-no* [N *kenkyuu*]]]], is properly licensed within the NP based on the temporal noun head, *ori* (see 5b). In (12a–f) as well, incremental structure building proceeds in a top-down manner, whereas incremental update proceeds in a bottom-up fashion (see 8a–b); and all the requirements are gone at the parsing stage of (12f).

Finally, consider the proposed parsing process in (13a–d) for (9d).

(13) a. [?VP Sooseki-?ga [*e*]]
b. [?VP Sooseki-?ga [?V' London-?de [*e*]]]
c. [?VP Sooseki-?ga [?V' London-?de [?V' Shakespeare-?o [*e*]]]]
d. [?VP Sooseki-?ga [?V' London-?de [?V' Shakespeare-?o [?V kenkyuu]]]]
e. [?VP Sooseki-?ga [?V' London-?de [?V' Shakespeare-?o [?V kenkyuu]-?no]]]
f. [NP [**VP** Sooseki-**ga** [**V'** London-**de** [**V'** Shakespeare-**o** [**V** kenkyuu]-**no**]]] [N **ori**]]
(agent (locative-**DE** (theme-**ACC**)))

As in (13a), syntax first accommodates the nominative NP, *Sooseki-ga*, within the ?VP shell structure by (4a). As in (13b), next, syntax includes the locative PP, *London-de*, within the ?VP by (4a). As in (13c), syntax then accommodates the theme NP, *Shakespeare-o*, within the fuzzy ?V projection by (4a). Subsequently, given the consistently fuzzy ?V projection in (13c), as shown in (13d), syntax chooses the fuzzy ?V label for the flexible predicate, *kenkyuu*, (see 6d), and it inserts [?V *kenkyuu*] into the empty head position. As in (13e), the genitive case *-no* may then attach to the lowest fuzzy ?V predicate, but does not trigger categorial labeling. (Observe that the categorial validation in (7c) is optional.) Last, as in (13f), the temporal noun, *ori*, validates the entire fuzzy projection as a V projection (see 7a). Consequently, in (13f), the nominative NP, *Sooseki-ga*, is licensed by the temporal noun

ori (see 5a); the locative PP, *London-de*, and the accusative NP, *Shakespeare-o*, are both licensed properly within the VP (see 5d). In (13f), the genitive case *-no* is attached to the lowest part of the VP; the VP is immediately dominated by the NP based on *ori*. Thus, in (13f), the genitive case which is attached to the predicate phrase, i.e. VP, is successfully licensed by (5b). Significantly, here as well, incremental structure building has proceeded from top to bottom, creating various requirements; incremental update has proceeded in a bottom-up fashion, satisfying such requirements step by step (see 8a–b).[13]

3. Incremental structure building & update: The case of multiple predicative heads

Now, let us consider the examples in (14a–c), each of which involves two predicative heads, *zyooto* 'giving' and *deki* 'can.'

(14) a. John-ga Mary-ni toti-o zyooto-deki-ru.
John-NOM Mary-DAT land-ACC giving-can-PRES
'John can give land to Mary.'
b. John-ga Mary-ni toti-ga zyooto-deki-ru.
John-NOM Mary-DAT land-NOM giving-can-PRES
c. *John-ga Mary-ni toti-no zyooto-deki-ru.
John-NOM Mary-DAT land-GEN giving-can-PRES

(14a–b) are acceptable, but (14c) is not. In all the examples in (14a–c), the external argument of *deki* is marked by the nominative case *-ga*; the goal argument of the verbal noun, *zyooto*, is marked by the dative case *-ni*. However, in (14a), the theme of the verbal noun is marked by the accusative case *-o*; in (14b), the theme by the nominative case *-ga*; in (14c), the theme argument by the genitive case *-no*. A question thus arises as to why (14a–b) are acceptable, while (14c) is unacceptable. Below, I attempt to demonstrate that the proposed analysis based on (8a–b) can also account for the properties of (14a–c) in a natural way.

