

Incremental Categorical Labeling in a Head-final Language: A Perspective from Dynamic Syntax¹

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1. INTRODUCTION

In Hoshi (2020d), I propose the following morphological and syntactic labels for four predicates in Japanese:

	<i>morphological labels</i>	<i>syntactic label</i>	
(1) a. adjective (<i>utukusi</i> ‘beautiful’):	A	[?V or ?N]	
b. verb (<i>tabe</i> ‘eat’):	V	[?V or ?N]	
c. adjectival noun (<i>kirei</i> ‘beautiful’):	AN	[?V or ?N]	
d. verbal noun (<i>syokuzi</i> ‘eat’):	VN	[?V or ?N]	(Hoshi 2020d: 2a–d)

Namely, as shown in (1a–d), I argue there that in Japanese, (i) adjectives, verbs, adjectival nouns, and verbal nouns have the distinct morphological labels (A, V, AN, or VN)²; importantly, however, (ii) they have the identical, fuzzy syntactic label, i.e. [?V or ?N]³; hence, iii) all these FUZZY PREDICATES display verbal or nominal properties similarly in syntax, depending on contexts (cf. Matsushita 1930, Martin 1975, Kageyama 1982, 1993, Miygawa 1987, Ito & Sugioka 2002, Kishimoto & Uehara 2016, Ueno 2016, Yuhara 2021, among others).⁴ Furthermore, I argue in Hoshi (2020d) that in a head-final language like Japanese, a HEAD which follows a fuzzy predicate determines the categorial nature of the fuzzy predicate by C-SELECTION step by step in the course of left to right processing of a string of words; and I propose the following two types of two-step c-selection: i.e. dynamic nominalization (2a) and

¹ I thank 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 my dynamic labeling analysis of fuzzy predicates in Japanese. As always, however, there should remain numerous shortcomings here, and I am the only one who is responsible for them.

² See Matsushita (1930), Martin (1975), Kageyama (1982, 1993), Miyagawa (1987), Ito & Sugioka (2002), Kishimoto & Uehara (2016), Ueno (2016), Yuhara (2021), among others, for much evidence for the different morphological labels for the Japanese predicates in (1a–d).

³ The proposal in (1a–d) implies that morphology and syntax are two separate components of grammar (cf. Ueno 2016, Yuhara 2021, etc.).

⁴ Martin (1975) considers lexical items such as *kirei* ‘beautiful’ as ADJECTIVAL NOUN (AN), and words like *syokuzi* ‘eat’ as VERBAL NOUN (VN); Kageyama (1982: 218; 1993: 30) claims that (i) an adjectival noun like *kirei* has a conjunction of [+A] and [+N] features; (ii) a verbal noun like *syokuzi* possesses a conjunction of [+V] and [+N] features (cf. Ito & Sugioka 2002, Kishimoto & Uehara 2016, etc.). On the other hand, Matsushita (1930) regards *kirei* as NON-CONJUGATED ADJECTIVE (NA) and *syokuzi* as NON-CONJUGATED VERB (NV). Hence, for Matsushita (1930), *kirei* is essentially an adjective; *syokuzi* is a verb (cf. Ueno 2016, Yuhara 2021, etc.). There is no theoretical difference, however, even if I adopt in (1c–d) the labels, NA and NV, in place of the labels, AN and VN, respectively; for ease of exposition, in Hoshi (2020d), I adopt Martin (1975)/Kageyama (1982, 1993) hypothesis for the morphological labels as in (1c–d). I am very grateful to Ichiro Yuhara, who brought Matsushita (1930) and Ueno (2016) to my attention.

verbalization (2b):^{5 6}

- (2) a. In syntax, dynamic categorizers such as case markers or aspectual head nouns *first c-select* the fuzzy [?V or ?N] label, and *then c-select* the N label, *turning* the fuzzy category into an N category.
- b. In syntax, dynamic categorizers such as the light verb *su* ‘do’ or aspectual head nouns *first c-select* the fuzzy [?V or ?N] label, and *then c-select* the V label, *turning* the fuzzy category into a V category. (Hoshi 2020d: 6a–b)

In Hoshi (2020d), I take (1a–d) and (2a–b) as evidence that (i) in the course of left to right processing of a string of words, syntax first constructs fuzzy linguistic representations together with their labels, then gradually enriching them for their proper interpretations; (ii) in head-final languages such as Japanese, heads finalize the hypothesized structures and their labels (cf. Kempson et al. 2001, Cann et al. 2005, etc.; cf. Phillips 1996, 2003, etc.). The labeling analysis by Hoshi (2020d), however, needs some improvement, because the above mentioned intuition, i.e. the incremental nature of language processing, is not captured by the analysis adequately.

In this paper, I therefore attempt to develop further the proposal based on (1a–d) and (2a–b), and aim to suggest a strictly incremental categorial labeling analysis for head-final languages such as Japanese. To attain this aim, I embed (1a–d) firmly within the INCREMENTAL ARCHITECTURE OF DYNAMIC SYNTAX, by adopting the following fundamental principle (cf. Kempson et al. 2001, Cann et al. 2005, Kempson et al. 2011, etc.; Phillips 1997, 2003, etc.).⁷

- (3) 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.
(cf. Kempson et al. 2001, Cann et al. 2005; cf. Phillips 1996, 2003)

Here, I also adopt the following two major hypotheses in place of dynamic nominalization (2a) and verbalization (2b):

- (4) a. Case markers such as *-ga*, *-o*, or *-no* help syntax to HYPOTHESIZE upcoming phrase structures together with their labels. (cf. Kempson & Kiaer 2010, etc.; cf. Saito 1985)
- b. A head which follows a fuzzy [?V or ?N] predicate VALIDATES by means of its C-SELECTION, the label which syntax HYPOTHESIZES for the fuzzy predicate. (cf. Hoshi 2014, 2019a–b, 2020a–d)

⁵ Sugioka (2009: 92, 27b–d) suggests that an aspectual head noun like $-\text{[AspN } tyuu]$ may nominalize any part of the projection of a verbal noun by means of its c-selection. Hence, it is Sugioka (2009), who first claims that c-selection by a head like $-\text{[AspN } tyuu]$ determines the categorial nature of a verbal noun.

⁶ It must be stressed here that theoretically, the proposed syntactic category with a disjunction of two choices, i.e. [?V or ?N], in (1a–d) is totally different from a CATEGORYLESS ROOT proposed by Distributed Morphology (Halle & Marantz 1993, Harley & Noyer 1999, Harley & Noyer 2000, etc.), by Exo-skeletal Model (Borer 2003, etc.), or by Asymmetrical Morphology (Di Sciullo 2005) (cf. Lieber 2006). Under the proposal in (1a–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 categorial nature of the fuzzy syntactic category in (1a–d) is not determined by invisible functional categories, *v* or *n*, by means of merge, but is determined by c-selection, triggered by visible syntactic updaters incrementally in the course of left to right processing of a string of words.

⁷ I am very grateful to Ruth Kempson, who encouraged me to develop further my dynamic labeling analysis of fuzzy predicates in Japanese, (i) by considering labeling in natural language from much broader a perspective; (ii) by making the proposed categorial labeling totally incremental, strictly in line with the spirit of Dynamic Syntax. The proposed analysis based on dynamic syntactic principle (3) and assumptions (4a–b) heavily relies on this suggestion.

