Bimoraic Compensation of Monomoraic Words in Japanese

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0. In the recent studies in Japanese phonology and morphology, the existence of a bimoraic foot has been widely discussed. Pöser (1990) among others extensively describes foot-based phenomena and argues for the existence of a metrical foot in Japanese.

One of the peculiar things in Japanese phonology and morphology is that although such a bimoraic foot constitutes a minimal word required in the prosodic structure, the language has an abundant stock of monomoraic words. Almost every monosyllable, which is orthographically represented in one Kana letter, coincides with one or more meaningful words which are able to stand alone as simplex words. ¹ (1) shows some examples.

(1) i 'stomach'     ne 'root'
e 'picture'      ha 'leaf'
ka 'mosquito'    hi 'fire'
ki 'tree, wood'  he 'fart'
ke 'hair'        mi 'fruit'
su 'nest'        me 'eye'
ta 'rice field'  ya 'arrow'
ti 'blood'       yu 'hot water'
te 'hand'        wa 'ring'

It seems to be the case that the prosodic structure of the majority of root words or root morphemes in a language conforms to the prosodic minimal word. Thus in Tagalog, for example, whose minimal word structure is CVCVC, the majority of root words are disyllabic. All of the native monosyllabic words are function words. They behave as enclitics; that is, they must be prosodically attached to a larger word.²

In Japanese, there are several types of monomoraic morphemes: case particles, stems for conjugating words, verb endings, Sino-Japanese roots, and stand-alone words, and so forth. All except the last are bound-morphemes; therefore, they are constructed into appropriate prosodic structures in the course of derivation. Being free-morphemes, stand-alone monomoraic words need a special treatment so that they are properly put into a bimoraic foot. Japanese needs a mechanism which compensates for the monomoraicity.
In this article, I will investigate the nature of the mechanism and demonstrate that it is a type of prosodic compensation. It might be simply called Bimoraic Compensatory Lengthening, because, in one case, the vowel of a monomoraic word is lengthened. However, there are other cases in which the compensation operates in a form other than lengthening. Thus, I use a more general term, Bimoraic Compensation so that the term may cover the entire phenomenon.

1. Compensation in a Deletion Cite

First, observe the following sentences in Tokyo dialect.

(2) a. Ki-o kitte (kudasai).  'Cut the wood, (please).'
   b. Ki kitte.  'Cut the wood.'

Omission of the case particle -o is permitted as in (2b) in colloquial speech. A careful observation of the normal utterance of (2b) reveals that the actual pronunciation sounds either (3a) or (3b); the monomoraic word ki is either prolonged or followed by a geminate. If the following word is vowel initial as in (4a,b), a glottal stop is inserted. (5) represents an actual pronunciation for (4b).

(3) a. [ki[i kitte]
   b. [k[i kitte]
   c. [k[i kitte]

(4) a. To-o akete (kudasai).
   b. To akete.
   'Open the door, (please).'
   'Open the door.'

(5) [toʔ akete]
   'Open the door.'

(3a,b) and (5) are the result of what I claim to be the bimoraic compensation; that is, a compensation for a flaw in the bimoraic foot structure.

1.1 Association of a Stranded Mora

In the following I will explain how the compensation operates. (6) is a representation of the prosodic structure for (2a), where the case particle -o appears under the second mora (µ) from the left. In this structure, -o contributes to the formation of a bimoraic foot.

(6)

\[
\begin{array}{c}
\text{Wd} \\
\sigma \sigma \\
\mu \mu \mu \\
\text{k i o \ k i t e (kudasai) = [k-i-o \ kitte (kudasai)](2a)}
\end{array}
\]
In the utterance where the case particle is omitted, the second mora, which has hitherto constituted a bimoraic foot together with the first mora, is stranded as in (7). This is the cite where the bimoraic compensation operates.

(7)

\[
\begin{array}{c}
\sigma \\
\mu \mu \\
\mu \mu \\
ki k i t e
\end{array}
\]

One of the important insights of the current prosodic theory is that the moraic structure is stable under deletion of a melodic unit. Rather than disappearing with the deleted melodic unit, moraic units stay there but remain stranded. (See Hayes (1989) and Perlmutter (1995) for compensatory lengthening and an argument for the moraic representation.) One of the prosodic strategies for salvaging a stranded mora is an association of the mora to a remaining melodic unit. In other words, this is a prosodic principle which maintains the stability of the moraic structure. (8) is an informal statement of the principle.

(8) Associate a stranded mora (\(\mu\)) to a melodic unit.

As is generally assumed in prosodic literature as a well-formedness condition, association lines should not cross each other. As a result, in the current case, the melodic unit available for the stranded mora in (7) to associate to is either the preceding vowel or the following consonant, that is, one of the neighboring melodic units. The result of the association by (8) are (9a) and (9b). These are well-formed structures.