Let us first examine parsing process (15a–h) for (14a). As in (15a),

(15) a. [?VP John-?ga [*e*]]
b. [?VP John-?ga [?V' Mary-?ni [*e*]]]
c. [?VP John-?ga [?V' Mary-?ni [?V' toti-?o [*e*]]]]
d. [?VP John-?ga [? [?VP Mary-?ni [?V' toti-?o [*e*]]]] [*e*]]
e. [?VP John-?ga [? [?VP Mary-?ni [?V' toti-?o [?V zyooto]]]] [*e*]]
f. [?VP John-?ga [?V' [VP Mary-**ni** [V' toti-**o** [V zyooto]]]] [?V deki]]
(goal-**DAT** (theme-**ACC**)))
g. [**TP** [**VP** John-**ga** [**V'** [**VP** Mary-**ni** [**V'** toti-**o** [**V** zyooto]]] [**V deki**]] [**T ru**]]

---

13 The following example is unacceptable:

(i) *Sooseki-ga London-de Shakespeare-o [V manab]-i-ori, …..
Sooseki-NOM London-in Shakespeare-ACC study- -occasion, …..
'When Sooseki studied Shakespeare in London, …..'

This is so, because the temporal noun, *ori*, is an independent word which does not accept verbal stems such as [V *manab*]- in the morphological component. Under the analysis proposed in this paper, example (i) has a well-formed structure like (13f) in syntax.

syntax first parses the nominative NP, *John-ga*, and accommodates it within the fuzzy ?V projection in accordance with (4a). As in (15b), syntax then includes the dative NP, *Mary-ni*, within the fuzzy ?VP, also by (4a). As in (15c), next, syntax accommodates the accusative NP, *toti-o* 'land-ACC', within the fuzzy ?V projection, by (4a) as well. At the stage of (15c), top-down incremental structure building has finished (see 8a); syntax now starts updating by heads, the fuzzy phrase structure in (15c) step by step in a bottom-up fashion (see 8b).

After reaching the parsing stage of (15c), syntax parses the complex predicate, [*zyooto*]-[*deki*] 'giving-can.' As in (15d), given the lexical semantics of the complex predicate together with (15c), syntax triggers restructuring, creating the two fuzzy ?VP shells. As in (15e), syntax first chooses the ?V label for the flexible predicate, *zyooto*, (see 6d) and inserts it into the lowest empty head position of the consistently fuzzy ?V projection. Then, as in (15f), syntax selects the ?V label for the flexible predicate, *deki*, (see 6b), and inserts it into the upper empty head position (see 8b). In (15f), the fuzzy ?V predicate, *deki*, validates the lower phrase as VP by (7a), licensing the dative goal, *Mary-ni*, and the accusative theme, *toti-o*, by (5d). Last, as in (15g), syntax parses the present tense marker, [T *ru*], and attaches it to the entire fuzzy projection based on *deki*, validating it as a V projection, by means of (7a). As a consequence, the nominative case marked NP, *John-ga*, is licensed by [T *ru*] by means of c-command (see 5a). Here as well, the requirements indicated by ? are all successfully satisfied by heads in a bottom-up fashion step by step (see 8b); the well-formedness of example (14a) is accounted for by the proposed incremental analysis based on (8a–b).

Let us next consider parsing process (16a–h) for (14b). The parsing process in (16a–g) parallels that in (15a–g) in a number of respects, but there is an important difference, concerning the deletion of inherent accusative case below. First, as in (16a–c),

(16) a. [?VP John-?ga [*e*]]
b. [?VP John-?ga [?V' Mary-?ni [*e*]]]
c. [?VP John-?ga [?V' Mary-?ni [?V' toti-?ga [*e*]]]]
d. [?VP John-?ga [? [?VP Mary-?ni [?V' toti-?ga [*e*]]]] [*e*]]
e. [?VP John-?ga [? [?VP Mary-?ni [?V' toti-?ga [?V zyooto]]]] [*e*]]
f. [?VP John-?ga [?V' or ?N' [**VP** Mary-**ni** [V' toti-?ga [V zyooto]]]] [?V deki]]
(goal-**DAT** (theme-~~ACC~~)))
g. [**TP** [**VP** John-**ga** [**V'** [**VP** Mary-**ni** [**V** toti-**ga** [**V** zyooto]]] [**V deki**]] [**T ru**]]

