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Sound Change and Grammaticalization in Japanese Verb Morphology
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Although Modern Japanese is agglutinative, and can have several suffixes attached to a verb, the possible combinations of suffixes are quite limited relative to older stages of the language. The purpose of this paper is to investigate reasons for the change from a more freely agglutinating system to the restricted system found in the modern language. The three factors considered are 1) opacity of the older morphological system due to sound change, 2) a tendency for suffixes to shift to a suffix type which can only appear at the end of the verb, and 3) new semantic overlaps created by grammaticalization of some suffixes.

Classical Japanese, by which I mean approximately 8th to 13th century Japanese, had a complex system of verbal morphology involving three types of suffixes. I will call the three types derivational, connecting, and *ba*-type suffixes. A verb root or a derivational suffix must be followed by one of the six connecting suffixes, and a verb root or derivational suffix plus a connecting suffix forms a stem. Derivational suffixes subcategorize for a particular stem before them, so a connecting suffix must occur between other morphemes of the verb. No verb root or connecting suffix can appear in the root form, since any following morpheme requires a particular stem to attach to, and the syntax of the sentence also requires a particular stem for the end of the verb. The possible arrangements of suffixes are shown in 1.

1. stem-connecting
stem-connecting-derivational-connecting
stem-connecting-derivational-connecting-derivational-connecting
stem-connecting-*ba*-type
stem-connecting-derivational-connecting-*ba* type

The *ba*-type suffixes (named after their most common member) behave like the derivational suffixes in that they require a particular stem (with connecting suffix) to their left, but they cannot be followed by a connecting suffix, and thus do not form the six stems that derivational suffixes do. Therefore, they can only appear at the end of a verb, since they cannot provide the appropriate stem for a further derivational suffix to attach to.

When connecting suffixes appear at the end of a verb, they serve as grammatical formatives. They mark the right edge of a major constituent, such as the main verb of the sentence or the verb of a relative clause. However, when connecting suffixes appear inside the verb, they have no grammatical meaning, and simply serve as the "glue" (Quinn, 1987) between the other morphemes. Examples of verbs with derivational suffixes are shown in 2. I have adopted Quinn's (1987) convention of writing connecting suffixes in capital letters.

2. todomar-I- tar- U
stop cont.-completive_{attr}.
"having stopped"
- (Hoojooki, 23)

ar-A- zar- I- ker-E- ba (McCullough 1988:7)
 be_{incompl.}-neg_{cont.}-past_{cond.}-provisional
 "since it was not"

In /todomaritaru/, the continuative stem, /todomar-i-/ is required by the derivational suffix /-tar-/. The attributive stem of the derivational suffix, /tar-u/, is used because this verb is in a relative clause. In /azararikereba/, the incomplete stem /ar-a-/ is required by the derivational suffix /-zar-/, the continuative stem /zar-i-/ is required by the derivational suffix /-ker-/, and the conditional stem /ker-e-/ is required by the *ba*-type suffix /-ba/. /-ba/ must be the end of the verb, since, as a *ba*-type suffix, it cannot be followed by a connecting suffix.

I refer to this system of verbal morphology as a "layering" system because a connecting suffix is "layered" between all the other morphemes of the verb. This system can be analyzed conveniently in a well articulated theory of stem morphology (such as in Aronoff (1994)), as has been done in the description above. This is very similar to the traditional, philological Japanese analysis, in which a verb plus its connecting suffix (here, a stem) is considered a unit, although one important motivation for using that analysis in Japan is that these verb stems can be written in the strictly CV Japanese orthography, while verb roots cannot. The preferred linguistic analysis of Modern Japanese makes the connecting suffix into part of the following derivational suffix, not a part of the preceding verb, but there are both formal and functional reasons (which will not be discussed here) against applying that analysis to Classical Japanese.

Classical Japanese had a large number of both derivational and *ba*-type suffixes, although membership in these groups changed over time. In *Hoojooki*, a Buddhist essay which was written in 1212 (the Kamakura Period), there are 15 different derivational suffixes and 5 *ba*-type suffixes. *Maryooshuu*, composed around the eighth century, uses approximately the same number, although several are different suffixes. Even though not every two suffixes could be combined in the same verb, there were many possible combinations yielding verbs with two or three derivational and/or *ba*-type suffixes. In this paper, I will present numerical data on suffix occurrences from several time periods. All of the numerical data is summarized in 3.