As an initial hypothesis for LABEL VALIDATION by heads in Japanese, I assume the following lexical specifications:

- (5) a. Verbs such as the light verb (-)[_V *su*] ‘do,’ -[_V *sase*] ‘cause,’ or -[_V *ta*] ‘want’ c-select and validate V.
 b. Case markers such -*ga*, -*o*, or -*no* c-select and validate N.
 c. Temporal head nouns such as [_N *ori*] ‘occasion’ or [_N *ue*] ‘top/upon’ c-select and validate V.
 d. Formal nouns such as [_N *koto*] ‘fact’ c-select and validate V.
 e. The copula verb -[_V *da*] ‘be’ which morphologically c-selects adjectival noun c-selects and validates V.
 f. Tense markers such as -[_T *ru*], -[_T *ta*], or -[_T *i*] c-select and validate V.
 g. Nominal suffixes such as -[_N *kata*] ‘WAY’ or -[_N *sa*] ‘-NESS’ c-select and validate N.
 h. Nouns such as -[_N *sase*] ‘cause’ or -[_N *ta*] ‘want’ c-select and validate N.
 i. Aspectual head nouns such as -[_{AspN} *tyuu*] ‘middle/while’ c-select and validate either V or N.
 etc. (cf. Hoshi 2014, 2019a–b, 2020a–d; cf. Sugioka 2009: 92, 27b–d)

In the following four sections, I sketch out an incremental categorial labeling analysis for head final languages such as Japanese based on (1a–d), (3) and (4a–b). Section 2 examines the nature of categorial labeling of a linguistic string involving verbal noun (see 1d); section 3 the properties of labeling of linguistic expressions containing adjectival noun (see 1c); section 4 the characteristics of categorial labeling of a string of words involving fuzzy verb (see 1b); section 5 the nature of dynamic categorial labeling of expressions with fuzzy adjective (see 1a). Section 6 concludes the discussion of this paper.

2. INCREMENTAL CATEGORIAL LABELING & VERBAL NOUN

Both (6a–b) involve the same verbal noun, *kenkyuu* ‘study.’ There is, however, a significant difference between them. That is, in (6a), the external argument *John* is marked by the nominative case -*ga*, but the internal argument, *nihongo* ‘Japanese,’ is attached by the accusative case -*o*.

- (6) a. *John-ga nihongo-o kenkyuu-si-ta.*
 John-NOM Japanese-ACC study - do -PST
 ‘John studied Japanese.’
 b. *John-no nihongo-no kenkyuu-ga subarasi-i.*
 John-GEN Japanese-GEN study -NOM fantastic-PRES
 ‘John’s study of Japanese is fantastic.’

In (6b), on the other hand, both the external and internal arguments are marked by the genitive case -*no*.

Under the incremental architecture of Dynamic Syntax, syntax parses a string of words one by one from left to right, forming a propositional unit incrementally as quickly and as efficiently as possible. Hence, given the nominative case marked NP, *John-ga*, as the first word, syntax constructs underspecified Larsonian VP shell-like structure (7a), where *John-ga* is supposed to be the highest argument of the VP with the empty V (see 3 and 4a; cf. Kempson & Kiaer 2010).^{8 9 10}

⁸ In this paper, I assume that (i) the nominative case -*ga* is licensed within a V projection (Fukui 1986); (ii) the accusative

- (7) a. [_{?VP} John-ga [_{?V} e]]
 b. [_{?VP} John-ga [_{?V} nihongo-o [_{?V} e]]
 c. [_{?VP} John-ga [_{?V} nihongo-o [_{?V} kenkyuu]]
 d. [_{VP} [_{VP} John-ga [_V nihongo-o [_V kenkyuu]] [_V si]]
 e. [_{TP} [_{VP} [_{VP} John-ga [_V nihongo-o [_V kenkyuu]] [_V si]] [_T ta]]

Syntax then encounters the accusative case marked NP, *nihongo-o*, and as in (7b), syntax regards it as the internal argument of the VP shell structure (see 4a; cf. Kempson & Kiaer 2010; cf. Koizumi 1995, Takano 2002). Then, *kenkyuu-si-ta* ‘study-do-PAST’ comes as the last word. The verbal noun *kenkyuu* ‘study’ has the fuzzy syntactic label [?V or ?N] (see 1d). Given VP shell structure (7b), syntax cannot use the label N, and hypothesizes the label V for *kenkyuu*, which is compatible with VP structure (7b) (see 3). Hence, as in (7c), the verbal noun *kenkyuu* with the label V is inserted into the empty V position. Then, as in (7d), the light verb *si* ‘do,’ comes, and c-selects the lower V projection for its validation in accordance with label validation (4b/5a) (cf. Hoshi 2014, 2019a–b, 2020a–d). As desired, at the processing stage of (7d), the VP structure whose head is [_V *kenkyuu*] is thus licensed categorially. Consequently, in (7d), the syntactic requirement indicated by ? is met by the phrase structure, incrementally built from left to right.¹¹ The final TP structure in (7e) is thus well-formed.

On the other hand, syntax parses a string of words in (6b) as follows:

- (8) a. [_{?NP} John-no [_{?N} e]]
 b. [_{?NP} John-no [_{?N} nihongo-no [_{?N} e]]
 c. [_{?NP} John-no [_{?N} nihongo-no [_{?N} kenkyuu]]
 d. [_{NP} John-no [_N nihongo-no [_N kenkyuu]]-ga

As in (8a), given the genitive case marked NP, *John-no*, as the first word, syntax builds the fuzzy Larsonian NP shell-like structure where *John-no* is supposed to be the highest argument of the NP with the empty N head (see 3 and 4a). As in (8b), there then follows the second word *nihongo-no*, and syntax incorporates it into the NP shell structure as the lower argument (cf. Koizumi 1995, Takano 2002, Kempson & Kiaer 2010). Subsequently, as the third word, the nominative case marked verbal noun *kenkyuu-ga* comes with its fuzzy syntactic label [?V or ?N] (see 1d). This time, syntax cannot use the label V, which is incommensurable with the NP shell structure. Hence, as shown in (8c), syntax hypothesizes the label N for *kenkyuu*, and inserts it into the empty N position (see 3). Then, as in (8d), the nominative case marker *-ga* c-selects and validates the N projection in accordance with label validation (4b/5b).

case *-o* is licensed in the complement position of a transitive [-stative] V (Saito 1985, Fukui 1986); (iii) the genitive case *-no* is licensed within an N projection (Saito 1982, 1985, Fukui 1986).

⁹ ? before VP indicates that VP is hypothesized by syntax, but is not yet validated. For ease of discussion, semantic features such as logical types, etc. are suppressed in representations such as (7a–d) (cf. Kempson et al. 2001, Cann et al. 2005, etc.).

¹⁰ There is an important difference between the ‘strict’ dynamic syntactic analysis and my incremental labeling analysis. That is, the strict dynamic syntactic analysis builds up semantic representations with no *syntactic features* at all, directly from words encountered in a linguistic string (Cann et al. 2005: 32, (2.1) vs. (2.2); 223, para. 2, etc.); whereas I propose that syntax constructs representations which necessarily include *syntactic features* such as categorial labels or Case features, besides semantic features (see 7a–e; cf. Phillips 1996, 2003, etc.). I am very grateful to Tohru Seraku for bringing Cann et al. (2005: 223, para. 2) to my attention.

¹¹ Strictly speaking, in (7d), the light verb [_V *si*] should also have the hypothesized label ?V, which must subsequently be c-selected and validated by the past tense marker _{-T} *ta* (see 5f). This is because under the proposed analysis, verbs in Japanese are also a fuzzy [?V or ?N] category in syntax (see 1b). See section 4 for relevant discussion on the fuzziness of Japanese verbs.

Consequently, in (8d), the NP structure is licensed categorially. Thus, as in (7d), the syntactic requirement indicated by ? is met in (8d).

Consider now examples (9a–b). (9a) is an instance of the light verb construction and (9b) an example of the temporal construction in Japanese.