syntax first accommodates successively, the nominative subject, the dative NP and the nominative object within the fuzzy ?V projection (see 8a). As illustrated in (16d), given the meaning of the complex predicate, [*zyooto*]-[*deki*], together with (16c), syntax restructures (16c) into the two fuzzy ?VPs with the two empty head positions; incremental update now begins by heads in a bottom-up fashion step by step (see 8b). As in (16e), syntax first chooses the fuzzy ?V label for the predicate, *zyooto*, (see 6d), and inserts it into the lower head position of the consistently fuzzy ?V projection. Then, as in (16f), syntax selects the fuzzy ?V syntactic label for the predicate, *deki*, (see 6b), and puts it into the higher head position. In (16f), the ?V predicate, deki, validates the embedded fuzzy phrase as VP by means of (7a), and deletes the inherent accusative case linked to the theme argument. Consequently, in (16f), the dative goal, *Mary-ni*, is licensed by (5d); however, the Case requirement ? by the nominative object, *toti-?ga* 'land-?NOM,' remains unsatisfied. At the processing stage of (16g), however, the present tense marker, *ta*, validates the fuzzy projection based on *deki* as a V projection by (7a); furthermore, the tense marker [T *ta*] licenses successfully the nominative subject and the nominctive object, *toti-ga*, by c-command (see 5a). All the requirements are thus satisfied by the end of the parsing process in (16g) (see 8a–b).

Consider now how the proposed analysis based on (8a–b) rules out the parsing process in (17a–h) for example (14c). As in (17a–c),

(17) a. [?VP John-?ga [*e*]]
b. [?VP John-?ga [?V' Mary-?ni [*e*]]]
c. [?VP John-?ga [?V' Mary-?ni [?V' or ?N' toti-?no [*e*]]]]
d. [?VP John-?ga [? [?VP Mary-?ni [?V' or ?N' toti-?no [*e*]]]] [*e*]]
e. [?VP John-?ga [? [?VP Mary-?ni [?V' or ?N' toti-?no [?V or ?N zyooto]]]] [*e*]]
f. [?VP John-?ga [?V' or ?N' [**VP** Mary-**ni** [**V'** toti-?no [**V** zyooto]]]] [?V deki]]
(goal-**DAT** (theme-~~ACC~~)))
g. *[**TP** [**VP** John-**ga** [**V'** [**VP** Mary-**ni** [**V'** toti-?no [V zyooto]]]] [**V deki**]] [**T ru**]]

syntax first accommodates successively, the nominative NP, the dative NP, and the genitive NP within the fuzzy projection, in accordance with (4a–b). Here as well, as in (17d), given the lexical semantics of the complex predicate, i.e. [*zyooto*]-[*deki*], together with (17c), syntax triggers restructuring, constructing the two fuzzy phrases with the two empty heads. As in (17e), syntax first chooses the fuzzy ?V or ?N label for the predicate, *zyooto*, (see 6d), and inserts [?V or ?N *zyooto*] into the lower empty head position. Then, as in (17f), syntax selects the fuzzy ?V label for the predicate, *deki*, (see 6b), and puts it into the higher head position in a bottom-up fashion (see 8b). Subsequently, as shown in (17f), the fuzzy matrix ?V predicate, *deki*, validates the lower phrase as a V projection by (7a), and deletes the accusative case linked to the theme (cf. 16f). Consequently, in (17f), the dative NP, *Mary-ni*, is licensed (see 5d), but the genitive object, *toti-no* 'land-GEN,' is left unlicensed (see 5b–c). Finally, in (17g), syntax merges the tense marker, *ru*, with the higher fuzzy phrase, validating it as a V projection (see 7a); at the processing stage of (17g), the nominative NP, *John-ga*, is licensed by the present tense marker (see 5a). Notice, however, that there is no chance for the genitive theme, *toti-?no*, to be properly licensed at any point of the parsing process in (17a–g) (see 5b–c). Example (14c) is thus correctly rejected by the proposed incremental analysis based on (8a–b).

Now, consider the well-formed examples in (18a–b).

(18) a. John-ga Mary-ni toti-no zyooto-ga deki-ru. (cf. *14c)
John-NOM Mary-DAT land-GEN giving-NOM can-PRES
'John can give land to Mary.'
b. John-ga Mary-e-no toti-no zyooto-ga deki-ru.
John-NOM Mary-to-GEN land-GEN giving-NOM can-PRES

In (18a), the external argument of the matrix predicate, *deki*, is marked by the nominative case *-ga*; the goal of the embedded predicate, *zyooto*, is by the dative case *-ni*; the theme of *zyooto* is by the genitive case *-no*. In this respect, (18a) parallels (14c) completely. The difference between ill-formed (14c) and well-formed (18a) is: in (14c), the embedded predicate *zyooto* is directly attached by the matrix predicate *-deki*; in (18a), on the other hand, *zyooto* is attached by the nominative case marker, *-ga*. On the other hand, (18a) and (18b) are the same except that in (18a), the goal argument of *zyooto* is marked by the dative case *-ni*; but in (18b), the goal is syntactically realized as genitive case marked PP, [PP *Mary*-[P *e*]]-*no* 'Mary-to-GEN.'

