ON MORPHOLOGICAL MERGER: TOWARD AN EXPLANATION OF VERBAL AGGLUTINATION IN JAPANESE AND KOREAN*

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1. Introduction

Verbal morphology has been one of the central issues in syntax and morphology since the dawn of generative grammar. In recent terms, in languages where overt movement of V to T is available, it straightforwardly results in an amalgamation of V and T. For instance, in French, an VO language, the correct constituent order is as in (1)a, but not (1)b. This fact is taken for evidence that this language has overt movement of V to T across negation, which intervenes between the two heads, as indicated in (2) (Pollock 1989, Chomsky 1995: chap. 2).

(1) a. Jean (n')embrasse pas Marie.
John kisses not Mary

'John does not kiss Mary.'

b. *Jean (ne) pas embrasse Marie.
John not kisses Mary

(2) [$_{TP}$ Jean [$_{T}$ -past, 3SM] pas [$_{VP}$ embrasse Marie]]
raising of V to T

Agreeing with *Jean* in ϕ-features under Spec-head agreement, T has 3SM features, and the V+T complex formed in the overt syntax is correctly spelled out as *embrasse* 'kiss.non-past.3SM' (<*embrasser* 'to kiss').

Unlike French, English does not have overt movement of V to T, as indicated in (3).

(3) a. *John not kisses Mary.

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b. *John kisses not Mary.
c. John does not kiss Mary.

In English, neither the inflected main verb nor negation can precede the other. Instead, the uninflected main verb remains *in situ* and inflection is realized by the dummy verb *do*. In contrast, *do*-support is not triggered when the non-emphatic T is adjacent to the main verb, as shown in (4).

(4) a. John kisses Mary.
b. *John does kiss Mary.

As long as the target of *do*-support is T, T and the main verb are string adjacent to each other in (4). Hence, *do*-support should not be triggered in this case. Instead, the 3S features of T must be realized on the main verb.

These facts, among others, motivated Bobaljik (1995) and Lasnik (1995) to propose that T and the main verb in English are amalgamated by morphological merger in PF, as indicated in (5)a. Since this process requires string adjacency between the two heads to be combined, it does not apply if negation intervenes as in (5)b.[1] [2]

(5) a. $[_{TP}$ John $[_{T}$ -past, 3S] $[_{VP}$ kiss Mary]]
√
b. $[_{TP}$ John $[_{T}$ -past, 3S] not $[_{VP}$ kiss Mary]]

In the case of (5)b, where $T_{[+finite]}$ is stranded, *do*-support is employed to rescue it, bringing about (3)c. In this respect, it is rather obvious that morphological merger of T with V is a recapitulation of Affix Hopping proposed by Chomsky (1957, 1965).[3]

In VO languages like French and English, the relative order between V and negation constitutes direct evidence for the presence or absence of movement of V to T. On the other hand, in OV languages like Japanese and Korean, direct evidence is scarce due to their strictly head-final nature. It is a priori not clear whether the inflected verb [V+T] in languages like Japanese and Korean is yielded as the result of head movement in the overt syntax as shown in (6)a, or the syntactic tree remains intact until Spell-Out as shown in (6)b. In the latter view, the fact of verbal inflection should be accounted for by a PF-process such as "morphological

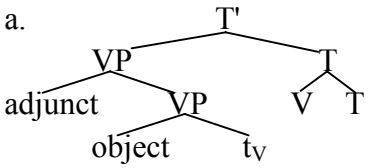
[1] Morphological merger, as envisaged in the text, was proposed much earlier by Marantz (1984). See also Marantz (1989) for relevant arguments.

[2] In terms of Distributed Morphology proposed by Halle and Marantz (1993), both head movement in French and morphological merger in English feed fusion of V+T into a single node, to which a lexical item (i.e. inflected verb) is inserted by Vocabulary Insertion (VI) at PF.

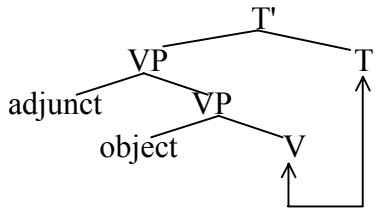
[3] See Lasnik (1995) for relevant discussions.

merger" to be discussed in detail below.

(6) a.



b.



Because the phonological component (=direct predecessor of PF) in the Standard Theory of Chomsky (1965) was only interpretive, it used to be a common exercise to take the simple fact of agglutination of verb stems and inflectional elements for an indication of a syntactic operation.[4]

However, the accumulation of studies on verbal morphology for the past decade or so points at the opposite direction. Yoon (1994) makes a type-categorial argument against V-raising in the overt syntax in Korean. Mainly based on scope facts, Sakai (1998, 2001) argues against V-raising in Japanese. Drawing on the nature of functional categories and facts of suppletion in Japanese, Aoyagi (2001, 2006b) argues against head raising of any type in that language. Furthermore, Takano (2005) claims that V-raising is impermissible in OV languages in general.[5] If these authors are on the right track, verbal inflection in Japanese and Korean should be explained away without recourse to overt movement of V to T. The most promising candidate seems to be "morphological merger," as suggested by these authors.[6]

It has been widely held under the minimalist approach advocated by Chomsky (1995) that while hierarchical configuration is a relavant notion during the derivation from Numeration to LF, linear order is defined in PF. Consequently, it has been assumed by many authors (e.g. Marantz 1989, Halle and Marantz 1993, Takano 1996, Fukui and Takano 1998, Aoyagi 1998b, 2006b, among many others) that configurational structure is preserved until terminal nodes are linearly aligned in Morphology in the derivation toward PF, as shown below.[7]

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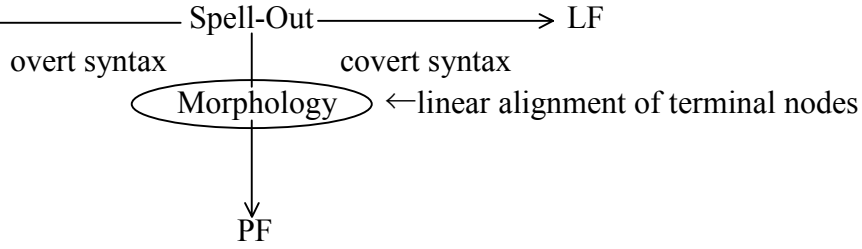
[4] It is still the case that many authors simply assume V-raising in Japanese and Korean. As far as I know, Koizumi (1995, 2000) is the only exception in that he argues for the presence of V-raising in Japanese on independent grounds. For relevant discussions, see Aoyagi (2006b) and the references cited therein. Also see Inoue (1976) and Kuroda (1978) for classical assumptions and arguments for predicate raising.

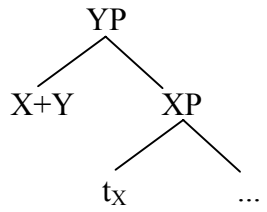
[5] Indeed Takano (2005) makes even a stronger claim that V-raising is not allowed either in the overt syntax or in PF in head-final languages like Japanese and Turkish.

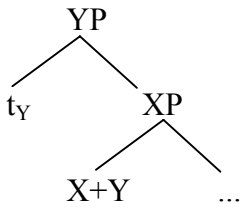
[6] Yoon (1994) is an exception in that he characterizes inflectional elements in Korean as "phrasal affixes."

[7] There are several proposals in this vein. Marantz (1989) and Halle and Marantz (1993) propose an independent level of representation, Morphological Structure, where morphemes are aligned (by merger, fusion and fission) and vocabulary insertion takes place. Chomsky (1995) suggests that Kayne's (1994) Linear Correspondence Axiom applies in PF. Furthermore, Takano (1996) and Fukui and Takano (1998) propose a linearization convention, by which phrase structure is dissembled by Demerge, and dissembled constituents are aligned by Concatenate. See these references for details.

(7) 

Under this view, "morphological merger" is only a cover term because its theoretical implementation depends on the range of possible operations in Morphology as envisaged in (7). Two immediate candidates are head raising and head lowering, as indicated in (8)a, b, respectively (linear order irrelevant).

(8) a. 

b. 

In either case, Y is a head that is immediately higher than another head X. In (8)a, X raises to Y in Morphology. In (8)b, on the other hand, Y lowers to X in Morphology. Embick and Noyer (2001) claim that while verbal inflection in French is the result of head raising in the overt syntax, that in English is the result of head lowering in PF. For Embick and Noyer, lowering of T to V is prohibited by an intervening head, *not* in the case of (5)b. Thus, in their terms, the adjacency requirement on morphological merger is attributed to the PF analogue of the Head Movement Constraint (HMC) (Baker 1988).

In this article, we will make an empirical argument that the raising and lowering options should both be allowed in PF. Simply put, while Korean takes the raising option, Japanese employs the lowering option. However, we will claim that "lowering" is not the result of lowering per se as indicated in (8)b, but its effect comes from the morphological nature of functional categories in Japanese together with a linearization algorithm in PF to be explicated below.