- (9) a. John-ga nihongo -no kenkyuu-o si -ta.
 John-NOM Japanese-GEN study -ACC do -PST
 ‘John studied Japanese in London.’ (cf. Grimshaw & Mester 1988)
- b. [John-ga nihongo -no kenkyuu-no ori], ...
 [John-NOM Japanese-GEN study -GEN occasion], ...
 ‘When John studied Japanese in London, ... ’(cf. Shitabani & Kageyama 1988)

In (9a–b), the external argument *John* is marked by the nominative case *-ga* as in (6a), but the internal argument *nihongo* is marked by the genitive case *-no* as in (6b). Importantly, the acceptability of (9a–b) is expected under the proposed dynamic syntactic analysis based on (1a–d), (3) and (4a–b). I focus on discussing the nature of (9b) below, because (9a–b) parallel in all relevant respects.¹²

As in (10a), given the nominative case marked NP, *John-ga*, as the first word,

- (10) a. [_{VP} John-ga [_V e]]
 b. [_{VP} John-ga [_{N'} nihongo-no [_N e]]]
 c. [_{VP} John-ga [_{N'} nihongo-no [_N kenkyuu]]]
 d. [_{VP} John-ga [_{N'} nihongo-no [_N kenkyuu]]-no]
 e. [_{NP} [_{VP} John-ga [_{N'} nihongo-no [_N kenkyuu]]]-no [_N ori]]

syntax constructs the VP shell-like structure with *John-ga* as the highest argument (see 3 and 4a; cf. 7a). There then comes the genitive case marked, second word, *nihongo-no* (cf. 8b). As shown in (10b), to accommodate the genitive case marked NP within the VP, syntax replaces the initially supposed empty V with the Larsonian NP shell-like structure which contains the genitive case marked NP, *nihongo-no*, as the second argument (see 3 and 4a). Then, there comes the genitive case marked, third word *kenkyuu-no*. As illustrated in (10c), significantly, under the proposed categorial labeling analysis based on (1d) and (3/4a), syntax may insert the verbal noun *kenkyuu* into the empty N position within the VP. This is so, because the verbal noun, *kenkyuu*, is a fuzzy predicate with the underspecified label [?V or ?N]; hence, syntax may use the label V or the label N for *kenkyuu* (see 1d). Notice that in (10c), (i) syntax hypothesizes the V label for the upper part of the projection of *kenkyuu*; (ii) syntax chooses the N label for the lower part of the projection. As in (10d), the genitive case marker *-no* then attaches to and c-selects the second highest projection, i.e. N', for its validation by label validation (4b/5b). Finally, as shown in (10e),

¹² There is a complication for (9a): like the example below, (9a) could involve the heavy verb *su* ‘do/carry out,’ not the light verb *su* ‘do,’ which is semantically vacuous (see Grimshaw & Mester 1988, Uchida & Nakayama 1993, Matsumoto 1996, Saito & Hoshi 2000, Miyamoto & Kishimoto 2016, Yuhara 2021, etc.).

- (i) John-ga suugaku -no syukudai -o si -ta.
 John-nom mathematics-gen homework-acc do-pst
 ‘John did math homework.’

For ease of exposition, I put aside this issue concerning (9a), and focus on discussing the nature of (9b) in the text.

the temporal head noun [_N *ori*] ‘occasion’ comes, and c-selects and validates the V projection by label validation (4b/5c). In this way, all the syntactic requirements indicated by ? are satisfied gradually by the processing stage of (10e). Accordingly, examples such as (9b) are correctly predicted to be well-formed under the proposed incremental labeling analysis.^{13 14}

Consider finally example (11). As in (9a–b), in (11), the external argument *John* is marked by the nominative case *-ga*, and the internal argument *nihongo* by the genitive case *-no*. However, (11) contrasts sharply with (9a–b) in its acceptability: (11) is unacceptable, whereas (9a–b) are acceptable.

- (11) **John-ga nihongo -no [kenkyuu] -si -ta.*
 John-NOM Japanese-GEN study -do -PST
 ‘John studied Japanese.’ (cf. Kageyama 1993: 10, 22–40, Chapter 5)

The unacceptability of example (11) is also accounted for under the proposed incremental categorial labeling analysis as follows:

- (12) a. [_{?VP} John-ga [_{?V} e]]
 b. [_{?VP} John-ga [_{?N'} nihongo-no [_{?N} e]]]
 c. [_{?VP} John-ga [_{?N'} nihongo-no [_{?N} kenkyuu]]]
 d. [_{VP} [_{VP} John-ga [_{?N'} nihongo-no [_{?N} kenkyuu]]] [_V si]]
 e. *[_{TP} [_{VP} [_{VP} John-ga [_{*N'} nihongo-no [_{*N} kenkyuu]]] [_V si]]] [_T ta]]

Given the first word *John-ga*, syntax constructs Larsonian VP shell-like structure as in (12a) (see 3 and 4a). Then, given the second word *nihongo-no*, as shown in (12b), syntax builds the VP which contains the NP shell-like structure (see 3 and 4a; cf. 10b). Then, the last word *kenkyuu-si-ta* ‘study-do-PAST’ comes. As illustrated in (12c), at the next step, syntax inserts [_N *kenkyuu*] into the empty N position (see 1d and 3). Recall that this insertion is possible, because the verbal noun *kenkyuu* has the fuzzy [_{?V} or _{?N}] label (see 1d); syntax may hypothesize the label V for the upper part of the structure, and may choose the label N for the lower part of the structure in (12c) (cf. 10c). Then, syntax forms structure (12d), where the light verb [_V *si*] c-selects and validates the upper V part of the projection of the fuzzy predicate *kenkyuu* by label validation (4b/5a). Notice, however, that unlike (9a–b), example (11) lacks a head which c-selects the label N for the lower part of the projection of *kenkyuu* for its validation in accordance with label validation (4b). (Recall that in (9a–b), the accusative case *-o* and the genitive case *-no* attached to *kenkyuu* can validate the label N of the fuzzy predicate by means of (4b/5a).) Hence, the parsing process in (12a–e) for examples

¹³ ‘MIXED CATEGORY PROJECTIONS’ such as the one in (10e) are first proposed by Sugioka (2009: 92, 27b–d). Importantly, phrase structure construction in (10a–e) is incompatible with Chomsky’s (1981, 1986, etc.) theory of phrase structure building based on X’ Theory.

¹⁴ As Jun Abe points out, the proposed labeling analysis based on (1a–d), (3) and (4a–b) implies that a fuzzy [_{?V} or _{?N}] predicate could also license phrase structure where the upper part of the structure is N; the lower part is V. The following example might be relevant for this possibility, if the structure indicated is correct:

- (i) [_{NP} anata-no [_{VP} sugoku kawai]-i]-o ooen -si -masu.
 you -GEN extremely beautiful -PRES -ACC support-do-PRES
 ‘We will support your extreme beauty.’

I leave for future research a question as to if this speculation regarding (i) could be on the right track. The reader is referred to section 5 for the fuzziness of adjective in Japanese.

such as (11) necessarily results in unacceptability with the requirement for the label N unsatisfied.^{15 16}

3. INCREMENTAL CATEGORIAL LABELING & ADJECTIVAL NOUN

The proposed categorial labeling analysis based on (1a–d), (3) and (4a–b) also accounts for verbal properties of the adjectival noun *nigate* in (13a) and nominal properties of *nigate* in (13b) adequately.

¹⁵ Not only example (ia), which parallels (11), but also example (ib), which parallels (6a), is ill-formed.

- (i) *[John-ga nihongo -no kenkyuu ori], ...
 John-NOM Japanese-GEN study occasion], ...
 ‘When John studies Japanese, ...’
- (ii) *[John-ga nihongo -o kenkyuu ori], ...
 John-NOM Japanese-ACC study occasion], ...
 ‘When John studies Japanese, ...’

I take the unacceptability of (ia–b) as evidence that a verbal noun like [_{VN} *kenkyuu*]- is a stem like [*tabe*]- ‘eat,’ which requires a suffix morphologically (see 6a–b, 9a–b, 11).