Let us consider now the proposed parsing process in (19a–h) for example (18a). As in (19a–b),

(19) a. [?VP John-?ga [*e*]]
b. [?VP John-?ga [?V' Mary-?ni [*e*]]]
c. [?VP John-?ga [?V' Mary-?ni [?V' or ?N' toti-?no [*e*]]]]
d. [?VP John-?ga [?V' Mary-?ni [?V' or ?N' toti-?no [?V or ?N zyooto]]]]
e. [?VP John-?ga [?V' Mary-?ni [N' toti-**no** [**N** zyooto]]-?ga]]
f. [?VP John-?ga [? [?VP Mary-?ni [**N'** toti-**no** [**N** zyooto]]-?ga]] [*e*]]

g. [?VP John-?ga [?V [**VP** Mary-**ni** [**N'** toti-**no** [**N** zyooto]]-?ga] [?V deki]]]
(goal-**DAT** (theme))
h. [**TP** [**VP** John-**ga** [**VP** Mary-**ni** [**N'** toti-**no** [**N** zyooto]]-**ga**] [**V deki**]]] [**T ru**]]

syntax accommodates successively the nominative NP, *John-ga*, and the dative NP, *Mary-ni*, into the fuzzy ?V projection in accordance with (4a). Then, as shown in (19c), syntax includes the genitive NP, t*oti-no* 'land-GEN,' inside the fuzzy ?V or ?N projection in accordance with (4b) (cf. 17a–c). Syntax then chooses the fuzzy ?V or ?N label for the flexible predicate, *zyooto*, (see 6d), and as in (19d), syntax inserts the ?V or ?N predicate into the empty head position. Syntax then parses the nominative case marker *-ga*, and as in (19e), it attaches the nominative case to the second lowest fuzzy ?V or ?N projection, validating it as an N projection. Consequently, at the processing stage of (19e), the genitive object NP, *toti-no*, is properly licensed by (5b). Subsequently, syntax parses the predicate *deki*, and as in (19f), given the meaning of the predicate together with (19e), syntax triggers restructuring, building the two fuzzy ?VPs with the empty head position. As illustrated in (19g), syntax then chooses the fuzzy ?V label for *deki*, (see 6b) and inserts it into the matrix predicate position, validating the lower phrase a V projection by (7a). At the parsing point of (19g), the dative NP, *Mary-ni*, is licensed by (5d). Finally, as in (19h), syntax parses the present tense marker, *ru*, and attaches it to the entire fuzzy phrase, validating it as a V projection by (7a); at the same time, the nominative subject, *John-ga*, and the nominative case marked nominal predicate, *zyooto-ga*, is successfully licensed by the present tense marker, [T *ru*] (see 5a).[14]

Let us next examine the proposed parsing process in (20a–h) for example (18b). As in (20a),

(20) a. [?VP John-?ga [*e*]]
b. [?VP John-?ga [?N' Mary-e-?no [*e*]]]
c. [?VP John-?ga [?N' Mary-e-?no [?V' or ?N' toti-?no [*e*]]]]
d. [?VP John-?ga [?N' Mary-e-?no [?V' or ?N' toti-?no [?V or ?N zyooto]]]]
e. [?VP John-?ga [**N'** Mary-e-**no** [**N'** toti-**no** [**N** zyooto]]]-?ga]
(goal-E (theme))
f. [?VP John-?ga [? [**NP** Mary-e-**no** [**N'** toti-**no** [**N** zyooto]]]-?ga [*e*]]]
g. [?VP John-?ga [?V' [**NP** Mary-e-**no** [**N'** toti-**no** [**N** zyooto]]]-?ga [?V deki]]]
h. [**TP** [**VP** John-**ga** [**VP** [**NP** Mary-e-**no** [**N'** toti-**no** [**N** zyooto]]]-**ga** [**V deki**]]] [**T ru**]]

syntax first parses the nominative NP, *John-ga*, and accommodates it within the fuzzy ?V projection by (4a). As in (20b), syntax then parses the genitive PP, [PP *Mary*-[P *e*]]-*no* 'Mary-to-GEN,' including it within the fuzzy ?N projection by (4c). As in (20c), next syntax parses the genitive NP, *toti-no*, accommodating it inside the fuzzy ?V or ?N projection by (4b). As in (20d), syntax then chooses the fuzzy ?V or ?N syntactic label for the flexible predicate, *zyooto*, (see 6d) and inserts it into the empty head position. As shown in (20e), syntax then parses the nominative case *-ga*, and attaches it to the second highest fuzzy projection, validating it as an N projection in accordance with (7c). Consequently, in (20e), the two genitive case markers within the validated NP are simultaneously licensed by (7b). Then, syntax parses the matrix predicate, *deki*; as in (20f), given the meaning of the predicate together with (20e), syntax triggers restructuring, creating the matrix ?VP and the embedded NP with the empty head position. As