The organization of this article is as follows. Section 2 presents key features of the predicate-contrastive construction (PCC), in which the predicate is contrastively topicalized by the particles *-wa* and *-nun* in Japanese and Korean, respectively. The most significant asymmetry between the two languages is that while Korean allows reduplication of V and T in the PCC, Japanese does not. To account for this asymmetry in a principled way, we will lay out a theoretical groundwork in section 3. In section 4, we will claim that both of the two modes of "morphological merger," as suggested above, are indeed possible. While Korean opts for head raising, Japanese opts for "lowering." However, head raising in PF forms a chain, but "lowering" does not. Due to the lack of head chains and the "extended" use of *su*-support, Japanese allows only one of the types of PCCs that are possible in Korean. Before closing this section, we will make regression to the noted presence and absence of *do*-support in English

and French negative sentences. In section 5, we will draw independent evidence for our analysis from two distinct suppletive processes in Japanese and Korean. Finally, section 6 concludes this article.

2. Predicate-contrastive constructions in Japanese and Korean

It is well known that simple declarative sentences in Japanese and Korean exhibit complete symmetry as in (9) modulo the lack of an overt declarative ending (in C) in Japanese.[8]

(9) a. Mary-ga sushi-o tabe-ta -ø (Japanese)
Mary-nom sushi-acc eat -pst-ø

'Mary ate sushi.'

b. Mary-ka chopap-ul mek-ess-ta (Korean)
Mary-nom sushi -acc eat -pst-decl

However, the two languages diverge in predicate-contrastive constructions (PCC).[9] In predicate-contrastive constructions, the topic particle, *-wa* in Japanese and *-nun* in Korean, separates the verb stem from the sentence-final chunk of inflectional elements. To put aside the presence of the post-verbal *-ki* in Korean[10] and its absence in Japanese, while Korean allows either the reduplicated lexical verb or the dummy verb *ha* 'do' with the sentence-final inflectional elements, Japanese only allows the dummy verb *su* 'do,' as shown in (10) and (11). We will henceforth call the PCC with *su* or *ha* as in (10) the dummy contrastive construction (DCC) and the construction with a reduplicated verb as in (11) the reduplicated contrastive construction (RCC).

(10) a. Mary-ga sushi-o tabe-wa si -ta (J: DCC)
eat -top do-pst

[8] As discussed by Aoyagi (2006b), the distribution of the suppletive copular *da* indicates the existence of an empty C in Japanese declarative sentences like (9)a (also see Nishiyama 1998). Or it might be the case that after adjunction of T to C takes place, one of the tense markers, *-ru* 'NON-PAST' or *-ta* 'PAST,' is inserted to the fused node by Vocabulary Insertion in the sense of Halle and Marantz (1993).

[9] Earlier (e.g. in Aoyagi 2006a) I referred to these constructions as predicate focus constructions. However, C.-M. Lee (2002) maintains that the non-thematic use of *-nun* in Korean and *-wa* in Japanese induces contrastive topic, distinct from sheer focus.Hence, I will use a more neutral term *predicate-contrastive* in the text, following Cho, Kim and Sells (2004).

[10] In the literature, *-ki* is often assumed to be a complementizer or a nominalizer without much discussion. Although a close examination of the nature of *-ki* is beyond the scope of this article, we assume with Kang (1988) and Jo (2004a, b) that *-ki* is inserted in order to "morphologically close" verb and tense stems. Unlike the Japanese counterparts, verb and tense stems are [+bound] on their right (see Aoyagi 2006a for relevant discussions).

'(What happened was that) Mary ate sushi (, but ...)'

b. Mary-ka chopap-ul mek-ki-nun ha-ess-ta (K: DCC)
eat -ki-top do-pst-decl

(11) a. *Mary-ga sushi-o tabe-wa tabe -ta (J: RCC)
eat -pst

'(What happened was that) Mary ate sushi (, but ...)'

b. Mary-ka chopap-ul mek-ki-nun mek-ess-ta (K: RCC)
eat -ki-top eat -pst-decl

The examples in (10) and (11) show that Japanese lacks the RCC.

Furthermore, as exhibited in (12) and (13), Korean allows the tense morpheme to be reduplicated, but Japanese does not.

(12) a. *Mary-ga sushi-o tabe-ta -wa si -ta (J: DCC)
eat -pst-top do-pst

'(What happened was that) Mary ate sushi (, but ...)'

b. Mary-ka chopap-ul mek-ess-ki-nun ha-ess-ta (K: DCC)
eat -pst-ki-top do-pst-decl

(13) a.?*Mary-ga sushi-o tabe-ta -wa si -ta (J: RCC)
eat -pst-top do-pst

'(What happened was that) Mary ate sushi (, but ...)'

b. Mary-ka chopap-ul mek-ess-ki-nun mek-ess-ta (K: RCC)
eat -pst-ki-top eat -pst-decl

Since Japanese lacks the RCC, the ungrammaticality of (13)a is expected.[11] However, even in the DCC, Japanese does not allow tense to be reduplicated, as shown in (13)a.

The observations made above are summarized in (14)–(17).

(14) DCC w/o tense reduplication:
a. Japanese: √ V-part do-tense

[11] Some Japanese speakers accept RCCs like (13)a. I suspect that for those speakers, the abstract noun *koto* 'thing' in the *koto-wa* construction, as exemplified in (i), can optionally be deleted.

(i) Mary-ga sushi-o tabe-ta -*koto* -wa tabe-ta
eat -pst-KOTO-top eat -pst

Tentatively, we consider that the *koto-wa* construction includes an adverbial clause of a sort. See Aoyagi (2006a, note 1) for relevant discussions.

b. Korean: √ V-part do-tense

(15) DCC w/ tense reduplication:
a. Japanese: * V-tense-part do-tense
b. Korean: √ V-tense-part do-tense

(16) RCC w/o tense reduplication:
a. Japanese: * V-part V-tense
b. Korean: √ V-part V-tense

(17) RCC w/ tense reduplication:
a. Japanese: * V-tense-part V-tense
b. Korean: √ V-tense-part V-tense

While Japanese allows only the DCC without reduplicated tense, Korean allows all the four patterns.

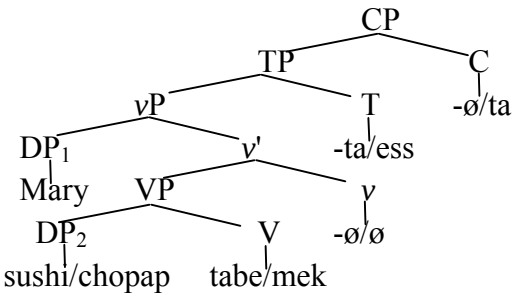
Recently, the PCC has drawn much attention in the literature (e.g. Nishiyama and Cho 1998, Choi 2003, Cho, Kim and Sells 2004, Jo 2004a, b). However, except for Nishiyama and Cho (1998), none of the existing analyses can readily account for the differences in these constructions between Japanese and Korean. In what follows, we will claim that the noted asymmetry automatically follows if verbal agglutination in Korean is the result of V-raising in PF, whereas that in Japanese results from "lowering" in PF.

3. Theoretical groundwork

3.1. Phrase structure of Japanese and Korean

We will assume that transitive clauses in Japanese and Korean as in (9) take the phrase structure in (18) at Spell-Out; however, surface positions of arguments are immaterial to the current discussion, and the constituent order is yet to be determined.[12]

(18)



3.2. Functional heads as bound morphemes

[12] Furthermore, lexical items under terminal nodes might be inserted by Vocabulary Insertion in PF in the sense of Halle and Marantz (1993).

On the observational level, it is obvious that the fact of verbal agglutination in Japanese and Korean results from the general morphological nature of their functional elements. The functional elements in these languages are bound morphemes that need a stem or host; in other words, they are morphologically specified as [+bound]. If a particle intervenes, stranded functional elements result in sheer ungrammaticality, as shown in (19) and (20) below.

(19) a. tabe-ta
eat -past
b. *tabe-wa ø-ta
eat -top -past

(20) a. mek-ess -ta
eat -past-decl
b. *mek-ki-nun ø-ess -ta
eat -KI-top -past-decl
c. *mek-ess -ki-nun ø-ta
eat -past-KI-top -decl

Since the tense morphemes in Japanese and Korean and the declarative ending in Korean are bound morphemes, they need an appropriate host to hold on to. However, due to the intervention of *-wa* or *-nun*, the tense morphemes in (19)b and (20)b and the declarative ending in (20)c are stranded; hence, sheer ungrammaticality results.

3.3. Morphological selection

Following Lieber (1992), we will assume that functional heads as affixes in Japanese and Korean morphologically select for a particular stem or host. Namely, C selects for T, T selects for *v*, and *v* selects for V, as summarized on table (21).