¹⁶ The lexical specification for label validation (5b) needs to be revised, because the label validation by case markers is context-dependent. Consider first the acceptability of examples (i) and (ii). (Example (i) sounds slightly awkward, probably due to a violation of the ‘surface double-*o* constraint’ (Harada 1973, Shibatani 1973, Kuroda 1978, Saito 1985, etc.).)

- (i) ?[_{VP} John-ga [_V nihongo -o [_V kenkyuu]]] -o si-ta.
 John-NOM Japanese-ACC study -ACC do-PST
 ‘John studies Japanese.’ (cf. Grimshaw & Mester 1988, etc.)
- (ii) [_{VP} John-ga [_V nihongo -o [_V kenkyuu]]] -no ori] ...
 John-NOM Japanese-ACC study -GEN occasion], ...
 ‘When John studied Japanese, ...’ (cf. Shibatani & Kageyama 1988, etc.)

Given the nominative case marked, external argument, *John-ga*, and the accusative case marked, internal argument, *nihongo-o* in (i–ii), both of these two examples seem to involve the simple VP without any N label, as indicated in (i–ii). If so, examples (i–ii) imply that the accusative case *-o* on *kenkyuu* in (i) and the genitive case *-no* on *kenkyuu* in (ii) do not c-select and validate N; it appears that the accusative case *-o* licensed by the light verb (*-si*) and the genitive case *-no* licensed by the temporal head noun like *ori* may, but do not have to c-select and validate N (see 9a–b vs. examples (i–ii) above; cf. Kuroda’s 1988, 1992 AGREEMENT PARAMETER).

Examine next the following example:

- (iii) [[_{VP} kitte -o /-*no [_V doohuu] -no] [_N ue]], moosikonde kudasai.
 [stamp-ACC/*GEN enclose -GEN top], apply please
 ‘Please make an application after enclosing a stamp.’
- (iv) [[_{VP} kitte -o /-*no [_V doohuu] -no] [_N koto]].
 [stamp-ACC/*GEN enclose -GEN fact]
 ‘Enclose a stamp.’

In examples (iii–iv), on the other hand, the internal argument, *kitte* ‘stamp,’ cannot be marked by the genitive case *-no*, but must be marked by the accusative case *-o*. (iii–iv) thus imply that the genitive case *-no* licensed by the noun head *ue* ‘top/upon’ or *koto* ‘fact’ is disallowed to c-select and validate N (cf. 9a–b). In constructions (iii) and (iv), therefore, there is only one label validator for *doohuu* ‘enclose,’ i.e. *ue* in (iii) and *koto* in (iv), respectively, which c-selects and validates V by label validation (5c–d).

- (13) a. John-ga suugaku-ga [nigate]-da.
 John-NOM math -NOM weak -COP
 ‘John is poor at mathematics.’
- b. John-no suugaku-no [nigate]-o kaisyooos -i-masu.¹⁷
 John-GEN math -GEN weak -ACC help-resolve - -PRES
 ‘We will help John overcome his weak spots on mathematics.’

Observe that in (13a), the external argument *John* and the internal argument *suugaku* are both attached by the nominative case *-ga*. In (13b), on the other hand, both of these two arguments are marked by the genitive case *-no*.

Given the string of words in (13a), syntax initially encounters the nominative case marked NP, *John-ga*.

- (14) a. [_{VP} John-ga [_V e]]
 b. [_{VP} John-ga [_V suugaku-ga [_V e]]
 c. [_{VP} John-ga [_V suugaku-ga [_V nigate]]
 d. [_{VP} [_{VP} John-ga [_V suugaku-ga [_V nigate]] [_V da]]

As shown in (14a), syntax thus first hypothesizes the Larsonian VP shell-like structure with *John-ga* as the highest argument in accordance with principle (3) and (4a). Given, then, *suugaku-ga* ‘math-NOM’ as the second word, syntax, as in (14b), accommodates the second NP as the internal argument within the VP shell. There then comes the third word, *nigate-da* ‘weak-COP’; as illustrated in (14c), syntax hypothesizes the label V for the fuzzy [_{?V} or _{?N}] predicate, i.e. *nigate*, which is compatible with the VP shell structure. Finally, as in (14d), the copula verb [_V *da*] c-selects and validates the V projection in accordance with label validation (4b/5e). Consequently, the formal requirement indicated by ? is satisfied at the processing stage of (14d), as desired.

On the other hand, in the case of (13b), syntax first meets the genitive case marked NP, *John-no*.

- (15) a. [_{NP} John-no [_N e]]
 b. [_{NP} John-no [_N suugaku-no [_N e]]
 c. [_{NP} John-no [_N suugaku-no [_N nigate]]
 d. [_{NP} John-no [_N suugaku-no [_N nigate]]-o

Hence, as in (15a), syntax hypothesizes the NP shell-like structure in accordance with (3) and (4a). Then, given *suugaku-no* ‘math-GEN’ as the second word, as shown in (15b), syntax regards it as the lower argument within the NP shell by (3) and (4a). Subsequently, the accusative case marked, third word *nigate-o* ‘weak-ACC’ comes, and as illustrated in (15c), syntax chooses the label N for the predicate [_{?V} or _{?N} *nigate*], which is compatible with the NP shell structure, in accordance with (1c) and (3). Last, as in (15d), the accusative case *-o* c-selects the N projection for its validation by means of label validation (4b/5b). As a result, the syntactic requirement ? is satisfied in (15d).

Observe that (16) contrasts sharply with (13a): (16) is not acceptable, whereas (13a) is acceptable.

- (16) *John-ga suugaku -no [nigate]- da. (cf. 11)
 John-NOM math -GEN weak COP
 ‘John is poor at mathematics.’ (cf. Kuroda 1978, 1992: 236)

¹⁷ I thank Mayumi Hoshi for drawing my attention to examples such as (13b).

The unacceptability of (16), which completely parallels that of (11), is also expected under the proposed labeling analysis based on (1a–d), (3) and (4a–b).

Given the string of words in (16), syntax initially encounters the nominative case marked NP, *John-ga*.

- (17) a. [_{?VP} John-ga [_{?V} e]]
 b. [_{?VP} John-ga [_{?N} suugaku-no [_{?N} e]]]
 c. [_{?VP} John-ga [_{?N} suugaku-no [_{?N} nigate]]]
 d. [_{VP} [_{VP} John-ga [_{?N} suugaku-no [_{?N} nigate]]] [_V da]]
 e. *[[_{VP} [_{VP} John-ga [_{*N} suugaku-no [_{*N} nigate]]] [_V da]]]

As shown in (17a), syntax thus first builds the Larsonian VP shell-like structure with the empty V in accordance with (3) and (4a). There then comes the genitive case marked, second word, *suugaku-no*. As illustrated in (17b), to accommodate the genitive case marked NP within the VP, syntax replaces the empty V with the NP shell-like structure (cf. 10b and 12b). Finally, the third word *nigate-da* comes. Because the adjectival noun *nigate* is also a predicate with the fuzzy [_{?V} or _{?N}] label, syntax inserts the predicate [_{?N} *nigate*] into the empty N position as in (17c). Remember that this type of head insertion is licit. This is so because the adjectival noun *nigate* also has the fuzzy [_{?V} or _{?N}] label; syntax may choose the label V for the upper part of the structure, and may hypothesize the label N for the lower part in (17c), based on (1c) and (3). Finally, the copula verb [_V *da*] which morphologically c-selects AN c-selects the upper V part of the projection of the fuzzy predicate *nigate* for its validation by label validation (4b/5e). Notice, however, that in (16), there is no head which validates the label N for the lower part of the projection of *nigate* in accordance with label validation (4b) (see 9a–b vs. 11). Consequently, as illustrated in (17e), the sentence processing in (17a–e) for examples such as (16) turn out to be unacceptable, because there necessarily remains a formal requirement unsatisfied: i.e. the label N of the fuzzy predicate *nigate* in (17e) is not validated.¹⁸

4. INCREMENTAL CATEGORIAL LABELING & FUZZY VERB

Consider now examples in (18a–b), both of which involve the verb, *tabe* ‘eat.’