(9) a. Associate to the left (vowel)  b. Associate to the right (consonant)

\[
\begin{array}{c}
\sigma \\
\mu \mu \\
\mu \mu \\
ki k i t e = [ki k ite] (3a)
\end{array}
\]

In (9a), the first vowel from the left [i] dominated by two mora (\(\mu\)) symbols represents a long vowel. In (9b), the second consonant [k] (originally a part of the verb stem) dominated by two mora symbols represents a geminate.

—— 29 ——  (282)
1.2 Glottal Epenthesis

Another prosodic strategy for salvaging a stranded mora is inserting a new melodic unit by an epenthesis. The glottal epenthesis accounts for the case in (5). [toʔ akete](‘Open the door.’). (10) shows the process.

(10) a. 

\[
\begin{array}{c}
Wd \\
\sigma \sigma \sigma \\
\mu \mu \mu \\
t o \ a k e t e
\end{array}
\]

\[
\xrightarrow{\text{Glottal Epenthesis}}
\]

\[
\begin{array}{c}
Wd \\
\sigma \sigma \sigma \\
\mu \mu \mu \\
t o \ a k e t e
\end{array}
\]

b.

I will note that the glottal epenthesis is common in languages whose syllable structure is C_VCVCVC. Since the onset of a syllable is always required, a VV sequence, which might eventually rise with suffixation, must be dissolved by inserting a consonant between the vowels. A glottal stop is the typical consonant to be inserted. (For example, Ilocano is such a language. See Hayes and Abad[1989]). Japanese is not such a language, however. Because the language permits a VV sequence, a restriction on the syllable structure is not a triggering factor of glottal epenthesis. Rather, a restriction on the alignment of moras, namely the bimoraicity, triggers glottal epenthesis. In Japanese, the glottal epenthesis fills an empty mora slot so as to complete a bimoraic foot. One of the common aspects of the operation of the glottal epenthesis in Ilocano and in Japanese is that the glottal epenthesis plays the role of correcting an illicit structure. The difference lies in that it operates on different levels of the prosodic structure.

One might claim that the glottal stop in (5)(=10b) is an instance of a phrasal pause instead of being a material used for compensation. Examples in (11), however, falsifies this claim.  

(11) a.*[to-oʔ akete] ‘Open the door.’
b.*[kido-oʔ akete] ‘Open the wooden door.’
c.*[kidoʔ akete] ‘Open the wooden door.’

If the inserted glottal stop were an instance of a phrasal pause, it would be able to appear after any phrase regardless of the mora count of the word or the phrase preceding the glottal stop, but this does not seem to be the case. A common characteristic observed in the examples in (11) is that the words or the phrases preceding the glottal stop are not monomoraic. It appears that a glottal stop is permitted only after a monomoraic word. In other words, the glottal epenthesis is mora-count sensitive. It does not work for creating phrasal pauses but for the maintenance of the moraic structure.

(281) — 30 —
1.3 Alternation of Association Strategy and Epenthesis Strategy

Let us look at the alternative application of the association strategy (8) and the glottal epenthesis strategy (10). We have seen that the glottal epenthesis accounts for the compensation of a stranded mora which is followed by a vowel initial word. What will happen if it applies to a stranded mora followed by a consonant initial word such as (7), repeated here as (12a)?

(12) a. Wd
\[ \sigma \sigma \sigma \mu \mu \mu \mu \mu \]
\[
\text{k i k i t e}
\]

b. *Wd
\[ \sigma \sigma \sigma \mu \mu \mu \mu \mu \]
\[
\text{k i \_ k i t e}
\]

The glottal epenthesis would create structure (12b). This is ill-formed because it does not conform with the syllable structure of Japanese, which permits no CC cluster except for a geminate obstructed and a moraic nasal followed by a consonant. Consequently, there is no case of glottal insertion if a monomoraic word is followed by a consonant initial word. (3a, b) are the only cases.

Conversely, what will happen if the association strategy applies to (10a)? This will create (13a) and (13b). (13a) has no problem per se; [too akete] is acceptable as (13b) [kiikite] is.

(13) a. Associate to the left

\[ Wd \]
\[ \sigma \sigma \sigma \mu \mu \mu \mu \mu \]
\[
\text{to a kete} = \text{[too akete]}
\]

b. Associate to the right

\[ *Wd \]
\[ \sigma \sigma \sigma \mu \mu \mu \mu \mu \]
\[
\text{to a kete} = *\text{[to a akete]}
\]

In (13b), the vowel [a] is dominated by two mora (\( \mu \)) symbols which are further dominated by separate syllable(\( \sigma \)) symbols. This is a contradictory structure, because only vowel segment is serving as a nucleus of two syllables. (13b) is ill-formed for this reason. (14) constrains the association of a stranded mora to the vowel in the left.