14 The construction like the one in (18a) is often called the light verb construction, and it has been considered to involve a special type of complex predicate formation like argument transfer, abstract incorporation, LF incorporation, etc. (cf. Grimshaw & Mester 1988, Kageyama 1993, Saito & Hoshi 2000, among others). The proposed fuzzy syntactic analysis is unique in that (i) it does not appeal to any of such special lexical or syntactic operations; furthermore, (ii) it attempts to reveal how we construct linguistic representation for light verb construction gradually in the course of left to right sentence processing.

in (20g), syntax then chooses the fuzzy ?V label for *deki*, (see 6b) and inserts it into the empty head position; in (20g), the matrix predicate, *deki*, c-selects the embedded NP. Last, as in (20h), the present tense marker, [T *ta*], validates the embedded fuzzy phrase as a V projection by (7a); the two nominative case markers in (20h) are properly licensed by the tense maker by means of c-command (see 5a). Here again, by the processing stage of (20h), all the syntactic requirements are created from top to bottom; and all the requirements are satisfied from bottom-up (see 8a–b).

Consider now the last example below:

(21) John-ga Mary-ni toti-no zyooto-deki-ru wake(-ga na-i.)
John-NOM Mary-DAT land-GEN giving-can-PRES reason(-NOM not-PRES)
'(Lit.) (There is no) reason John can give land to Mary' (cf. *14c, 18a)

In (21), the external argument of the matrix predicate, *John*, is marked by the nominative case *-ga*; the goal of the verbal noun, *zyooto*, is marked by the dative case; the theme of *zyooto* is marked by the genitive case. Importantly, in this respect, example (21) parallels example (14c); like (18a), however, (21) sounds much better than (14c). It seems that the crucial difference between (14c) and (21) is the following: (14c) contains the conclusive tense marker, -[T(CONCL) *ru*], whereas (21) involves the adnominal tense marker, -[T(ADN) *ru*] (cf. Hiraiwa 2001, Saito 2001, etc.).[15]

Let us consider, finally, how the proposed incremental analysis based on (8a–b) accounts for the acceptability of example (21). As in (22a–b),

(22) a. [?VP John-?ga [*e*]]
b. [?VP John-?ga [?V' Mary-?ni [*e*]]]
c. [?VP John-?ga [?V' Mary-?ni [?V' or ?N' toti-?no [*e*]]]]
d. [?VP John-?ga [? [?VP Mary-?ni [?V' or ?N' toti-?no [*e*]]]] [*e*]]
e. [?VP John-?ga [? [?VP Mary-?ni [?V' or ?N' toti-?no [?V or ?N zyooto]]]] [*e*]]
f. [?VP John-?ga [?V' or ?N' [**VP** Mary-**ni** [**V'** toti-?no [**V** zyooto]]]] [?V deki]]
(goal-**DAT** (theme-~~ACC~~)))
g. [**TP** [**VP** John-**ga** [**V'** [**VP** Mary-**ni** [**V'** toti-**no** [**V** zyooto]]]] [**V** deki]] [**T(?ADN) ru**]]
i. [**NP** [**TP** [**VP** John-**ga** [**V'** [VP Mary-**ni** [**V'** toti-**no** [**V** zyooto]]]] [**V** deki]] [**T(ADN) ru**]] [**N wake**]]

syntax parses successively the nominative NP and the dative NP, accommodating them within the fuzzy ?V projection in accordance with (4a). As in (22c), syntax then includes the genitive NP, *toti-?no*, inside the fuzzy ?V or ?N projection by (4b). After parsing the complex predicate, [*zyooto*]-[*deki*] 'giving-can', as in (22d), syntax triggers restructuring, building the matrix and embedded phrases with the two empty head positions. As in (22e), syntax

---

15 Yoko Sugioka points out in personal communication that there is a contrast between (ia) and (ib).

(i) a.?(?) John-ga nihongo-no wakar-u koto
John-NOM Japanese-GEN understand-PRES fact
'the fact that John understands Japanese'
b. John-no nihongo-ga wakar-u koto
John-GEN Japanese-NOM understand-PRES fact