(21)

functional affixes in J	functional affixes in K	categories	selectional features
-ø (decl. mood)	-ta	C	+[T_]
-ta (past tense)	-ess	T	+[*v*_]
-ø (light verb)	-ø	*v*	+[V_]

3.4. Particles as cross-categorial clitic-like adjuncts

Adopting intuitions of many authors (Cho and Sells 1995, Sells 1995, among others), Aoyagi (1998a, b, 2006b) propose that topic/focus-inducing particles like *-wa* 'top", *-mo* 'also', and *-sae* 'even' in Japanese are cross-categorial clitic-like adjuncts, and Aoyagi (2006a) extends this analysis to the Korean counterparts *-nun*, *-to*, and *-cocha*. They are cross-categorial, in the sense that they can be attached to virtually any category, as exemplified in (22)–(26).

(22) a. Mary-ga [$_{DP}$ sushi]-wa /mo /sae tabe-ta (DP)
-nom sushi -top/also/even eat -pst

'Mary ate at least/also/even SUSHI.'

b. Mary-ka [$_{DP}$ chopap]-un /to /cocha mek-ess-ta
-nom sushi -top/also/even eat -pst-decl

(23) a. daihyoosya -ga [$_{PP}$ New York-kara]-wa/mo /sae ki -ta (PP)
representatives-nom -from -top/also/even come-pst

'Representatives came at least/also/even FROM NEW YORK.'

b. dayphyoca -ka [$_{PP}$ New York-eyse]-nun/to /cocha wa -ss -ta
representatives-nom -from -top/also/even come-pst-decl

(24) a. Mary-ga [$_{VP}$ hon -o yomi]-wa/mo /sae si -ta (VP)
-nom book-acc read -top/also/even do-pst

'Mary at least/also/even READ A BOOK.'

b. Mary-ka [$_{VP}$ chayk-ul ilk -ki]-nun/to /cocha ha-ess-ta
-nom book -acc read-KI -top/ also/even do-pst-decl

(25) a. shachoo -ga [$_{AP}$ shain -o isogasi-ku]-wa/mo /sae si -ta (AP)
president-nom workers-acc busy -KU -top/also/even do-pst

'The president at least/also/even made HIS WORKERS BUSY.'

b. sacang -i [$_{AP}$ cikwen -ul pappu-key]-nun/to /cocha ha-ess-ta
president-nom workers-acc busy -KEY -top/ also/even do-pst-decl

(26) a. John-ga [$_{CP}$ Mary-ga sin-da to] -wa/ mo /sae iw -ta (CP)
-nom -nom die-pst -comp-top/also/even say-pst

'John at least/also/even said THAT MARY DIED.'

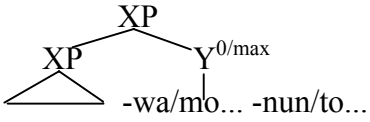
b. John-i [$_{CP}$ Mary-ka cwuk-ess-ta ko] -nun/to /cocha malha-ess-ta
-nom -nom die -pst-decl-comp-top/also/even say -pst-decl

More importantly, they are adjuncts since they have nothing to do with selection, as clearly illustrated by Sells (1995). Finally, they are clitic-like elements like other functional elements in the two languages, in the sense that they need a morphophonological host.

Drawing on these facts, Aoyagi (1998a, b, 2006a, b) concludes that particles like *-wa* and *-nun* are non-projecting heads that can be adjoined to any category in syntax, as shown in (27)a, and they must be attached to the head of that category in Morphology in the PF-side of the derivation, as represented in (27)a.[13]

[13] What distinguishes clitic-like particles such as *-wa/nun* from functional affixes is their lack of

(27) a. Overt syntax

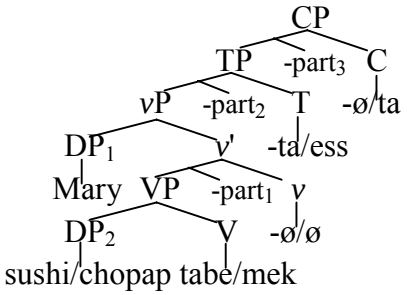


b. Morphology

... X^0+Y^0 ...

Under the proposed view of particles like *-wa/nun* in Japanese and Korean, nothing seems to prohibit them from adjoining to VP, *v*P and TP, as shown in (28).[14]

(28)

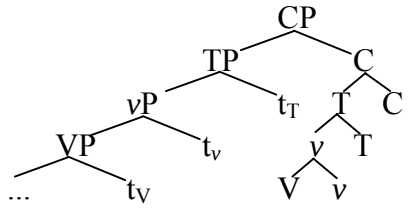


4. The proposals

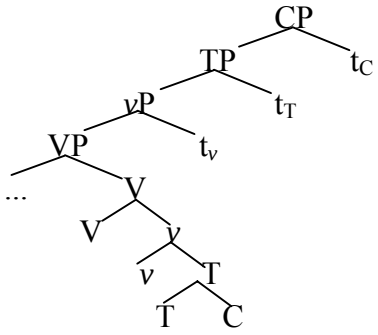
4.1. Agglutination in Japanese and Korean

Given the two imaginable modes of "morphological merger" suggested in section 1 above (see (8)), the following two representations of a complex head will be possible for languages like Japanese and Korean.

(29) a. head raising



b. head lowering



As long as the linear order of terminal nodes is concerned, either the raising option in (29)a or the lowering option in (29)b leads to the same result, i.e., V+*v*+T+C, as indicated in (30).

(30) a. V + *v* + T + C (tabe + ø + ta + ø → tabe-ta) (Japanese)

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categorial selection for their hosts. See Aoyagi (1998b: chap. 2) for relevant discussions.

[14] The reason that a particle like *-wa/nun* is prohibited from being adjoined to the root CP is because it mediates a Subject-Predicate relation in the sense of Kuroda (1992: chap. 2).

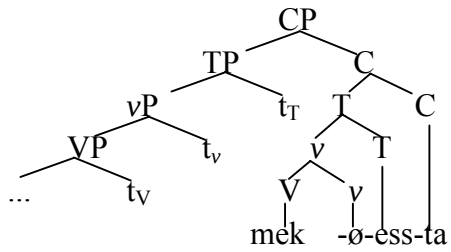
b. V + *v* + T + C (mek + ø + ess + ta → mek-ess-ta) (Korean)

Thus, the fact of verbal morphology in simple declarative sentences in Japanese and Korean can be accounted for by either option. Note that the direction of adjunction as the result of either head raising or lowering is basically free. However, the order in (30)a, b is virtually the only permissible one, due to the morphological selectional properties to the effect that each of the functional elements in Japanese and Korean must be suffixed to a host of a specific category (see table (21) above).

4.2. Head raising in PF in Korean

We propose that verbal morphology in Korean is the result of head raising in PF, as indicated in (29)a. Thus, the fully inflected verb *mek-ess-ta* 'eat-past-decl' obtains as shown in (31).

(31)



Following Chomsky's (1995) copy theory of movement, we assume that traces are copies, but departing from Chomsky, we will assume with Nunes (2004) that successive cyclic head movement in (31) forms an extended chain that consists of four links (i.e. t_V, t_v, t_T, and C). Furthermore, we assume that a general principle as in (32) governs the pronunciation of chain links.

(32) The Chain Minimization Principle
Other things being equal, all chain links except the highest one are deleted to minimize the existing features.

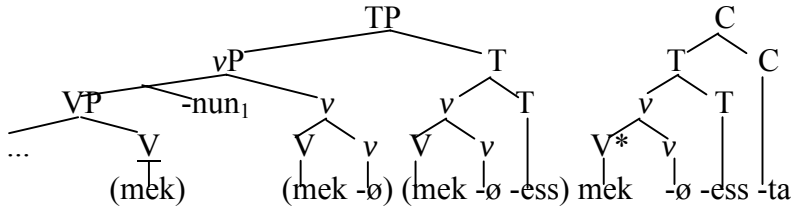
However, the principle in (32) does not prevent non-head links from being put to pronunciation by certain morphological requirements. As shown below, the RCC in Korean provides a case where more than one links in a chain are pronounced.

4.3. The PCC in Korean

4.3.1. When *-nun* adjoined to VP

First, let us consider the case where *-nun* is adjoined to VP, the PF derivation provides the representation in (33). Note that since *-nun* is an adjunct by hypothesis (see section 3.4 above), it does not block raising. Hence, successive cyclic head raising forms a four-member chain in the sense suggested above.

(33)



When a chain is formed, only the highest link is usually pronounced, as stated in (32). In the case of (33), however, since *-nun* requires a host (see (27)b above), the lowest link *mek* must be pronounced. Hence, (34)b (=the RCC in (11)b) results. According to Nunes (2004), in cases like (33), the PF computation may well delete V* under identity with the underlined V, which is forced to be pronounced, for the purpose of minimization of the existing features. If it happens, the light verb contained in the highest link will lose its host, resulting in an ungrammatical surface string in (34)c. However, in such a case, Korean has a rescue operation, *ha*-support. If *ha*-support is employed after the deletion of V*, the grammatical string in (34)d, that is, the DCC in (10)b, obtains.