Hoojooki contains 483 verbs with at least one derivational or *ba*-type suffix, of which 44 have two suffixes and 4 have three. These 48 verbs can be divided into three categories: those ending with a *ba*-type suffix (exemplified in 4), those with the causative or passive as the first derivational suffix (shown in 5), and other combinations of two derivational suffixes (shown in 6). The reason for this classification will become clear when compared with Modern Japanese.

3. Number of occurrences of various combinations for different time periods	no. of verbs examined	total verbs with 2+ suffixes	no. ending in a <i>ba</i> -type suffix	no. with caus., pass., or potential (MJ) as first suffix	other combinations
time period	483	48	23	9	21
<i>Hoojooki</i> (1212)		(4 w/ 3 suffs.)			
Saikaku (17th century)	577	44	20	23	4
Modern Japanese	400	40	32	27	1

Numbers do not add up to the total because occurrences with both the passive or causative and a *ba*-type suffix are counted in both categories, and verbs with three suffixes are counted once for the first and second suffix and once for the second and third.

4. 2-suffix verbs ending in a *ba*-type suffix

sirA-nE-ba (Hoojooki, 30)
 know_{incompl.}-neg_{cond.}-provisional
 'since (we) did not know'
 miE-siKA-do (Hoojooki, 33)
 seem_{cont.}-past_{cond.}-concessive
 'even though it seemed'

5. 2-suffix verbs with passive or causative as the first suffix

kobotA-rE-tE (Hoojooki, 27)
 dismantle_{incompl.}-pass_{cont.}-assertive_{cont.}
 'were definitely dismantled'

yorokobA-simE-mU (Hoojooki, 38)
 rejoice_{incompl.}-caus_{incompl.}-conjecture_{concl.}
 'intend to cause to rejoice'

6. Other combinations

nI-tarI-kerU (Hoojooki, 23)
 resemble_{cont.}-completive_{cont.}-past_{attr.}
 'resembled'

sirE-rI-sI (Hoojooki, 24)
 know_{imp.}-completive_{cont.}-past_{attr.}
 'knew, came to know'

siri-nU-besi
(Hoojooki, 29)

know^{cont.}-assertive-compl.-potential-concl.
'can certainly know'

/-zarI-kI/
/zarI-kerI/
/nI-kI/
/nI-kerI/
/tarI-tU/
/tU-besi/
neg.-past
neg.-storytelling past
assertive-past
assertive-storytelling past
completive-assertive
assertive-potential

In *Hoojooki*, 9 verbs with two or more suffixes use the causative or passive (the category in 5), 23 end in a *ba*-type suffix (the category in 4), and 21 have other combinations (the category in 6). The data in 6 shows that, at the time of *Hoojooki*, there were many possible combinations of suffixes which neither end with a *ba*-type suffix nor contain the causative or passive.

In *Maryooshuu*, which is quite long and therefore contains more suffixed verbs, there are many more possibilities for the "other combinations" category. These combinations are shown in 7.

7. Additional "other combinations" in *Maryooshuu*

/-tE-kI/
assertive-past
/tE-kemU/
assertive-past conjecture
/tE-mU/
assertive-conjecture
/tE-masI/
assertive-conjecture
/tE-kerI/
assertive-storytelling past
/zU-tU/
negative-assertive
/zU-kI/
negative-past
/zU-kemU/
negative-past conjecture
/zU-kerI/
negative-storytelling past
/zarA-mU/
negative-conjecture
/zarA-masI/
negative-conjecture
/tarE-rI/
completive-completive
/tarI-kI/
completive-past
/tarA-mU/
completive-conjecture
/rI-kemU/
completive-past conjecture
/rI-kerI/
completive-storytelling past
/rA-mU/
completive-conjecture
/rA-masI/
completive-conjecture
/kerA-zU/
storytelling past-negative