The examples in (ia–b) are semantically equivalent. Observe, however, that as in (ib), the genitive subject may precede the nominative object naturally; whereas as in (ia), the nominative subject may not be placed before the genitive object so easily. Observe further that example (21) in the text parallels example (ia) above in this respect; some native speakers may find such unnaturalness for (21). I leave for future research a question as to how we should account for the nature of the unacceptability of examples such as (ia).

chooses the fuzzy ?V or ?N label for the embedded predicate, *zyooto*, (see 6d) and inserts it into the lower head position. Then, as in (22f), syntax selects the fuzzy ?V label for the matrix predicate, *deki*, (see 6b) and inserts it into the higher head position. In (22f), the fuzzy ?V predicate, *deki*, validates the lower fuzzy phrase as a V projection by (7a), deleting the inherent accusative case linked to the theme argument; and the dative NP, *Mary-ni*, is licensed by the embedded predicate, [V *zyooto*], by (5d). As in (22g), then, the adnominal form of the present tense maker, [T(ADN) *ru*], validates the highest phrase as a V projection by (7a). Furthermore, in (22g), the adnominal tense marker licenses both the nominative subject, *John-ga*, and the genitive object, *toti-no*, by means of c-command by (5c). Finally, as in (22i), the noun head, wake 'reason,' selects and licenses the adnominal T. Here as well, in the parsing process in (22a–i), all the syntactic requirements are created in a top-down manner; the requirements are all satisfied and eliminated in a bottom-up fashion step by step in the course of left to right sentence processing (see 8a–b).[16] [17]

4. Conclusion: Sytnax & The flow of language understanding

In this paper, I have proposed (8a–b) for strictly head-final languages such as Japanese; (8a–b) are repeated below as (23a–b):

(23) In the course of left to right sentence processing, (= 8a–b)
  a. syntax FIRST forms fuzzy phrase structure step by step in a TOP-DOWN manner in accordance with (4a–c);
  b. THEN, syntax updates by HEADS, such fuzzy phrase structure step by step in a BOTTOM-UP fashion by means of (7a–c), (5a–d), etc.

That is, in head-final languages such as Japanese, under the actual flow of language understanding, syntax first constructs extremely weak, i.e. fuzzy, phrase structure, creating a number of requirements in a top-down manner based on case information (see 4a–c); then, syntax attempts to satisfy such requirements by means of phrase final heads step by step in a bottom-up fashion (see 7a–c & 5a–d).

If correct, (23a–b) imply that (i) the dynamics of language understanding might affect the nature of syntax in a significant manner (Hawkins 1990, 1994, 2004, 2014, etc.), and that (ii) syntax might indeed be a dynamic system which parses a string of words one by one in the course of left to right sentence processing (Phillips 1996, 2003, Kempson et al. 2001, Culicover & Nowak 2003, Cann et al. 2005, Kempson et al. 2011, Kempson 2015, 2017, etc.; cf. Chomsky 1965, 1981, 1986, 1995, among others).

REFERENCES

Abe, Jun. 2015. The nature of scrambling in Japanese, Ms.

Borer, Hagit. 2003. Exo-skeletal vs. endo-skeletal explanations: Syntactic projections and the lexicon. In John Moore and Maria Polinsky (eds.), 31–67.

Cann, Ronnie, Ruth Kempson & Lutz Marten. 2005. *The dynamics of language: An introduction*. Oxford: Elsevier.

Chomsky, Noam. 1965. *Aspects of the theory of syntax*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1981. *Lectures on government and binding*. Dordrecht: Foris.

16 If the proposed incremental analysis is correct, the genitive theme in (18a–b), on the one hand, and that in (21), on the other, have to be licensed in a totally different way on-line.

17 As for nominative-genitive conversion, analyses such as the ones proposed by Harada (1971), Miyagawa (1993, 2013), Watanabe (1996), Hiraiwa (2001), Saito (2011), etc. are important. Unlike the fuzzy syntactic analysis proposed in this paper, however, it is not clear how such 'mainstream' analyses can be made compatible with the actual flow of language understanding in the course of left to right sentence processing. The reader is also referred to Kishimoto's (2006) important analysis of syntactic nominalization in Japanese, e.g. -[N *kata*] 'way' nominalization, which has the same potential problem (cf. 7b, footnote 11; cf. Sugioka 1992, Kageyama 1993, Ito & Sugioka 2002, among others).