(34) a. *... __-nun mek-ø-ess -ta (*-nun* having no host to cliticize to)
-top eat -ø-past-decl

b. √... mek-ki-nun mek-ø-ess -ta (RCC in (11)b)
eat -KI-top eat -ø-past-decl

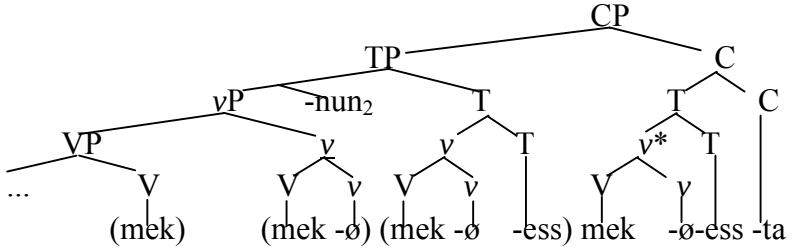
c. *... mek-ki-nun __-ø-ess -ta (V* deleted under identity with the
eat -KI-top -ø-past-decl pronounced link (V); *v*'s morphological selection not satisfied)

d. √... mek-ki-nun ha-ø-ess -ta (DCC in (10)b; *ha*-support)
eat -KI-top do-ø-past-decl

4.3.2. When *-nun* adjoined to *v*P

When *-nun* is adjoined to *v*P, the PF derivation provides the representation in (35), where almost the same thing happens as in (33), due to the null phonetic content of the light verb.

(35)



In (35), what *-nun* forces to be pronounced is the underlined light verb *v*. In the straightforward case, (36)b (=the RCC in (11)b) results. If the starred light verb *v** contained in the highest link is deleted under identity with the underlined *v*, the same rescue operation, *ha*-support, comes in to rescue the stranded T, yielding (36)d (=the DCC in (10)b).

(36) a. *... __-nun mek-ø-ess -ta (*-nun* having no host to cliticize to)
-top eat -ø-past-decl

b. √... mek-ø-ki-nun mek-ø-ess -ta (RCC in (11)b)
eat -ø-KI-top eat -ø-past-decl

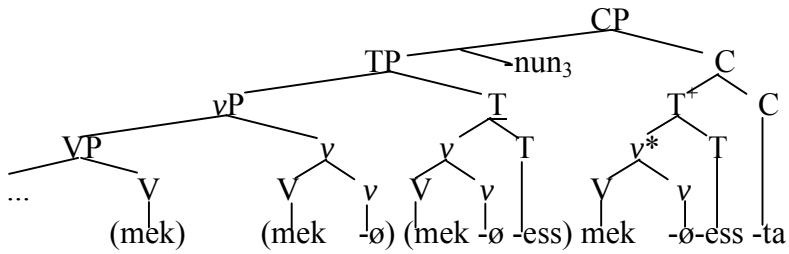
c. *... mek-ø-ki-nun __-ess -ta (*v** deleted under identity with (*v*); T's
eat -ø-KI-top -past-decl morphological selection not satisfied)

d. √... mek-ø-ki-nun ha-ø-ess -ta (DCC in (10)b; *ha*-support)
eat -ø-KI-top do-ø-past-decl

4.3.3. When *-nun* adjoined to TP

Finally, when *-nun* is adjoined to TP, the representation in (37) is derived in PF.

(37)



In (37), the underlined T is forced to be pronounced by the presence of *-nun*. If nothing else happens, (38)b (=the RCC in (13)b) obtains.

(38) a. *... __-nun mek-ø-ess -ta (*-nun* having no host to cliticize to)
-top eat -ø-past-decl

b. √... mek-ø-ess -ki-nun mek-ø-ess -ta (RCC in (13)b)
eat -ø-past-KI-top eat -ø-past-decl

As noted above, the PF computation may well delete a certain constituent in the highest link under identity with some other pronounced links. If deletion is allowed up to recoverability, it should target and delete *v**, instead of T^+ which is adjoined to C. This is because the root C must generally be tensed in Korean, as indicated by the examples in (39).

(39) a. Mary-ka chopap-ul mek-nun-ta
-nom sushi -acc eat -pres-decl

'Mary eats sushi.'

b. Mary-ka chopap-ul mek-ess -ta

-nom sushi -acc eat -past-decl

'Mary ate sushi.'

c. *Mary-ka chopap-ul mek-ø-ta
-nom sushi -acc eat -ø-decl

Either a present or a past tense morpheme is attached to the root C in (39)a, b, respectively, but in (39)c, there is no tense morpheme, hence, ill-formed.[15] Given this constraint on deletion, it is expected that *v** but not T^+ can be deleted in (37). This is borne out.

(40) a. *... mek-ø-ess -ki-nun __-ess -ta (*v** deleted up to recoverability; T's
eat -ø-past-KI-top -past-decl morphological selection not satisfied)

b. √... mek-ø-ess -ki-nun ha-ess -ta (DCC in (12)b; *ha*-support)
eat -ø-past-KI-top do-past-decl

After the deletion of *v** in (37), T^+ adjoined to C is stranded, as shown in (40)a, but it can be saved by *ha*-support, as indicated in (40)b.

However, rather surprisingly, the most straightforward application of deletion is also possible, as exhibited in (41) below (Jo 2004a, b). Namely, T^+ adjoined to C can be deleted under strict identity with the underlined T in (37).

(41) a. * ...mek-ø-ess -ki-nun __-ta (T^+ deleted under identity with T; C's
eat -ø-past-KI-top -decl morphological selection not satisfied)
b. √... mek-ø-ess -ki-nun ha-ta (DCC; "extended" *ha*-support)
eat -ø-past-KI-top do-decl

As noted by Jo (2004a, b), *ha*-support in Korean has an extended use that rescues the stranded C as well. This is the source of the DCC with *ha* without tense in (41)b.[16]

Adopting Fukui's (1995) functional specification of categories (i.e. [±F(unctional), ±L(exical)]) as well as the lexical categorial features [±N, ±V] widely held since Chomsky (1970), Aoyagi (2006b) proposes that the Japanese dummy verb *su* is specified as [+L, –N,

[15] This applies to verbs only. The suffix for adjectives in the present (or non-past) is -ø in Korean.

[16] However, many Korean speakers show preference of the use of a theme vowel *-e/a* as an informal sentence-ending element over *-ta*, the formal sentence-ending particle. For those speakers, (i)b sounds better than (i)a.

(i) a.(?)Mary-ka chopap-ul mek-ess -ki-nun ha-ta.
-nom sushi -acc eat -past-KI-top do-FORMAL

'(What happened was that) Mary ate sushi (, but ...)'

b. Mary-ka chopap-ul mek-ess -ki-nun ha-e.
-nom sushi -acc eat -past-KI-top do-INFORMAL

+V] being neutralized with respect to the [±F] feature, so that it may substitute either the main verb V or the light verb *v*, where V, a pure lexical category, is specified as [–F, +L, –N, +V] and *v*, a hybrid, as [+F, +L, –N, +V].[17] Furthermore, Fukui suggests that T is a pure functional category with verbal nature, being specified as [+F, –L, –N, +V]. If so, a natural extension is to assume that the Korean dummy verb *ha* belongs to a further generalized verbal category, [–N, +V], being underspecified with respect to [±L] as well as [±F]. The following table provides the feature specification of the relevant functional categories in Japanese and Korean.

(42)

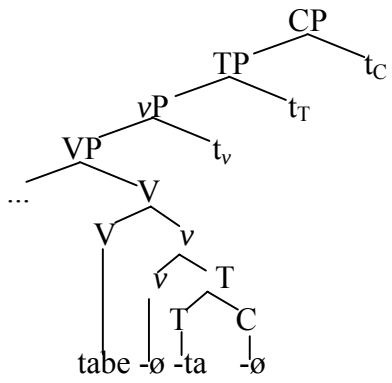
	Functional Specification	Lexical Categorial Features
T in J and K	+F, –L	–N, +V
v in J and K	+F, +L	–N, +V
V in J and K	–F, +L	–N, +V
su in J	+L	–N, +V
ha in K	none	–N, +V

To sum up this section, it has been shown that our PF head raising approach to Korean verbal morphology provides a principled account of the four possible patterns of the PCC in (14)–(17). Furthermore, our approach can provide an account of the fifth pattern, exemplified in (41)b, as a subtype of the DCC. This is possible because the Korean dummy verb *ha* is made to rescue stranded C as well as T and *v*.