Some of these combinations might have occurred in the later *Hoojooki* if the text had been longer, others were probably not possible by that time. For example, in *Hoojooki* /-zU/ (negative) combines only with the passive or the *ba*-type suffixes

/-ba, -do/, and there is no reason to believe it could appear with anything else. The combinations /-kerA-zU/ and /-zU-kerI/, which occur in *Maryooshuu* (Yokoyama 1950), were not possible in *Genji Monogatari* (written two centuries after *Maryooshuu*), although *Genji* also provides a very large corpus. However, it is clear that a great variety of suffix combinations in the "other combinations" category were possible at the time of *Maryooshuu*, and many of them were still available in *Hoojooki* four centuries later.

Turning to Modern Japanese, we find a very different system of verbal morphology. The layering system is nearly or completely gone. Most linguistic analyses of Modern Japanese inflection (Vance 1987:184, 189) make what is left of the old word-internal connecting suffixes into part of the following derivational suffix, with the vowel dropped after a vowel-final verb stem. Simplifications of the Classical paradigm have removed the obstacles which made it difficult to accept this analysis for Classical Japanese.

Modern Japanese is also quite different from Classical in the way it combines multiple suffixes. Verbs with multiple suffixes are still possible in Modern Japanese, as in 8-10, and it is still known as an agglutinative language.

8. ik-ase-rare-mas-ita
go-caus.-pass.-polite-past
'was caused to go'
9. i-rare-nakat-ta
be-potential-neg.-past
'could not be'
10. donar-are-te
shout-pass.-gerund
'was shouted at and'
- (Umeda et al, 1987:113)
- (Umeda et al, 1987:113)

However, the number of possible suffix combinations has decreased greatly. Classical Japanese had multiple-suffix verbs in three categories: those ending in a *ba*-type suffix, those with the causative or passive as the first suffix, but also those with a variety of other combinations. In Modern Japanese, almost all verbs fall into the first two categories: they either end with a *ba*-type suffix or have the causative, passive, or potential as their first suffix. (The potential developed out of the passive, and thus is included in this group for Modern Japanese.)

For Modern Japanese, I collected 400 verbs with at least one suffix from three sources, the novel *Tugumi* (Yoshimoto, 1992) and two essays from a Japanese high school textbook (Umeda et al, 1987). 39 verbs had two suffixes, one had three suffixes. 32 ended with a *ba*-type suffix, usually either /-te/ or /-ta/. 27 verbs used the causative, potential, or passive, as in 10 and 11. (Numerical data is summarized in 3 above.)

11. ik-e-nai
sir-e-nai
go-potential-neg.
know-potential-neg.
'can't go'
'can't know'
- (Umeda et al, 1987:87)
- (Umeda et al, 1987:87)

Only one verb occurrence, shown in 12, falls into the "other combinations" category.

12. s-ita-garu do-desider.-GARU 'wants to do (3rd pers.)'
(Umeda et al, 1987:114)

/-garu/ is a suffix which indicates emotions of someone other than the speaker, and can follow only the desiderative suffix, as here, or a small class of adjectives of emotion. The one verb with three suffixes, shown in 9, contains both the potential and a *ba*-type suffix.

This data confirms that verbs with two suffixes in Modern Japanese almost always either end in a *ba*-type suffix or have the potential, passive, or causative as the first suffix. The wide variety of other combinations which were possible in Classical Japanese (those shown in 6 and 7) are almost completely gone. In Modern Japanese, the number of combinable suffixes has been so far reduced that among 400 suffixed verbs, the only one which does not fit into the two categories described above is the rather unproductive pattern /-ta-garu/ in 12. Thus, it is not that Modern Japanese is not agglutinative, but that the possibilities for agglutination have been severely restricted.

In order to include a stage between Classical and Modern Japanese, I collected 577 verbs with at least one derivational or *ba*-type suffix from two seventeenth century texts, both by Ihara Saikaku. I chose stories which described events contemporary to the time the stories were written, hoping that descriptions of contemporary events would use less archaic language than descriptions of events that happened several centuries earlier. 44 verbs had two or more suffixes, of which 23 involved the causative or passive as the first suffix, and 20 ended in a *ba*-type suffix. This data is again summarized in 3 above. In the "other combinations" category, there are only four verbs, those shown in 13.