Chomsky, Noam. 1986. *Knowledge of language: Its nature, origin, and use*. New York, NY: Praeger.

Chomsky, Noam. 1995. *The minimalist program*. Cambridge, MA: MIT Press.

Culicover, Peter & Andrzej Nowak. 2003. *Dynamical grammar: Minimalism, Acquisition, and Change*. Oxford University Press.

Culicover, Peter & Ray Jackendoff. 2005. *Simpler Syntax*. Oxford University Press.

Di Sciullo, Anna Maria (2005) *Asymmetric morphology*. Cambridge, MA: MIT Press.

Hale, Ken & Samuel J. Keyser 1993. *The view from building 20: Essays in linguistics in honor of Sylvain Bromberger.* Cambridge, MA: MIT Press.

Halle, Morris & Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In Ken Hale & Samuel J. Keyser (eds.), 111–176.

Harada, Shin.-Ichi. 1971. *Ga-no* conversion and idiolectal variations in Japanese. *Gengokenkyu* 60, 25–38.

Harley, Heidi & Rolf Noyer. 1999. Distributed morphology. *Glot International* 4(4), 3–9.

Harley, Heidi &. Rolf Noyer. 2000. Formal vs. encyclopedic properties of vocabulary: Evidence from nominalizations. In B. Peeters (ed.), 349–374.

Hawkins, John. 1990. A parsing theory of word order universals, *Linguistic Inquiry* 21, 223-61.

Hawkins, John. 1994. *A performance theory of order and constituency*, Cambridge University Pres.

Hawkins, John. 2004. *Efficiency and complexity in grammars*, Oxford University Press.

Hawkins, John. 2014. *Cross-linguistic variation and efficiency*, Oxford University Press.

Hiraiwa, Ken. 2001. On nominative-genitive conversion. *MIT Working Papers in Linguistics* 39, 66–125.

Hoshi, Hiroto. 2014. Case, tense and light verb constructions: A dynamic property of language. In Hideki Kishimoto & Yoko Yumoto (eds.), *Hukuzatu-zyutugo-kenkyuu-no genzai* [Current issues in complex predicate research]. 67–97. Tokyo: Hituzi Syobo.

Hoshi, Hiroto. 2019a. Dynamic categorization of adjectival nouns and verbal nouns: A study of fuzzy categories. *Memoirs of Faculty of Education and Human Studies*, 77-84. Akita University.

Hoshi, Hiroto. 2019b. Fuzzy categories and dynamic categorization. *Annual Research Report on General Education*, 29–43. Akita University.

Hoshi, Hiroto. 2020a. Selection and dynamic categorization: A study of adjectival nouns and verbal nouns. *Memoirs of Faculty of Education and Human Studies*, 71-78. Akita University.

Hoshi, Hiroto. 2020b. Dynamic categories and projections in a head-final language. *Bulletin of the Global Center for Higher Education*, 13–29. Akita University.

Hoshi, Hiroto. 2021a. Morphological and syntactic labels: Dynamic labeling of fuzzy predicates in a head-final language. *Memoirs of Faculty of Education and Human Studies*, 79-90. Akita University.

Hoshi, Hiroto. 2021b. Incremental categorial labeling in a head-final Language: A perspective from dynamic syntax. *Bulletin of the Global Center for Higher Education*, 21–39. Akita University.

Hoshi, Hiroto. 2021c. Syntactic nominalization and nominative-genitive conversion: An incremental categorial labeling analysis, Ms., Akita University.

Hoshi, Hiroto. 2021d. Selecting and updating the fuzziness of adjectival nouns and verbal nouns. In Reiko, Okabe, et al. (eds.) *The Joy and Enjoyment of Linguistic Research: A Festschrift for Takane Ito*, 355–364. Tokyo: Kaitakusha.

Ito, Takane & Yoko Sugioka. 2002. *Go-no sikumi-to gokeisei* [Word forms and word formation]. Tokyo: Kenkyusha.

Jackendoff, Ray. 1997. *The architecture of the language faculty*. Cambridge, MA: MIT Press.

Jackendoff, Ray. 2003. *Foundations of language: Brain, Meaning, Grammar, Evolution*. Oxford University Press.

Kageyama, Taro. 1982. Word formation in Japanese. *Lingua* 57, 215–258.

Kageyama, Taro. 1993. *Bunpoo-to gokeisei* [Grammar and word formation], Tokyo: Hituzi Syobo.

Kageyama, Taro & Hideki Kishimoto. 2016. *Handbook of Japanese lexicon and word formation*. Berlin: Mouton de Gruyter.