4.4. Lowering as the result of Linearization

Recall that we are proposing that while Korean takes the raising option, Japanese takes the lowering option in PF. However, lowering per se, as proposed by Embick and Noyer (2001), is not without problems. First of all, it is not entirely clear why traces in PF are innocuous to the Proper Binding Condition (PBC) (Fiengo 1980, Saito 1989). If the inflected verb from *tabe-ta* 'eat-past' is the result of successive cyclic head lowering as in (43), the traces of C, T and *v* are left unbound.

(43)



The treatment of so-called VP adverbs other than *not* in English poses another problem.

[17] See Aoyagi (2006b: chap. 2) for relevant discussions.

Compare the examples in (44) with our earlier examples in (3)a, c, reproduced as (45)a, b.

(44) a. John never/often/always kisses Mary.
b. *John does never/often/always kiss Mary.

(45) a. *John not kisses Mary.
b. John does not kiss Mary.

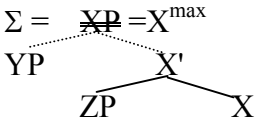
Unlike *not*, adverbs as in (44) do not trigger *do*-support. Noting this asymmetry, Embick and Noyer (2001) maintain that *not* is inherently a head, but other adverbs are maximal projections on their own; hence, only the former is visible with respect to the HMC. However, on bare phrase theoretic terms, they are indistinguishable in that they are both X^0 and X^{max} simultaneously, just like topic/focus particles in Japanese and Korean in our terms. If the adverbs in (44)a as maximal projections are invisible to lowering of a head, the same should apply to *not* in (45)a, contrary to fact.

To circumvent the problems noted above, we will claim that the lowering effect obtains as the result of Linearization in the sense of Takano (1996) and Fukui and Takano (1998). Unlike Kayne (1994), these authors contend that the base constituent order is universally specifier-complement-head, and languages are parametrized with respect to head movement in the overt syntax; V raises to (the domain of) T in French, to *v* in English, but it stays in situ Japanese, etc. As an alternative to Kayne's Linear Correspondence Axiom (LCA), Fukui and Takano propose Linearization, which consists of Demerge and Concatenate, as in (46).[18]

(46) Linearization (Fukui and Takano 1998: 41)
Applied to Σ, Demerge yields $\{\alpha, \{\Sigma - \alpha\}\}$, α an X^{max} constituent of Σ, and Concatenate turns $\{\alpha, \{\Sigma - \alpha\}\}$ into $\alpha + (\Sigma - \alpha)$.

As we have assumed (see section 1 above), linear order is yet to be determined in early stages of the PF-side of the derivation. Linearization in (46) is an algorithm that applies to an arbitrary syntactic object Σ and determines its constituent order. If Linearization applies to Σ = XP below, Demerge first strikes out XP, as indicated in (47)a, and then Concatenate let YP (=[Spec, XP]) precede the rest of XP (i.e. X') since the former is a maximal projection, as shown in (47)b.

(47) a. Demerge b. Concatenate

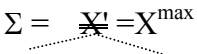


YP – X'

Linearization applies successive counter-cyclically, erasing the mother node and aligning its daughters in a linear string. On the next stage, when Linearization applies to X' in (48)a, X^{max} at this point, Demerge erases X', and Concatenate let ZP precede X, as indicated in (48)b.

[18] For some arguments against the application of the LCA to OV languages like Japanese, see Takano (1996) and Aoyagi (1998b).

(48) a. Demerge



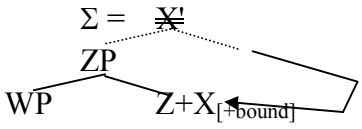
b. Concatenate

ZP – X

As a result, the constituent order of XP is determined as YP – ZP – X. For Takano (1996) and Fukui and Takano (1998), this is what happens in languages like Japanese.

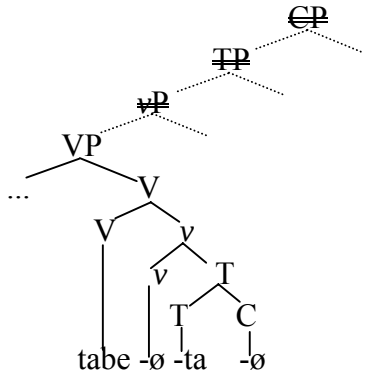
Note that in terms of Takano (1996) and Fukui and Takano (1998), Linearization is not sensitive to the morphological nature of heads. For instance, X (=X^0) in (48) may be either free or bound. Now we will add one point to Linearization: the moment that a [+bound] head is detached from its mother node by Demerge, it must be adjoined to the immediately lower head. If X in (48)a is [+bound], X is adjoined to the head of ZP as soon as Demerge applies to X', as shown below.

(49)



We take this to be the way that the lowering version of "morphological merger" is exercised in languages like Japanese. Applied to the phrase structure in (18) from the topmost CP down to *v*P, Linearization yields the complex head as in (50) (where the arguments are suppressed for expository reasons).

(50)



Notice that the conceptual problem associated with unbound traces in Embick and Noyer's (2001) analysis does not arise in our approach because the lowering effect is only a by-product of Linearization.[19]

4.5. The PCC in Japanese

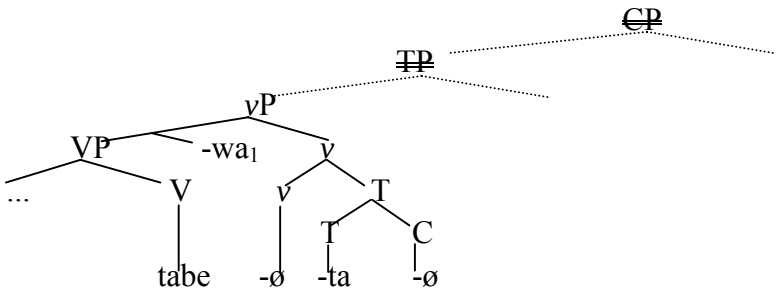
Based on the discussions above, we will account for the fact that Japanese allows only the DCC among the variety of PCCs that are allowed in Korean in this section.

[19] Naturally, Linearization should apply after head raising in PF in Korean. We will turn to this point in section 4.6.

4.5.1. When *-wa* adjoined to VP

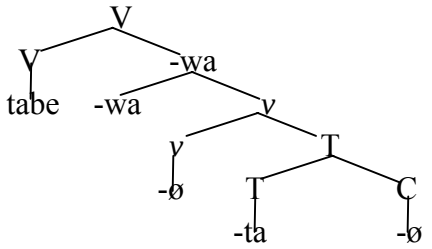
First, we consider the case where *-wa* is adjoined to VP. Linearization applies successive counter-cyclically, first to the topmost CP, and then to TP. Since C and T are both [+bound], each head must be adjoined to the immediately lower head as soon as it is detached by Demerge. The representation after Linearization applied to TP is like (51), where C is adjoined to T and T is adjoined to *v*.

(51)



On the next cycle down, where Linearization applies to *v*P, *v* is detached by Demerge. Since *v* is [+bound] by assumption, it must be adjoined to the immediately lower head *-wa*. Next, when Linearization applies to the upper segment of VP, *-wa* is detached by Demerge. Since this particle is also [+bound], it must instantly be adjoined to V.[20] Eventually, the complex head as in (52) will be formed.

(52)



Recall that each functional head in Japanese is morphologically subcategorized for a particular stem (see table (21) above). In (52) the morphological requirements of C and T are met. However, *v* is stranded from V due to the intervention of the particle *-wa*; hence, the linear string in (53)a is impermissible. However, Japanese is equipped with a rescue operation, *su*-support, which is an analogue of *ha*-support in Korean. *Su*-support rescues the stranded *v*, yielding (53)b, that is, the DCC in (10)a.

(53) a. *... tabe-wa __-ø-ta -ø (*v*'s morphological selection not satisfied)

[20] Exactly speaking, the result of Demerge applied to the upper segment of VP is a set of syntactic objects consisting of two maximal projections, the lower segment of VP (=V^{max}) and *-wa*$^{0/max}$. As pointed out by Aoyagi (1998b) and Takano (2005), adjuncts in general are problematic to Fukui and Takano's (1998) Linearization as well as Kayne's (1994) LCA. In this case, however, given that the morphological requirement of the particle (i.e. [+bound]) must be satisfied immediately, the general problem associated with adjuncts does not arise.

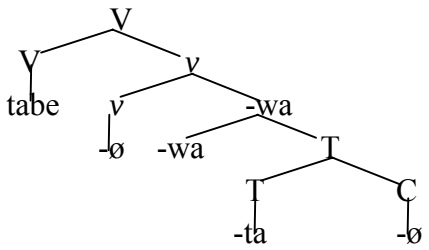
eat -top -ø-past-ø

b. √... tabe-wa si -ø-ta -ø (DCC in (10)a; *su*-support)
eat -top do-ø-past-ø

4.5.2 When -*wa* adjoined to *v*P

When -*wa* is adjoined to *v*P, Linearization applies in a similar way. The only difference is the order of adjoined heads. In this case, the complex head in (54) is finally formed.