13. Suffix combinations in the "other combinations" category in seventeenth century data (one occurrence of each)

/-tarA-zU/	completive-negative
/-nU-bekI/	assertive-conjecture
/-zarI-sI/	negative-past
/-rE-tE-kerI/	passive-assertive-storytelling past

In *Hoojooki*, which is a somewhat smaller corpus, there are 21 occurrences of combinations like these. The fact that combinations outside of the two categories possible for Modern Japanese occur only four times in the seventeenth century corpus shows that combinations of suffixes had been considerably restricted by this time.

Now I would like to discuss possible reasons for the change between the Classical and Modern Japanese systems, especially for the restriction of suffix combinability. I believe there are three inter-related factors which were involved: 1) re-analysis of the morphological system due to the *onbin* sound changes, 2) a shift of several previously derivational suffixes to *ba*-type suffixes, and 3) grammaticalization of the derivational suffixes.

Shortly after the time of *Hoojooki*, the last Classical Japanese data examined, a group of sound changes called *onbin* took place. The term *onbin* is actually a "catch-all category" (Martin 1987:125), including several changes of syncope, elision, and crasis, which Martin says were caused partly by loss of juncture (1987:37-38, 125). The four traditional types of *onbin* are 1) elision of /k/ or /g/, as /naki-te>/nai-te/ 'cry-TE'; 2) elision and crasis of /VCi/ to /u/, as /omohi-te>/omou-te/ 'think-TE'; 3) development of the mora nasal, as /yobi-te>/yon-de/ 'read-TE'; and 4) simplification to geminates, as /kati-te>/kat-te/ 'win-TE' (all examples from McCullough (1988:76-78)). I will use the term *onbin* in its traditional sense as a cover term for the changes which affected the verb paradigms, especially before certain suffixes such as /-tarI/ and /-tU/, as shown in 14. (The pre-*onbin* forms are actually Kyoto dialect, while the Modern standard forms are Tokyo dialect, but modern Kyoto dialect shows equivalent changes.)

14. Effects of *onbin* before the suffix /-ta/ (</-tarI/)

pre- <i>onbin</i> form	Modern form	gloss
sak-I-tar-I	sai-ta	'bloomed'
oyog-I-tar-I	oyoi-da	'swam'
kaw-I-tar-I	kat-ta	'bought'
os-I-tar-I	osi-ta	'pushed'
nor-I-tar-I	not-ta	'rode'
tob-I-tar-I	ton-da	'flew'
nom-I-tar-I	nom-da	'drank'
sin-I-tar-I	sin-da	'died'
m-I-tar-I	mi-ta	'saw'
tab-E-tar-I	tabe-ta	'ate'
root-cont.-tar-concl.	stem -ta	

Before *onbin*, all of these verb forms consisted of the continuative stem (/sak-i-, oyog-i-/ etc.) plus the conclusive stem /-tar-i/ of the suffix /tar-/ (the use of the conclusive stem for the final suffix of the verb is arbitrary, chosen here because the conclusive is the citation form for inflecting Japanese words). The continuative stem itself consisted of a verb root and the vowel of the continuative, which looks much like a theme vowel, since it also shows which conjugation class the verb belongs to. The vowel of the continuative was clearly segmentable from the verb root, and all verbs formed their continuative stems by adding a vowel to their root.

In Modern Japanese, the suffix /-ta/ still attaches to a stem of the verb (/sai-, oyoi-, kat-/ etc.), which could perhaps be called the T-stem, since it is used for the suffixes /-ta-, -te-, -tari/. However, this unanalyzable stem cannot be segmented into the verb root and a stem-forming suffix, the form of the T-stem varies widely among different verbs, and there are no connecting suffixes. Sound changes often make paradigms opaque, and the *onbin* made the old connecting suffixes opaque, since the changes left no visible connecting suffix in many forms, such as /kat-ta-, ton-da/, etc. This loss of connecting suffixes brought about a re-analysis from the old layered morphology, in which continuative and other stems were analyzable, to the Modern system, with its unanalyzable stems. That is, *onbin* caused the loss of the layering system.