Kempson, Ruth. 2015. Syntax as the dynamics of language understanding. In Keith Allan (ed.), *The Routledge handbook of linguistics*, 135–152. London: Routledge.

Kempson, Ruth. 2017. Shifting concepts of language: Meeting the challenge of modelling interactive syntax. In Edda Weigand (ed.), *The Routledge handbook of language and dialogue*, 197–213. London: Routledge.

Kempson, Ruth, Wilfried Meyer-Viol, & Dov Gabbay. 2001. *Dynamic syntax: The flow of language understanding*. Oxford: Blackwell.

Kempson, Ruth & Jieun Kiaer. 2010. Multiple-long distance scrambling: syntax as reflections of processing. *Journal of Linguistics* 49, 127–192.

Kempson, Ruth, Eleni Gregoromichelaki, & Chris Howes. 2011. *Dynamics of lexical interfaces*. Chicago: CSLI Press.

Kishimoto, Hideki. 2006. Japanese syntactic nominalization and VP-internal syntax. *Lingua* 116, 771-810.

Kishimoto, Hideki & Satoshi Uehara. 2016. Lexical categories. In Taro Kageyama & Hideki Kishimoto (eds.), 51–91.

Koizumi, Masatoshi. 1995. *Phrase structure in minimalist syntax*. Ph.D. dissertation, MIT.

Kuroda, S. -Y. 1988. Whether we agree or not. *Linguisticae Investigationes* 12, 1–47.

Kuroda, S. -Y. 1992. *Japanese syntax and semantics*. Dordrecht : Kluwer.

Lieber, Rochelle. 2006. The category of roots and the roots of categories: What we learn from selection in derivation. *Morphology* 16: 247–272.

Martin, Samuel. 1975. *A reference grammar of Japanese*. New Haven, CT: Yale University Press.

Matsushita, Daizaburo. 1930. *Kaisen hyoozyun nihon bunpoo* [*Revised standard Japanese grammar*]. Tyuubunkan Shoten.

Miyagawa, Shigeru. 1987. Lexical categories in Japanese. *Lingua* 73, 29–51.

Miyagawa, Shigeru. 1993. LF case-checking and minimal link condition. *MIT Working Papers in Linguistics* 19, 213–254.

Miyagawa, Shigeru. 2013. Strong uniformity and *ga/no* conversion. *English Linguistics* 30, 1–24.

Moore, John & Maria Polinsky. 2003. *The nature of explanation in linguistic theory*. Stanford, CA: CSLI Publications.

Phillips, Colin. 1996. *Order and structure*. Ph.D. dissertation, MIT.

Phillips, Colin. 2003. Linear order and constituency. *Linguistic Inquiry* 34, 37–90.

Saito, Mamoru. 1985. *Some asymmetries in Japanese and their theoretical implications*. Ph.D. dissertation, MIT.

Saito, Mamoru. 2001. Genitive subjects in Japanese: Implications for the theory of empty pronouns. In Peri Bhaskararao (ed.), *International Symposium on Non-nominatie Subjects*, 269–279. Institute for the Study of Languages and Cultures of Asia and Africa, Tokyo University of Foreign Studies.

Sugioka, Yoko. 1992. On the role of argument structure in nominalization. *Language, Culture and Communication* 10, 53–80. Keio University.

Sugioka, Yoko. 2009. '*-Tyuu'*-no tagisei: zikan-o arawasu setuzi-o meguru koosatu [The Ambiguity of '*-tyuu'*: considerations of temporal affixes]. In Yoko Yumoto & Hideki Kishimoto (eds.), *Goi-no imi-to bunpoo* [Lexical semantics and grammar], 85–104. Tokyo: Kuroshio.

Takano, Yuji. 2002. Surprising constituents. *Journal of East Asian Linguistics* 11(3), 243–301.

Ueno, Yoshio. 2016. *Gendai nihongo-no bunpoo koozoo: Keitairon* [The Grammatical structure of modern Japanese: Morphology]. Tokyo: Waseda University Press.

Watanabe, Akira. 1996. Nominative-genitive conversion and agreement in Japanese: A cross-linguistic perspective. *Journal of East Asian Linguistics* 5, 373–410.

Yuhara, Ichiro. 2021. Verbal nouns are in fact verbs. In Reiko, Okabe, et al. (eds.) *The Joy and Enjoyment of Linguistic Research: A Festschrift for Takane Ito*, 365–374. Tokyo: Kaitakusha.