(54)



In (54) the morphological requirements of C and *v* are satisfied. However, T is stranded from *v* by the presence of -*wa*, which will end in an impermissible string in (55)a.

(55) a. *... tabe-ø-wa __-ta -ø (T's morphological selection not satisfied)
eat -ø-top -past-ø

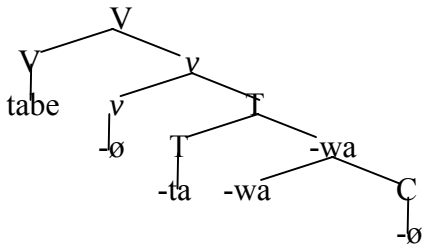
b. √... tabe-ø-wa si -ta -ø (DCC in (10)a; *su*-support)
eat -ø-top do-past-ø

As argued by Aoyagi (1998b, 2006b), the Japanese dummy verb *su* is a generalized verb that can substitute either V or *v* (see table (42) above). Hence, *su*-support can be employed to save the stranded T, which is subcategorized for *v*. The use of *su*-support yields the permissible linear string in (55)b, which turns out to be the same as (53)b, since *v* is morphologically ø. Hence, either (53)b or (55)b can be the source of the DCC in (10)a.

4.5.3 When -*wa* adjoined to TP

Theoretically speaking, adjunction of -*wa* to TP should be possible in Japanese as well. If -*wa* is adjoined to TP, successive counter-cyclic application of Linearization produces the complex head in (56).

(56)



In (56) the morphological requirements of T and *v* are satisfied, but that of C is not, because it

is stranded from T by the presence of *-wa*, resulting in an impermissible string in (57)a.

(57) a. *... tabe-ø-ta -wa __-ø (C's morphological selection not satisfied)
eat -ø-past-top -ø

b. *... tabe-ø-ta -wa su-ø (No "extended" *su*-support)
eat -ø-past-top do-ø

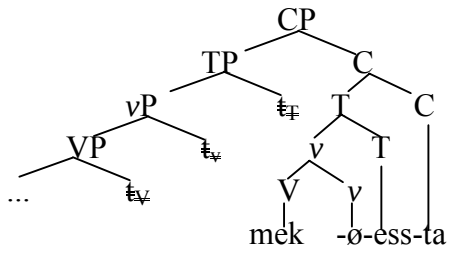
Recall that in Korean, *ha*-support can rescue stranded C (as well as T and *v*) owing to its underspecified feature composition (see table (42) above). However, unlike *ha*-support in Korean, *su*-support in Japanese is not able to rescue stranded C. After all, adjunction of *-wa* to TP, though theoretically possible, may not generate a permissible linear string.

To sum up sections 4.3 and 4.5, our proposal can make a principled account of all facts observed in our earlier examples in (10)–(13). Specifically, the presence of RCC in Korean and its absence in Japanese follows from our proposal that while Korean employs head raising that forms a non-trivial chain in PF, Japanese exhibits the effect of head lowering as the result of Linearization. Furthermore, the possibility of adjoining a particle to TP in Korean and its impossibility in Japanese need not be stipulated. It follows from different modes of verbal agglutination and the presence and absence of the "extended" use of the dummy verb.

4.6 Head movement in PF and Linearization in Korean

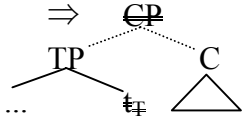
We will return to the question as to how head raising in PF interacts with Linearization in Korean. To begin with, let us consider simple declarative sentences. Naturally, head raising takes place before Linearization applies. Furthermore, due to the Chain Minimization Principle in (32), all chain links except the highest one are deleted, as shown in (58).

(58)



Linearization applies to the structure in (58) from top to bottom in exactly the same way it does in Japanese. First, Demerge erases the topmost CP, and then Concatenate let TP precede C, as indicated in (59).

(59) a. Demerge ⇒ ~~CP~~ b. Concatenate



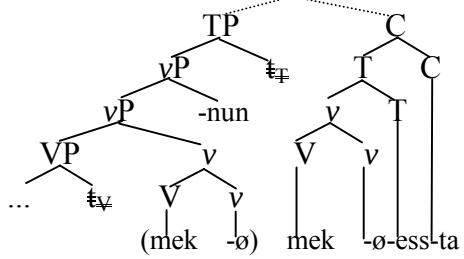
TP – C

Note that the complex C need not be adjoined to any host because the morphological requirements of the functional affixes are all satisfied inside that complex. At ensuing cycles,

Linearization applies from TP down. Since (59)b entails that all constituents included in TP precede the complex C, the strict head-finality of Korean is ensured.

Next, let us consider the case of PCCs where *-nun* is adjoined to *v*P, for instance, as discussed in section 4.3.2. After head raising in PF, Linearization applies successive counter-cyclically. First, Demerge erases the topmost CP in the same way that it does in (59)a, and then Concatenate let TP precede the complex C in the same way that it does in (59)b.

(60) a. Demerge ⇒ ~~CP~~

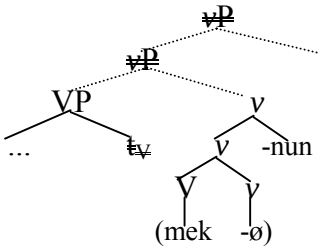


b. Concatenate

TP – C

Again, (60)b ensures that the verb stem together with a chunk of functional affixes will appear sentence-finally. What makes (60) distinct from (58) is the presence of *-nun* adjoined to *v*P. When Linearization applies to the upper segment of *v*P, *-nun* must be adjoined to the trace of *v*, which is composed of V+*v*, as soon as Demerge erases that segment. Recall that the trace of *v* must be put to pronunciation because *-nun* requires a non-silent host. On the next cycle, Demerge erases the lower segment of *v*P, and Concatenate let VP precede the head (=the trace of *v*) to which *-nun* is adjoined, as demonstrated in (61).

(61) a.



b.

VP – ((V+*v*)+*nun*)

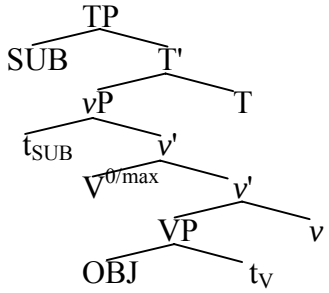
All in all, Linearization correctly yields the surface constituent order in the PCC. The most straightforward output is the RCC in (11)b, SUB-OBJ-*mek-ki-nun mek-ess-ta* 'sub-obj-eat-KI-top eat-past-decl.' If the complex headed by *v* within the highest link C is deleted under identity with the link to which *-nun* is adjoined, the DCC in (10)b, *mek-ki-nun ha-ess-ta* 'eat-KI-top do-past-decl,' will result.[21]

4.7. English vs French

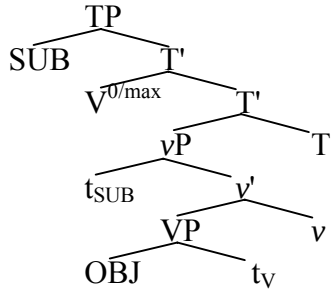
[21] Note that the position of subject at Spell-Out, whether it is in [Spec, TP] or [Spec, *v*P], does not affect the text discussion. In either position, it is detached earlier than the complex head that includes *-nun* in (61)a. The same qualification applies to object as well. (61)b ensures that all constituents included in VP precede the complex head in which *-nun* is included. See Fukui and Takano (1998) for relevant discussions.

Before closing this section, we will reconsider the presence and absence of *do*-support in English and French negative sentences. Following Fukui and Takano (1998), we will assume that head movement in the overt syntax is "substitution" to a specifier. In this respect, head movement in the overt syntax is distinct from head raising in PF because the latter takes the form of head-to-head adjunction, as we have assumed above.[22] Recall that for Fukui and Takano, specifier-complement-head is the base constituent order across languages, and languages are parametrized with respect to V-raising. In OV languages like Japanese and Korean, there is no V-raising in the overt syntax; hence, the head finality is maintained. On the other hand, both English and French employ V-raising, but they exhibit a difference in how far V can raise. Fukui and Takano claim that while V in French can raise as high as the domain of TP, V in English can only raise to the domain of *v*P. Given this, simple transitive sentences in these two languages will have the following representations at some point in the derivation.

(62) a. English



b. French



V in English raises to an inner specifier position of *v*P as shown in (62)a, and V in French raises to an inner specifier position of TP as shown in (62)b.

Departing from Fukui and Takano (1988)[23], we assume that T in English and French is morphologically specified as [+bound] and +[V_], and that the inflected verb is the result of fusion of [V+T] in the sense of Halle and Marantz (1993).[24] Fusion can be fed by movement or "morphological merger" in the sense that we have elaborated on above. Now we propose that French, but not English, further allows movement of T to V either in the overt syntax or in PF. If it takes place in the overt syntax, it ends up in the form of adjunction to a specifier (=X^{max}) as indicated in (63)a. If, on the other hand, it takes place in Morphology in PF, it is an instance of head-to-head adjunction as indicated in (63)b.