I believe this weakening of the layering system was one factor in the restriction of suffix combinations, as well. Before *onbin*, each verb and each derivational suffix could appear in any of the six stems, and the following derivational suffix determined which stem was used. The six stems were formed in almost the same way for any verb, with differences based on conjugation class. All of the derivational suffixes followed the same rules for attaching to a preceding verb, and also for allowing another derivational suffix to follow them. After *onbin*, those six stems did not exist anymore, and different verbs which had belonged to the same conjugation class formed their new stems in different ways, depending on the final consonant of the root. After the *onbin*, different derivational suffixes attached to a wide variety of verb stem allomorphs, and some suffixes even attached to the bare verb stem, as in 15.

15. ik-oo go-hortative 'let's go'

This was not possible in Classical Japanese, and shows the extent to which the layering system had been lost. Recursive suffixation depended on the fact that each derivational suffix required a particular stem before it, and could appear in any of the stem forms itself. Although all verbs acquired a new stem, the T-stem, through re-analysis, many of the derivational suffixes did not acquire this new stem. This meant that other derivational suffixes which might require that stem could not follow them, and therefore that some previously possible suffix combinations were ruled out.

The second factor which helped restrict the combinability of suffixes was a shift in suffix types: several suffixes which were derivational in Classical Japanese, and therefore could potentially be followed by another suffix, became *ba*-type suffixes in Modern Japanese. *Ba*-type suffixes are defined by having just one invariant form; they lack the six stems of derivational suffixes. This means they cannot be followed by any other suffix, so the tendency of derivational suffixes to become *ba*-type naturally limited the number of possible combinations. For example, the derivational /-t-U/ could be followed by any of the connecting suffixes in Classical Japanese, forming a full paradigm of stems, as shown in 16. Its stems could also be followed by other derivational suffixes, as in the combination /-tU-besI/.

16. Change of suffixes to *ba*-type

Classical Japanese paradigm for suffix /-tU/ (assertive, completive)	Surviving Modern form (gerund)
incompletive	-tE
continuative	-tE
conclusive	-tU
attributive	-tURU
conditional	-tURE
imperative	-tE

In Modern Japanese, however, it survives as /-te/, which has no other forms, and occurs only at the end of a word. Thus, /-te/ is now a *ba*-type suffix. The Modern

ba-type suffixes /-ta/ (past), /-tari/ (alternative action), /-zu/ (archaic negative), /-beki/ (obligation), and /-oo/ (hortative) also developed from older derivational suffixes. All of these suffixes appear in Classical Japanese in a variety of stems and with other derivational or *ba*-type suffixes following them, but in Modern Japanese have only one form and can occur only at the end of a verb. This clearly had an effect on the number of possible suffix combinations.

This loss of a paradigm and simplification to one invariant form is another case of re-analysis, since Classical forms like /-bek-I/ and /-tar-I/ consisted of a suffix root plus a connecting suffix, while the segmentally identical Modern forms are unanalyzable. This change may be related to *onbin*, even though the *onbin* sound changes had no effect on the forms /-beki/ and /-tari/ themselves: *onbin* caused the loss of some connecting suffix vowels, as discussed above, and the remaining medial connecting suffixes were re-analyzed as part of the following suffix, no longer an entity of their own. This may have encouraged the re-analysis of /-bek-I/ to /-beki/. The development of the new *ba*-type suffix /-oo/ is more directly related to *onbin*, since the sound changes produced it from the old derivational sequence /-a-mu/.

One might think that the conversion of derivational suffixes to *ba*-type, along with the outright loss of several Classical suffixes, would completely account for the lesser combinability of suffixes in Modern Japanese. However, the data from the seventeenth century shows that this factor is not the only one involved. At that stage, suffixes such as /-zarI, -nU, -tU, -tarI, -kerI, -rI/, which could combine with each other in Classical Japanese (the "other combinations" category), were still in frequent use, but rarely combined with each other. These suffixes had not been converted to *ba*-type suffixes, since they could still be followed by *ba*-type suffixes themselves, as in the attested combinations listed in 17.