- (18) a. John-ga ringo-o [tabe]-ta.
 John-NOM apple-ACC eat -PST
 ‘John ate an apple.’

¹⁸ Examples (i–iii) involve the adjectival noun *hituyoo* ‘need.’ As expected, example (i), which parallels examples (6a) and (13a), is well-formed; example (ii), which parallels (11) and (16), is unacceptable.

- (i) [_{VP} John-ni -wa okane -ga [_V hituyoo]]-da. (cf. 6a and 13a)
 [John-DAT -TOP money-NOM need]-COP
 ‘John needs money.’
 (ii) *[[_{VP} John-ni -wa okane -no [_V hituyoo]]]-da. (cf. 11 and 16)
 [John-DAT -TOP money-NOM need]-COP
 ‘John needs money.’

Example (iii), which parallels (9a–b), is acceptable, forming a mixed category projection as indicated below:

- (iii) [_{VP} John-ni -wa [_N okane -no [_N hituyoo]] -ga] aru. (cf. 9a–b)
 [John-DAT -TOP money-NOM need -NOM] COP
 ‘John needs money’

- b. John-no ringo-no [tabe]-kata
 John-GEN apple-GEN eat -WAY
 ‘John’s way of eating an apple’
 (cf. Sugioka 1992, Kageyama 1993, Ito & Sugioka 2002, Kishimoto 2006, etc.)

Observe that in (18a), the verb *tabe* displays verbal properties, licensing the verbal cases, *-ga* and *-o*; *tabe* in (18b), on the other hand, appears to show nominal properties, licensing the genitive case *-no*.

Exactly the same contrast shows up between (19a) and (19b), both of which involve the complex causative verb, [*tabe*]-[*sase*] ‘eat-cause.’

- (19) a. John-ga Mary-ni ringo-o [tabe]-[sase] -ta.
 John-NOM Mary-DAT apple-ACC eat - cause -PST
 ‘John made Mary eat an apple.’
 (cf. Kuroda 1965, Kuno 1973, Shibatani 1973, etc.)
- b. John-no Mary-e-no ringo-no [tabe]-[sase] -kata
 John-GEN Mary-to-GEN apple-GEN eat - cause-WAY
 ‘John’s way of making Mary eating an apple’
 (cf. Sugioka 1992, Kageyama 1993, Ito & Sugioka 2002, Kishimoto 2006, etc.)

Namely, in (19a), the complex verb, [*tabe*]-[*sase*], displays verbal properties, allowing the verbal case particles, *-ga*, *-ni*, and *-o*. In contrast, in (19b), the same complex causative predicate appears to show nominal properties, licensing only the genitive case marker, *-no*.

(18b) and (19b) are instances of *-kata* ‘WAY’ nominalization, which seems to be unique to head-final languages such as Japanese.¹⁹ Given the contrast in (18a–b) and (19a–b), a question arises as to why verbs in a head-final language like Japanese display verbal or nominal properties, depending on syntactic contexts. Here, I wish to suggest that this context-dependent phenomenon arises, precisely because as proposed in (1a–d), not only verbal nouns and adjectival nouns, but also verbs and adjectives in Japanese have the syntactically fuzzy [?V or ?N] label (cf. Hoshi 2014, 2019a–b, 2020a–d).

Now, let us consider how the proposed incremental categorial labeling analysis accounts for the data in (18a–b) and (19a–b), based on (1a–d), (3) and (4a–b). The proposed analysis treats (18a–b) and (19a–b) exactly in the same way in all important respects. Below, I first focus on discussing the nature of the data in (19a–b). Then, I consider the nature of examples based on (18a–b), which involve modifiers such as adverbs or adjectives.

Let us consider first how causative example (19a) is parsed step by step by syntax. First, given the nominative case marked NP, *John-ga*,

- (20) a. [_{VP} John-ga [_V e]]
 b. [_{VP} John-ga [_V Mary-ni [_V e]]]
 c. [_{VP} John-ga [_V Mary-ni [_V ringo-o [_V e]]]]
 d. [_{VP} John-ga [_{VP} Mary-ni [_V ringo-o [_V e]]] [_V e]]]
 e. [_{VP} John-ga [_{VP} Mary-ni [_V ringo-o [_V tabe]]] [_V e]]]
 f. [_{VP} John-ga [_{VP} Mary-ni [_V ringo-o [_V tabe]]] [_V sase]]]

¹⁹ The reader is referred to Sugioka (1992), Kageyama (1993), Ito & Sugioka (2002), Ueno (2016) and particularly Kishimoto (2006) for detailed discussion of the nature of *-kata* ‘WAY’ nominalization.

g. [_{TP} [_{VP} John-ga [_{VP} Mary-ni [_V ringo-o [_V tabe]]] [_V sase]]] [_T ta]]

as in (20a), syntax may construct the Larsonian VP shell-like structure with *John-ga* as the highest argument (see 3 and 4a). Second, given the dative case marked NP, *Mary-ni*, as in (20b), syntax may accommodate it within the VP shell as the second highest argument. Third, given the accusative case marked NP, *ringo-o* ‘apple-ACC,’ as the third word, as in (20c), syntax may insert it into the VP as the lowest argument, waiting for a three-place predicate like *age-ta* ‘give-PAST.’ In the case of (19a), however, syntax then encounters the complex causative predicate *tabe-sase-ta* ‘eat-cause-PAST.’ Given the lexical semantic information about the complex predicate, as shown in (20d), syntax is forced to trigger restructuring, consequently creating bi-clausal structure which contains the two Larsonian VP shells (cf. Kuroda 1965, etc.). As shown in (20e), syntax then hypothesizes the label V for the fuzzy [_{?V} or _{?N}] predicate *tabe* (see 1b and 3), and inserts it into the lower empty V position, where the predicate [_{?V} *tabe*] selects *Mary-ni* and *ringo-o* as the external and internal arguments, respectively. After that operation, as in (20f), syntax chooses the label V for the fuzzy [_{?V} or _{?N}] predicate *sase* (see 1b and 3), and inserts the causative predicate into the upper empty V head position, where the predicate [_{?V} *sase*] selects *John-ga* as the external argument and the lower VP as the internal argument. Significantly, in (20f), the causative verb [_{?V} *sase*] c-selects and validates the syntactic label V of *tabe* in accordance with (4b/5a). At the processing stage of (20g), then, the past tense marker [_T *ta*] comes, subsequently c-selecting and validating the upper V projection based on [_{?V} *sase*] in accordance with label validation (4b/5f). In this way, all the formal requirements indicated by ? disappear by the processing point of (20g); the standard bi-clausal structure for Japanese causative is constructed by syntax strictly incrementally (cf. Kuroda 1965, Kuno 1973, Shibatani 1973, among others).