(63) a. $[V^{0/max} [V^{0/max} + T^{0/max}]]$ (adjunction to specifier in the overt syntax)

[22] It can be taken that heads do not project in PF in the same way that they do in the overt syntax. For an alternative approach to head movement in the overt syntax and its effect on Linearization, see Takano (1996).

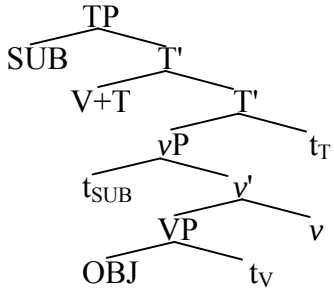
[23] It seems that Fukui and Takano tacitly assume that verbs in English and French are inflected at Numeration, and they are checked against a relevant functional head (i.e. T or *v*) during the course of derivation.

[24] On the other hand, we assume with Fukui and Takano (1998) that the light verb *v* does not have such morphological specifications, hence, negligible in terms of Linearization in these languages.

b. $[V^{0/max}\ [V^0 + T^0]]$ (head-to-head adjunction in PF)

In either case, French successfully feeds fusion of [V+T] before Linearization applies in PF, as shown in (64).

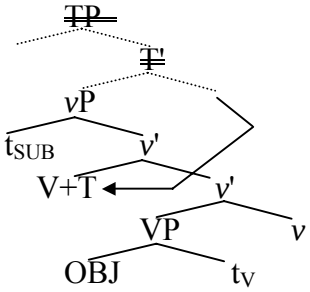
(64) French (before Linearization)



Naturally, Linearization applies to (64) from top to bottom in French as well. It first applies to the topmost TP, Demerge erases TP, and Cocatenate let the subject precede T'. On the next cycle, Demerge erases the upper segment of T', and Concatenate let [V+T] precede the lower segment of T' since [V+T], formed in either way in (63), counts as a maximal projection. Thus, successive counter-cyclic application of Linearization eventually yields the correct SUB-[V+T]-OBJ order.

On the other hand, English is not able to feed fusion of [V+T] before the application of Linearization at PF. Linearization first targets the topmost TP. Demerge erases it, and Concatenate let the subject (=X^{max}) precede T'. On the next cycle, Linearization applies to T'. Since T in English is [+bound] by assumption, it must be adjoined to the closest head below, that is V, as soon as Demerge detaches it from T', as shown in (65).

(65) English (Morphology in PF)

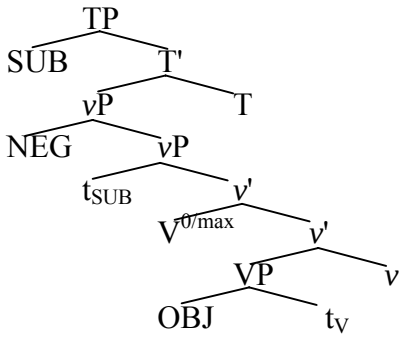


Because the [V+T] complex thus formed is not distinct from (63)b, Linearization, when applied to the upper segment of *v*', let the [V+T] complex as X^{max} precede the lower segment of *v*'. After all, SUB-[V+T]-OBJ, the same surface constituent order as in French, results in English.

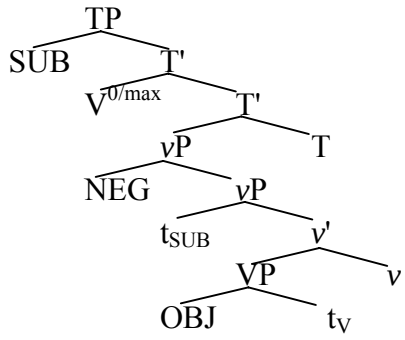
However, English and French diverge when sentential negation comes into play a role (see our earlier example in (1) and (3)). Suppose that NEG is a head and a maximal projection simultaneously (i.e. $NEG^{0/max}$) which is adjoined to *v*P, the smallest CFC. Then, the following

representations will obtain after V-raising takes place in each language.

(66) a. English



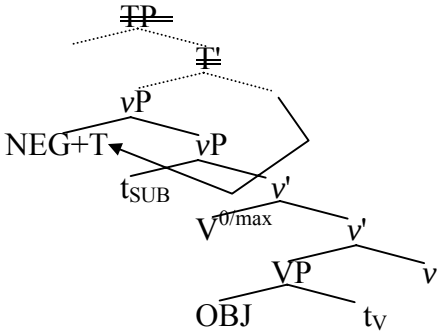
b. French



What happens in French is rather straightforward. T is adjoined to V either in the overt syntax or in PF exactly in the same way as in (64), and Linearization, applied successive counter-cyclically, yields the SUB-[V+T]-NEG-OBJ order as in (1)a, a favorable result.

On the other hand, what happens in English negative sentences is a little more complicated. At the second cycle from the top, as soon as Demerge erases T', T must be adjoined to NEG, but not V, because the former is the closest head from T, as shown in (67).

(67) English (Morphology in PF)



Since NEG is not an appropriate host to realize the verbal and agreement features of T, the [NEG+T] complex, as it is, may not yield a correct PF output. In such a case, we propose, the relevant features of T are discharged by fission in the sense of Halle and Marantz (1993). According to Halle and Marantz, fission is an operation that discharges a subset of features from one morphological head so that the discharged features and the residue will be spelled out in two separate vocabulary items. Suppose that the features of T, including tense, agreement and verbal features, are discharged from the [NEG+T] complex by fission, as in (68). Then, Vocabulary Insertion may target the discharged features of T and the residue of NEG separately, as in (69)a, b, respectively.[25]

(68) fission

[25] According to Choe (2006), the Korean preverbal ("short-from") negation is also the result of fission.

{T} {NEG} ⟵ [NEG+T]

(69) Vocabulary Insertion
a. /does/ ⟷ {[–past], [3S], [–N, +V], ...}
b. /not/ ⟷ {[+neg]}

Inasmuch as the English *do*-support can be conceived of this way, Linearization, applied to the negative sentence in English of the form in (67), eventually yields the correct surface constituent order, i.e., SUB-*does*-*not*-V-OBJ, as in (3)c.[26]

The purpose of this subsection is to make regression to English and French negative sentences. As we have seen, our analysis of verbal morphology in Japanese and Korean with recourse to Linearization is not orthogonal to the presence and absence of *do*-support in English and French negative sentences.

5. Further evidence

Our proposal that while the appropriate mechanism for verbal agglutination in Korean is head raising in PF, that in Japanese is the lowering effect of Linearization not only accounts for the PCC in the two languages, but it also receives an empirical support from some other facts of Japanese and Korean morphology.

5.1. Honorific suppletion in Korean

First, honorific suppletion in Korean seems to support our view that Korean opts for head raising. Korean has a productive honorific suffix *-(u)si*, which can generally be attached to verbs as well as adjectives, as exemplified in (70) and (71).

(70) a. ka-n -ta
go-pres-decl
b. ka-si -n -ta
go-hon-pres-decl
c. ka-ss -ta
go-past-decl
d. ka-si -ess -ta
go-hon-past-decl

(71) a. ilk -nun -ta
read-pres-decl
b. ilk -usi -n -ta
read-hon-pres-decl
c. ilk -ess -ta
read-past-decl
d. ilk -usi -ess -ta
read-hon-past-decl

However, some verbs take suppletive forms. For example, the past tense honorific forms of

[26] Our current approach to *do*-support in English does not instantly account for the noted asymmetry between *not* and other adverbs (see our earlier examples in (44) and (45)). This asymmetry led Bobaljik (1995) to stipulate that adverbs other than *not* are invisible to morphological merger. However, adverbs other than *not* may appear either much higher in the domain of TP or lower than V within the domain of *v*P. Indeed, Boskovic and Lasnik (2003) point out the possibility that adverbs other than *not* in English are base-generated higher than T. I would like to thank Yuji Takano for drawing my attention to Boskovic and Lasnik's work.

ca-ta 'to sleep' and *mek-ta* 'to eat' are *cwumwusi-ta* 'to sleep.hon' and *capswusi-ta* 'to eat.hon,' respectively, but not **ca-si-ta* or **mek-usi-ta*. This suppletive process affects neither tense nor the declarative ending, as shown by the parallelism in the functional domain between the regular cases in (70)–(71) and the suppletive cases in (72)–(73).[27]

(72) a. ca -n -ta
sleep-pres-decl

b. *ca -si -n -ta / cwumwusi-n -ta
sleep-hon-pres-decl / sleep.hon -pres-decl

c. ca -ss -ta
sleep-past-decl

d. *ca -si -ess -ta / cwumwusi-ess -ta
sleep-hon-past-decl / sleep.hon -past-decl