17. Suffixes followed by a *ba*-type suffix in 17th century Japanese
- | | |
|------------|-------------------------------|
| /-zarE-ba/ | negative-provisional |
| /-nurE-ba/ | assertive-provisional |
| /-nurE-do/ | assertive-concessive |
| /-kerE-ba/ | storytelling past-provisional |
| /-tarE-ba/ | completive-provisional |

However, the ability of these suffixes to combine with each other had already been severely restricted by the seventeenth century, as is shown by the fact that only four verbs in the corpus fell into the "other combinations" category, as in 13 above. This shows that conversion of derivational suffixes to *ba*-type is not the only reason for the restriction of agglutination.

The third reason for the restriction on combination of suffixes involves grammaticalization. The Modern past tense suffix, /-ta/, is a reduction of the Classical suffix /-tari/, which meant "completion of an act or process," "continuation of the result of a completed act or state," or "continuation of an act or state" (McCullough, 1988:13). The change from a complex meaning of continuation or completion, /-tari/, to a relatively clear-cut past tense marker, /-ta/ (Yoshida, 1971:226), is a case of grammaticalization, since past tense is a more grammatical morpheme. Other characteristics of grammaticalization (Bybee et al.,

1994:8, 20), such as phonological reduction and more fusional morphology (as demonstrated in 14 above, again related to *omhin*), are also present.

Classical /-tarI/ itself developed from an older form /-E arI/, the continuative stem of the suffix /-tU/ followed by the verb "to exist" (Yoshida, 1973:602).

18. -tE arI > -tarI > -ta
 assertive be > completive > past

This development fits very well in the verbal grammaticalization cline:

19. full verb > auxiliary > clitic > affix (Hopper and Traugott, 1993:108)
 arI tE arI -tarI, -ta

(Heine and Reh mention the difficulty of establishing a stage of cliticization separate from affixation in many non-Indo-European languages (1984:33-34), and this seems to be the case here as well.) The development from /-tE arI/ through /-tarI/ to /-ta/ matches what Bybee et al (1994:105) and Heine and Reh (1984:130) found for the origins of past tense morphemes in many languages. Starting with a verb meaning 'be,' /arI/, the meaning becomes resultative, as in the meaning 'continuation of the result of an act or state.' It finally becomes simply past, as in /-ta/.

In Classical Japanese, there were five suffixes with meanings such as completive, continuative, assertive, or perfective: /-tU, -tarI, -rI, -kI, -kerI/. These suffixes all had distinct semantics (McCullough, 1988:12-16), and most of them could be combined with each other, as discussed above. However, as /-tarI/ was grammaticalized to the simpler meaning of "past," it would have developed new semantic overlaps with other suffixes. Yoshida mentions it possibly expanding to cover the meanings of the others (1971:226). Classical Japanese did not allow combination of suffixes when there was too much semantic overlap, as shown for example by the failure of /-ki/ and /-kerI/, both of which usually indicate a past event, to appear together. The increasing semantic generality of /-ta/ must have reduced the number of possible suffix combinations. This is consistent with Bybee's finding (1994:8) that during grammaticalization, a morpheme undergoes semantic generalization and replaces other members of its class. Some other members of its class are often lost, as /-rI, -kI, -kerI/ have been lost in this case. Thus, grammaticalization of /-tarI/ helped restrict the possible combinations of suffixes by creating new semantic overlaps between /-ta/ and other suffixes.

In conclusion, Classical Japanese allowed more productive combination of its suffixes than Modern Japanese does. While verbs with two suffixes in Modern Japanese almost always either end in a *ba*-type suffix or use the passive, causative, or potential, Classical Japanese also had a large group of other suffix combinations. I have discussed three reasons for this reduction in productivity of agglutination: 1) sound changes made the layered morphology of Classical Japanese opaque and left some suffixes without the necessary stems; 2) several derivational suffixes became *ba*-type suffixes, and thus could not be followed by other suffixes anymore; and 3) grammaticalization of suffixes created new semantic overlaps, and rendered some previously used combinations impossible.

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