Let us now examine how syntax parses the string of words in (19b) one by one incrementally from left to right. Given the genitive case marked NP, *John-no*, as the first word,

- (21) a. [_{?NP} John-no [_{?N} e]]
 b. [_{?NP} John-no [_{?N'} Mary-e-no [_{?N} e]]]
 c. [_{?NP} John-no [_{?N'} Mary-e-no [_{?N'} ringo-no [_{?N} e]]]]
 d. [_{?NP} John-no [_{?NP} Mary-e-no [_{?N'} ringo-no [_{?N} e]]] [_{?N} e]]]
 e. [_{?NP} John-no [_{?NP} Mary-e-no [_{?N'} ringo-no [_{?N} tabe]]] [_{?N} e]]]
 f. [_{?NP} John-no [_{NP} Mary-e-no [_{N'} ringo-no [_N tabe]]] [_{?N} sase]]]
 g. [_{NP} [_{NP} John-no [_{NP} Mary-e-no [_{N'} ringo-no [_N tabe]]] [_N sase]]] [_N kata]]

syntax first builds the NP shell-like structure in (21a) (see 3 and 4a; cf. 20a). Given then the genitive case marked PP, [_{PP} *Mary-e*]-*no*, as in (21b), syntax accommodates it within the NP shell (cf. 20b). Given then the genitive case marked NP, *ringo-no* ‘apple-GEN,’ as in (21c), syntax inserts it into the shell structure, presumably anticipating a noun head like *okurimono* ‘present’ (cf. 20c). After the third word *ringo-no*, however, syntax encounters the complex causative predicate with *-kata*, i.e. *tabe-sase-kata* ‘eat-cause-WAY,’ as the fourth word. Given the meaning of the complex causative predicate, *tabe-sase* ‘eat-cause,’ syntax is then forced to trigger restructuring, creating the NP shell containing another NP shell as shown in (21d) (cf. 20d). Then, syntax chooses the label N for the fuzzy [_{?V} or _{?N}] predicate, *tabe*, (see 1b and 3) and inserts it into the lower empty N position as in (21e), where the noun [_{?N} *tabe*] selects *Mary-e-no* and *ringo-no* as the external and internal arguments, respectively (cf. 20e). After that, as illustrated in (21f), syntax hypothesizes the label N for the fuzzy [_{?V} or _{?N}] predicate, *sase*, (see 1b and 3), and inserts it into the upper empty N head position, where the noun [_{?N} *sase*] takes *John-no* as the external argument and the lower NP based on [_{?N} *tabe*] as the internal argument (cf. 20f). Importantly, in (21f), the causative predicate *sase* with the label _{?N} c-selects and validates the label N of the lower predicate [_{?N} *tabe*], in accordance with (4b/5h). As shown in (21g), the nominal head *kata* ‘WAY’ then c-selects the label N of the noun [_{?N} *sase*] by means of (4b/5g) (cf. 20g). At the

processing point of (21g), no syntactic requirement remains, and the well-formedness of (19b) is accounted for.²⁰

To summarize, under the proposed incremental categorial labeling analysis based on (1a–d), (3) and (4a–b), examples (19a–b) turn out to be basically the same configurationally. (19a–b) are, however, significantly different with respect to categorial labels assigned to their phrase structures. That is, in (19a), the two predicates *tabe* ‘eat’ and *sase* ‘cause’ necessarily have the label V, whereas those two predicates in (19b) are forced to possess the label N (see 20a–g and 21a–g).

Finally, notice that the contrasts in (22a–b) are a direct consequence of the proposed analysis in this paper.

(22) a. John-ga (subayaku /*subayai) ringo-o tabe -ta. (cf. 18a)
 John-NOM (quickly /*quick) apple-ACC eat -PST
 ‘John ate an apple quickly/*quick.’

b. John-no (*subayaku /subayai) ringo-no tabe -kata (cf. 18b)
 John-GEN (*quickly /quick) apple-GEN eat -WAY
 ‘John’s way of eating an apple *quickly/quick.’

(cf. Kishimoto 2006: 782, 21a–b)

Example (22a) parallels (19a), because both of them involve the past tense marker $[-_T ta]$. Hence, syntax parses the string of words in (22a) step by step as follows (cf. 20a–g):

(23) a. $[_{VP} \text{John-ga } [_{?V} e]]$ (cf. 20a)
 b. $[_{VP} \text{John-ga } [_{?V} \text{subayaku } [_{?V} e]]]$
 c. $[_{VP} \text{John-ga } [_{?V} \text{subayaku } [_{?V} \text{ringo-o } [_{?V} e]]]]$ (cf. 20b)
 d. $[_{VP} \text{John-ga } [_{?V} \text{subayaku } [_{?V} \text{ringo-o } [_{?V} \text{tabe}]]]]$ (cf. 20e–f)
 e. $[_{TP} [_{VP} \text{John-ga } [_{V} \text{subayaku } [_{V} \text{ringo-o } [_{V} \text{tabe}]]]] [_{T} ta]]$ (cf. 20g)

As in (23a), syntax first builds the Larsonian VP shell-type structure with *John-ga* as the highest argument (see 3 and 4a). Second, as in (23b), syntax accommodates the adverb *subayaku* ‘quickly’ within the VP shell structure. Third, as in (23c), syntax includes *ringo-o* ‘apple-ACC’ as the internal argument within the VP (see 3 and 4a). As shown in (23d), syntax then chooses the label V for the fuzzy $[?V \text{ or } ?N]$ verb *tabe* ‘eat’, and inserts the predicate into the empty V position (see 1b and 3). Finally, as illustrated in (23e), the past tense marker $[_T ta]$ c-selects and validates the V projection based on $[_{?V} \text{tabe}]$ in accordance with label validation (4b/5f). In the final structure (23e), TP contains the validated VP, where the adverb *subayaku* ‘quickly’ is properly contained. Hence, (22a) with the adverb *subayaku* is acceptable. Unlike the adverb *subayaku*, the adjective *subayai* ‘quick’ cannot be included within VP, but must be contained inside NP. However, there is no NP which could contain the adjective *subayai* in the parsing process in (23a–e). Hence, example (22a) with the adjective *subayai* is unacceptable. The contrast between the adverbial and adjectival modification in (22a) is thus accounted for under the proposed labeling analysis.

Example (22b), on the other hand, parallels (19b) in that both of these examples involve the nominal suffix $[-_N kata]$ ‘WAY.’ Observe now how syntax parses step by step the string of words in (22b) below:

(24) a. $[_{NP} \text{John-no } [_{?N} e]]$ (cf. 21a)
 b. $[_{NP} \text{John-ga } [_{?N} \text{subayai } [_{?N} e]]]$

²⁰ Under the proposed categorial labeling analysis, $[_N \text{tabe}]$ and $[_N \text{sase}]$ in (21e–g) are thus instances of ‘VERBALLY CONJUGATED NOUN (VCN)’ in Japanese (cf. Matsushita’s 1930 non-conjugated verb (NV); cf. Ueno 2016, Yuhara 2021).

- c. [_{?NP} John-no [_{?N'} subayai [_{?N'} ringo-no [_{?N} e]]]] (cf. 21b)
 d. [_{?NP} John-no [_{?N'} subayai [_{?N'} ringo-no [_{?N} tabe]]]] (cf. 21e–f)
 e. [_{NP} [_{NP} John-no [_{?N'} subayai [_{N'} ringo-no [_N tabe]]]] [_N kata]] (cf. 21g)

Given the genitive case marked NP *John-no* as the first word, syntax first builds the NP shell-type structure (24a) with *John-no* as the highest argument (see 3 and 4a). Second, syntax accommodates the adjective *subayai* ‘quick’ within the NP shell as in (24b). Third, syntax takes the genitive case marked NP *ringo-no* ‘apple-GEN’ as the internal argument. Given configuration (24c), syntax then chooses the label N for the fuzzy [_{?V} or _{?N}] predicate *tabe* ‘eat,’ and inserts [_{?N} *tabe*] into the empty N position as illustrated in (24d) (see 1b and 3). Finally, the nominal head [_N *kata*] c-selects and validates the label N of the verb [_{?N} *tabe*] in accordance with label validation (4b/5g). In configuration (24e), the N projection of [_N *kata*] contains the lower NP based on the predicate [_N *tabe*], where the adjective *subayai* ‘quick’ is properly included; hence, example (22b) with the adjectival modifier *subayai* is well-formed. However, the adverb *subayaku*, ‘quickly,’ must be contained within VP, and there is no VP at all which could include the adverb in the parsing process in (24a–e). Example (22b) with the adverbial modifier *subayaku* is thus illicit. In short, the contrasts concerning the adjectival and adverbial modification in (22a–b) are accounted for under the incremental categorial labeling analysis, because the verb *tabe* in (22a) necessarily has the categorial label V in syntax (see 23a–e); the verb *tabe* in (22b), on the other hand, is forced to have the label N in syntax (see 24a–e).