(73) a. mek-nun -ta
eat -pres-decl

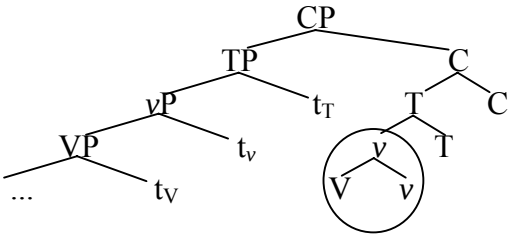
b. *mek-usi -n -ta / capswusi-n -ta
eat -hon-pres-decl / eat.hon -pres-decl

c. mek-ess -ta
eat -past-decl

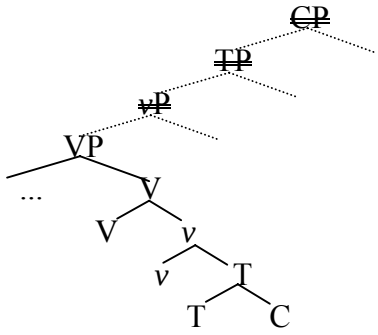
d. *mek-usi -ess -ta / capswusi-ess -ta
eat -hon-past-decl / eat.hon -past-decl

This indicates that this suppletive process only targets the verb stem (i.e. "root") and the honorific feature. Given that the relevant honorific feature resides in *v*, and only constituents can be targets of suppletion (or Vocabulary Insertion in the sense of Halle and Marantz 1993), V and *v* can form a constituent that excludes T and C only if the raising option is taken, as exhibited in (74).

(74) a. head raising



b. head "lowering"



The complex head formed by head raising includes a constituent that consists only of V+*v*, as shown in (74)a, but the complex head formed as the result of Linearization does not, as shown in (74)b. This can be taken that while the verb root (√V) suffixed with a [–honorific] *v* is spelled out as a non-honorific verb, the same verb root with a [+honorific] *v* as an honorific verb, as domonstrated in (75)a, b, respectively.

(75) a. $\sqrt{\text{eat}} + v_{[-\text{hon}]} \longleftrightarrow$ /mek/ (non-honorific verb)

[27] In Korean, the present and past tense suffixes exhibit allomorphism. The present tense suffix appears as *-nun* for consonant-stem verbs like *mek* 'eat,' but it appears as *-n* for vowel-stem verbs like *ca* 'sleep.' The choice of the theme vowel contained in the past tense suffix depends on the final vowel of the verb stem. If it is [a] or [o] ("light vowel"), the past tense suffix is *-ass*; however, if the vowel stem verb ends in [a], the suffix gets shortened to be *-ss*, as in (58)c. On the other hand, if the final vowel of the verb stem is anything else ("dark vowel"), the past tense suffix is *-ess*.

b. $\sqrt{eat} + v_{[+hon]} \longleftrightarrow$ /capswu/ (honorific suppletive verb)

This is a welcome result for our analysis of Korean verbal morphology.[28]

5.2 Adjectival suppletion in Japanese

Furthermore, our proposal sheds light on the fact of adjectival inflection in Japanese. Adjectives in Japanese exhibit a seemingly irregular paradigm with respect to tense inflection, as shown in (76) and (77).

(76) a. (yama -ga) taka-i
(mountain-nom) high-pres
'The mountain is high.'

b. (yama-ga) taka-katta
high-pst
'The mountain was high.'

(77) a. (michi-ga) hiro -i
(road-nom) wide-pres
'The road is wide.'

b. (michi-ga) hiro -katta
wide-pst
'The road was wide.'

It is rather transparent that the past tense ending *-katta* in (76)b and (77)b comes from three separate morphemes; i.e., *ku+ar+ta*, of which *-ku* is a functional ending for an adjective stem (presumably, the light adjective *a*, analogous to the light verb *v*, proposed by Takano 1996), *ar* is a be-verb, and *-ta* is past tense. Usually, replacing *-ta* with *-ru* provides the present tense form. However, the present ending of adjectives is *-i*, as shown in (76)a and (77)a, but not **-ku ar-(r)u*, which is impermissible under normal contexts.[29] However, when a particle like *-wa* is inserted to the right of an adjective stem, the expected three morphemes, *-ku*, *ar* and *-ru*, resurge, as shown in (78)b and (79)b.

(78) a. *taka-i -wa / *taka-wa-i

b. taka-ku-wa ar-ru

[28] For potentially problematic cases of honorific suppletion in Japanese, see Aoyagi (2006a: note 7).

[29] The expected chunk of morphemes *-ku ar-u* may appear in some very limited (mainly archaic or written) contexts even in Modern Japanese, as exemplified below ((i)b due to Saeko Urushibara (p.c.)).

(i) a. (kokorozasi-wa) taka-ku ar-u besi
ambition -top high-a be-pres should
'((One's) ambition) should be high.'

b. (kokorozasi-wa) taka-ku ar-u mai
ambition -top high-a be-pres might.not
'((One's) ambition) might not be high.'

As noted by Aoyagi (1998b), the non-suppletive present tense form of the adjective *taka* 'hight' is embedded under an archaic auxiliary in each case. As exhibited by its adnominal form *beki*, the deontic modal *besi* is in direct descent from Old Japanese spoken until circa the 15th century. Also, the negative prospective modal *mai* is the descendant of the Old Japanese auxiliary *mazi*. Thus it can safely be concluded that the expected chunk of morphemes for adjectives in the present tense is prohibited under normal contexts in the present-day spoken Japanese.

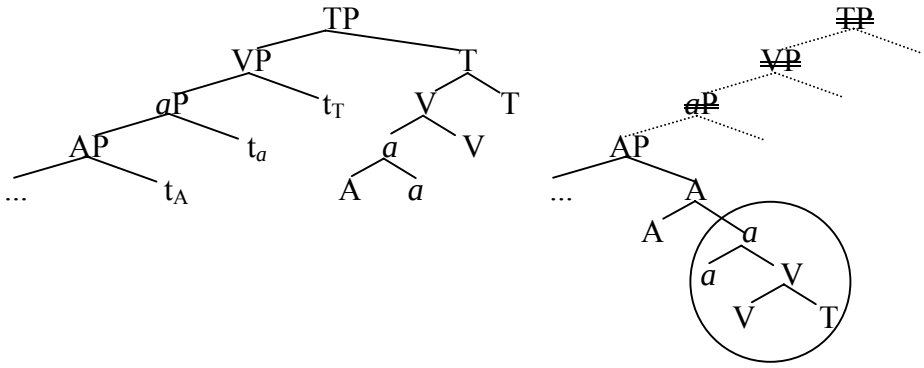
	high-pres-top / high-top-pres		high-ku-top be-pres
(79) a.	*hiro -i -wa / *hiro -wa -i	b.	hiro -ku-wa ar -ru
	wide-pres-top / wide-top-pres		wide-ku-top be-pres

This can be explained if we assume that the constituent that is composed *all and only* of *ku+ar+ru* '*a*+be+pres' can be replaced with *-i* by suppletion (or the relevant set of features is replaced with /i/ by Vocabulary Insertion in the sense of Halle and Marantz 1993), as indicated in (80).

(80) a. {ku, ar, ru} ⟷ /i/ (suppletion available)
b. {ku, wa, ar, ru} ⟷* /i/ (suppletion unavailable)

If adjectival inflection in Japanese is the result of head raising, the resultant complex headed by T necessarily includes the adjective stem, as shown in (81)a. There is no constituent that includes *ku+ar+ru* '*a*+be+pres' but excludes the adjective stem. This means that we need to posit as many rules of suppletion as the number of adjectives in the registry of Japanese; in other words, the rule of suppletion which replaces *hiro-ku ar-(r)u* with *hiro-i* 'wide-pres' should be separately set from that which replaces *taka-ku ar-(r)u* with *taka-i* 'high-pres'. This is an undesirable situation.

(81) a. head raising b. head "lowering"



On the other hand, if our proposal that Japanese does not employ head raising for agglutination is extended to adjectival inflection, the fact of adjectival suppletion can be accounted for straightfowardly. The complex head formed as the result of Linearization should look like the one in (81)b. The complex headed by the adjective stem in (81)b includes a constituent that includes *ku+ar+ru* '*a*+be+pres' but excludes the adjective stem (i.e., the upper segment of *a*). This makes it possible to posit a single rule that replaces a constituent with *-i*, irrespective of the adjective stem. To the extent that the current discussion is on the right track, our approach to Japanese verbal morphology is further supported by otherwise mysterious facts of adjectival inflection in this language.

6. Conclusion

In this article, we have argued that the discrepancy between Korean and Japanese verbal morphology, especially in predicate-contrastive constructions, results from the choice between options for verbal agglutination allowed in PF. Korean takes the raising option, whereas Japanese has recourse to the lowering effect of Linearization. This view receives further support from other morphological phenomena in the two languages, and it is not orthogonal to facts in typologically different languages like English and French.

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