5. INCREMENTAL CATEGORIAL LABELING & FUZZY ADJECTIVE

Significantly, verbs and adjectives in Japanese display verbal or nominal properties similarly, depending on syntactic environments. Consider now examples (25a–b), both of which involve the adjective *utukusi* ‘beautiful.’

- (25) a. Mary-ga utukusi -i. (cf. 18a)
 Mary-NOM beautiful -PRES
 ‘Mary is beautiful.’
 b. Mary-no utukusi -sa (cf. 18b)
 Mary-GEN beautiful -NESS
 ‘Mary’s beauty’

In (25a), the adjective *utukusi* shows verbal properties, allowing the nominative case *-ga*; while in (25b), the same adjective appears to display nominal properties, licensing the genitive case marker *-no*. (25a–b), which involve the adjective *utukusi*, are thus similar to (18a–b), which involve the verb *tabe* ‘eat.’

Exactly the same contrast arises in (26a–b).

- (26) a. John-ga ringo-ga tabe - ta - i (koto) (cf. 19a)
 John-NOM apple-NOM eat - want - PRES (fact)
 ‘John wants to eat an apple.’
 b. John-no ringo-no tabe -ta -sa (cf. 19b)
 John-GEN apple-GEN eat -want -NESS
 ‘John’s desire to eat an apple’ (cf. Kageyama 1993, Ito & Sugioka 2002, Ueno 2016, etc.)

(26a–b) both involve the complex adjective [_v *tabe*]-[_A *ta*] ‘eat-want.’ As in (25a), the complex adjective in (26a) shows verbal properties, permitting the verbal case particle *-ga*; (26a) is thus similar to (19a), which involves the

causative complex verb [_V *tabe*]-[_V *sase*]. On the other hand, as in (25b), the complex adjectival predicate [_V *tabe*]-[_A *ta*] in (26b) seems to display nominal properties, allowing the genitive case particle *-no*; hence, (26b) is similar to (19b), which contains the complex verb [_V *tabe*]-[_V *sase*].

The proposed categorial labeling analysis based on (1a–d), (3) and (4a–b) accounts for the contrasts in (25a–b) and (26a–b) in the same way as it explains the nature of (18a–b) and (19a–b), consequently capturing the parallelisms between verbs and adjectives in Japanese. Let me focus on examining the nature of (26a–b) below.

In the case of (26a), syntax first encounters the nominative case marked NP, *John-ga*. Hence, as in (27a), syntax initially constructs the Larsonian VP shell-like structure with the empty V head (see 3 and 4a).

- (27) a. [_{VP} John-ga [_V e]] (cf. 20a)
 b. [_{VP} John-ga [_V ringo-ga [_V e]]] (cf. 20b)
 c. [_{VP} John-ga [_V [_{VP} ringo-ga [_V e]] [_V e]]] (cf. 20d)
 d. [_{VP} John-ga [_V [_{VP} ringo-ga [_V *tabe*]] [_V e]]] (cf. 20e)
 e. [_{VP} John-ga [_V [_{VP} ringo-ga [_V *tabe*]] [_V *ta*]]] (cf. 20f)
 f. [_{TP} [_{VP} John-ga [_V [_{VP} ringo-ga [_V *tabe*]] [_V *ta*]]] [_T *i*]] (cf. 20g)

As in (27b), given *ringo-ga* ‘apple-NOM’ as the second word, syntax then accommodates the second nominative case marked NP within the VP shell as the lower argument. Subsequently, the complex predicate, *tabe-ta-i* ‘eat-want-PRES’ comes. As shown in (27c), given the lexical semantic information of the complex predicate, syntax restructures the representation, creating the two VP shells. Given configuration (27c), syntax then hypothesizes the label V for the fuzzy [?V or ?N] category, i.e. the verb *tabe*, (see 1b and 3), and as shown in (27d), syntax inserts the verb [_V *tabe*] into the lower empty V position, where [_V *tabe*] takes *ringo-ga* ‘apple-NOM’ as its internal argument. Given structure (27d), syntax then chooses the label V for the fuzzy [?V or ?N] category, i.e. the adjective *ta* ‘want’ (see 1a and 3). As in (27e), syntax then inserts the adjective [_V *ta*] into the higher empty V position, where [_V *ta*] takes *John-ga* and the lower VP as the external and internal arguments, respectively. There, the adjective [_V *ta*] c-selects and validates the V projection based on [_V *tabe*] in accordance with (4b/5a). Finally, as illustrated in (27f), the present tense marker [_T *i*] comes, c-selecting and validating the label V of the adjective [_V *ta*] ‘want’ by label validation (4b/5f). Consequently, the well-formedness of (26a) is accounted for, and at the same time, the similarities between (19a) and (26a) are captured directly under the proposed labeling analysis.

In the case of example (26b),

- (28) a. [_{NP} John-no [_N e]] (cf. 21a)
 b. [_{NP} John-no [_N ringo-no [_N e]]] (cf. 21b)
 c. [_{NP} John-no [_N [_{NP} ringo-no [_N e]] [_N e]]] (cf. 21d)
 d. [_{NP} John-no [_N [_{NP} ringo-no [_N *tabe*]] [_N e]]] (cf. 21e)
 e. [_{NP} John-no [_N [_{NP} ringo-no [_N *tabe*]] [_N *ta*]]] (cf. 21f)
 f. [_{NP} [_{NP} John-no [_N [_{NP} ringo-no [_N *tabe*]] [_N *ta*]]] [_N *sa*]] (cf. 21g)

the genitive case marked NP, *John-no*, comes first. Hence, as in (28a), syntax first constructs the Larsonian NP shell-type structure (see 3 and 4a). Then, syntax parses the second word, *ringo-no* ‘apple-GEN,’ forming structure (28b), where the second nominative case marked NP is considered to be the lower argument of the NP shell. Finally, syntax parses the complex word, *tabe-ta-sa* ‘eat-want-NESS.’ Given the lexical information of the complex word, syntax is forced to trigger restructuring, forming the two NP shell structures with the two empty N positions as in (28c). As shown in (28d), after that, syntax chooses the label N for the fuzzy [?V or ?N] verb, *tabe*, and insert [_N *tabe*] into the lower N head position (see 1b and 3). There, [_N *tabe*] selects *ringo-no* ‘apple-GEN’ as the internal argument.

Subsequently, as illustrated in (28e), syntax chooses the label N for the fuzzy [$?V$ or $?N$] adjective, i.e. *ta* ‘want,’ and inserts [$?N$ *ta*] ‘want’ into the upper empty N position, where [$?N$ *ta*] takes *John-no* and the lower NP as the external and internal arguments, respectively (see 1a and 3). Furthermore, [$?N$ *ta*] ‘want’ c-selects and validates the label N of the projection based on [$?N$ *tabe*] in accordance with (4b/5h). At the processing stage of (28f), the nominal head [$_N$ *sa*] ‘-NESS’ c-selects and validates the label N of [$?N$ *ta*] ‘want.’ Consequently, all the formal requirements indicated by ? successfully disappear by then; the acceptability of (26b) is explained, and the similarities between (19b) and (26b) are captured under the incremental categorial labeling analysis.²¹

Finally, consider examples (29a–b). (29a–b) are minimally different from (26a–b): the examples in (29a–b) include the modifiers, i.e. [$_{Adv}$ *sugoku*] and [$_{Adj}$ *sugoi*], whereas (26a–b) don’t. In all the other respects, (29a–b) are identical with (26a–b).

(29) a. John-ga sugoku /*sugoi ringo-ga tabe -ta -i (koto)
 John-NOM awfully /*awful apple-NOM eat -want -PRES (fact)
 ‘John wants to eat an apple awfully/*awful.’

b. John-no *sugoku/sugoi ringo-no tabe -ta -sa
 John-GEN *awfully/awful apple-GEN eat -want -NESS
 ‘John’s desire to eat an apple *awfully/awful’ (cf. Kageyama 1993, Ito & Sugioka 2002, Ueno 2016, etc.)

Observe that the contrasts in (29a–b) parallel those in (22a–b). Given the parsing process in (30a–g) for (29a) and that in (31a–g) for (29b), the contrasts in (29a–b) are straightforwardly accounted for under the proposed labeling analysis. Furthermore, the similarities between (29a–b) and (22a–b) are captured as well.

As shown in (30a–g), syntax parses the string of words in (29a) one by one from left to right.

(30) a. [$?_{VP}$ John-ga [$?_V$ *e*]] (cf. 27a)
 b. [$?_{VP}$ John-ga [$?_V$ sugoku [$?_V$ *e*]]]
 c. [$?_{VP}$ John-ga [$?_V$ sugoku [$?_V$ ringo-ga [$?_V$ *e*]]]] (cf. 27b)
 d. [$?_{VP}$ John-ga [$?_V$ sugoku [$?_V$ [$?_{VP}$ ringo-ga [$?_V$ *e*]] [$?_V$ *e*]]]] (cf. 27c)
 e. [$?_{VP}$ John-ga [$?_V$ sugoku [$?_V$ [$?_{VP}$ ringo-ga [$?_V$ *tabe*]] [$?_V$ *e*]]]] (cf. 27d)
 f. [$?_{VP}$ John-ga [$?_V$ sugoku [$?_V$ [$_{VP}$ ringo-ga [$_V$ *tabe*]] [$?_V$ *ta*]]]] (cf. 27e)
 g. [$_{TP}$ [$_{VP}$ John-ga [$_V$ sugoku [$_V$ [$_{VP}$ ringo-ga [$_V$ *tabe*]] [$_V$ *ta*]]]] [$_T$ *i*]] (cf. 27f)

Here, the adverb *sugoku* ‘awfully’ is included within the VP shell structure at the processing stage of (30b), and it turns out that the adverb is properly licensed within the V projection based upon the adjective [$_V$ *ta*] ‘want’ in (30g). On the other hand, the adjective *sugoi* ‘awful’ is disallowed to be present in the parsing process in (30a–g), because there is no way for the adjective to be contained within the N projection of the adjective [*ta*] ‘want’ in this parsing process. The contrast between the adverbial and adjectival modification in (29a) is thus accounted for.

On the other hand, as illustrated in (31a–g), syntax parses the linguistic string in (29b) as follows:

(31) a. [$?_{NP}$ John-no [$?_N$ *e*]] (cf. 28a)
 b. [$?_{NP}$ John-no [$?_N$ sugoi [$?_N$ *e*]]]

²¹ Under the proposed labeling analysis, [$_N$ *tabe*] and [$_N$ *ta*] in (28d–f) are thus examples of ‘verbally conjugated noun (VCN)’ and ‘ADJECTIVALLY CONJUGATED NOUN (ACN)’ in Japanese, respectively (cf. Matsushita’s 1930 non-conjugated verb (NV) and non-conjugated adjective (NA); cf. Ueno 2016, Yuhara 2021).

- c. [_{?NP} John-no [_{?N'} sugoi [_{?N'} ringo-no [_{?N} e]]]] (cf. 28b)
 d. [_{?NP} John-no [_{?N'} sugoi [_{?NP} ringo-no [_{?N} e]] [_{?N} e]]]] (cf. 28c)
 e. [_{?NP} John-no [_{?N'} sugoi [_{?NP} ringo-no [_{?N} tabe]] [_{?N} e]]]] (cf. 28d)
 f. [_{?NP} John-no [_{?N'} sugoi [_{NP} ringo-no [_N tabe]] [_{?N} ta]]]] (cf. 28e)
 g. [_{NP} [_{NP} John-no [_{N'} sugoi [_{NP} ringo-no [_N tabe]] [_N ta]]]] [_N sa]] (cf. 28f)

In this parsing process, the adjective *sugoi* ‘awful’ is accommodated within the NP shell at the stage of (31b); the adjective is successfully contained and licensed within the N projection based upon the adjective [*ta*] ‘want’ with the syntactic label N in (31g). There is, however, no chance for the adverb *subayaku* to be included and licensed within the V projection of the adjective [*ta*] with the label V in this parsing process. Hence, the contrast between the adjectival and the adverbial modification in (29b) is also accounted for.

The parallelisms between (22a–b) and (29a–b) are also captured by the proposed categorial labeling analysis based on (1a–b), (3) and (4a–b). This is so, because (i) in (22a) and (29a), the tense markers, i.e. $-[{}_T ta]$ and $-[{}_T i]$, necessarily c-select and validate the syntactic label V of a fuzzy [$?V$ or $?N$] category by label validation (4b/5f); (ii) in (22b) and (29b), the nominal suffixes, i.e. $-[{}_N kata]$ ‘WAY’ and $-[{}_N sa]$ ‘-NESS,’ c-select and validate the label N by means of label validation (4b/5g).

6. CONCLUSION & SPLIT UTTERANCES IN DIALOGUE

In this paper, I have attempted to develop Hoshi’s (2020d) analysis further, and have tried to suggest a fully incremental, categorial labeling analysis for head-final languages such as Japanese, based on (1a–d), (3) and (4a–b). If correct, the suggested analysis, in turn, reinforces the hypothesis that (i) in Japanese, adjectives, verbs, adjectival nouns, and verbal nouns all have the same, fuzzy [$?V$ or $?N$] label in syntax (see 1a–d); (ii) categorial labeling is DYNAMICAL: i.e. it is carried out step by step in the course of left to right processing of a string of words (see 3); (iii) categorial labels are determined gradually by the interaction of various factors such as case information, structural configurations, label validation triggered by heads, etc. (see 4a–b and 5) (cf. Kempson et al. 2001, Cann et al. 2005, Kempson et al. 2011, among others).

To finish the discussion of this paper, following a lead by Kempson (2017), I wish to point out briefly that an incremental analysis like the one suggested in this paper could provide a natural account for the nature of the following split utterances in dialogue:

- (31) A: John-ga nihongo -no (cf. 9b and 10a–e)
 John-NOM Japanese-GEN
 B: kenkyuu -no ori ,.....
 study -GEN occasion ,.....
- (32) A: John-ga Mary-ni ringo-o (cf. 19a and 20a–g)
 John-NOM Mary-DAT apple-ACC
 B: tabe -sase -ta.
 eat -cause -PST
- (33) A: John-no Mary-e -no (cf. 19b and 21a–g)
 John-GEN Mary-to -GEN
 B: ringo-no tabe -sase -kata
 apple-GEN eat -cause -WAY

- (34) A: John-no sugoi ringo-no (cf. 29b and 31a–g)
 John-GEN awful apple-GEN
 B: tabe -ta -sa
 eat -PST -NESS

The communicative interactions between speakers A and B in (31–34) are all very natural, and can be carried out smoothly. Under the assumption that the speaker and the hearer share in actual communication the parsing process in (10a–e) for (9b), share that in (20a–g) for (19a), share that in (21a–g) for (19b), and share that in (31a–g) for (29b), the existence of these natural split utterances is a matter of course. Significantly, however, it does not seem to be entirely clear how analyses based on the complete separation of language competence from performance could account for these types of linguistic interaction (cf. Kempson 2017, etc.; cf. Chomsky 1965, 1981, 1995, among others).

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