(14) If X is a vowel, the structure below is prohibited.7

\[ *\sigma \sigma \mu \mu \]
\[ X \]

---

(296)
(14) follows from the monosyllabicity of a long vowel, which means that a vowel segment dominated by two moras is a long vowel and that a long vowel is considered as monosyllabic; that is, a long vowel must be dominated by one syllable symbol. In this respect, vowels are different from consonants: the latter may be long (geminate) and may be dominated by two different syllable symbols.

To summarize the above sections, a stranded mora is compensated either by association or by epenthesis, and a condition on the syllable structure and a condition on a long vowel (monosyllabicity) restrict the possibility of compensation.

2. Compensation in Morphology

In this section I will show that the same mechanism operates in morphological processes.

2.1 Hypocoristic Formation

(15) shows a characteristic of a type of Japanese hypocoristics with a suffix -tyan.

(15) The stem real name sayuri
   a. sayu-tyan
   b. saa-tyan
   c. sat-tyan
   d. *sa-tyan

Poser (1990) points out that -tyan hypocoristics formation is to be characterized not by the number of melodic units copied from the stem real name but by the number of moras which come before the hypocoristic suffix -tyan. The prosodic structure of each example is shown as (16a,b,c,d).

The stem sayu- of (15a) is a two-mora copy of the real name. Since it satisfies the bimoraic requirement as it is, it needs no compensation. (15b, c,d) are of our special interest here. In these examples, only the initial CV segment of the real name is used as the stem. Since this CV material is originally monomoraic, it must expand into a bimoraic foot by some means; otherwise, it will turn out to be ill-formed as in (16d). Principle (8) operates here. Thus as in (16b), the would-be stranded second mora is linked to the left (to the vowel of sa-), and in (16c) the would-be stranded second mora is linked to the right (to the consonant of -tyan), eventually forming a geminate. (The dotted association lines indicate these.)

\[
\begin{align*}
(16) & \quad a. & \quad b. \\
Wd & \quad \sigma & \quad Wd \\
\sigma & \quad \sigma & \quad \sigma \\
\mu & \quad \mu & \quad \mu \\
\mu & \quad \mu & \quad \mu \\
\text{sayutyan} & \quad=\text{sayu-tyan} & \quad(15a) \\
\text{satyyan} & \quad=\text{saa-tyan} & \quad(15b)
\end{align*}
\]
Notice that the expanded parts in (16b, c) look exactly like those in (9a,b). The stranded mora in (16d) explains the ill-formedness. In these cases, a bimoraic foot is acting as a template in the derivation and the template compensates the monomoraic copies exactly in the same way as in the cases of the case particle deletion.

### 2.2 Reduplication of a Monomoraic Verb Stem

An adjunct clause expressing a repetitive and simultaneous action with the action denoted by the main verb is created by a reduplication of the verb in Renyokukei form. Examples are in (17). The main verbs are in parentheses:

(17) a. naki-naki (ku eru)    ('go home) crying'
    b. tabe-tabe (aru ku)    ('walk) eating'
    c. utai-utai (aru ku)    ('walk) singing'
    d. yorokobi-yorokobi (taberu)    ('eat) rejoicing'

As has been already pointed out in Poser (1990), if the renyokukei form consists of only one mora, the vowel is lengthened into two moras and this lengthened form is reduplicated as in (18).

(18) BASE       REDUPLICATED FORM
    a. si- (<suru 'do')    sii-sii
    b. mi- (<mi-ru 'see')  mii-mii

(19) a. Sippai-o sii-sii (ookikunaru).
    (Grow up) making mistakes.
    b. Terebi-o mii-mii (sigoto-o suru).
    (Do work) watching TV.

This is another case of bimoraic compensation. (20) shows the process in which the association strategy converts a monomoraic stem into a bimoraic stem.

(20)
2.3 A Musician's Secret Language

The bimoraic compensation naturally accounts for one of the problematic cases of the formation of a secret language used by Japanese musicians, which is known as zuijya-go in Japanese. The following are examples of the secret language.

(21) BASE SECRET FORM
a. Quadrimalric
   Yamaguti Guti-yama (a family name)
   koohii hii-koo 'coffee'

b. Trimoraic
   nioi oii-nii 'smell'
   onma naa-on 'woman'

c. Bimoraic
   kane nee-kaa 'money'
   mesi sii-mee 'meal'
   hai ii-haa 'lung'
   kii il-kii 'key'
   pan nn-paa 'bread'

d. Monomoraic
   hi ii-hii 'fire'
   he ee-hee 'fart'

In recent literature, Tateishi (1989) most extensively describes the musician's secret language and gives a persuasive analysis in prosodic terms. In the creation of a secret form, the base form is transposed into a template which consists of two bimoraic foot. According to Tateishi's analysis, this secret language formation copies on the first of the two bimoraic foot "the largest right most constituent which does not cover the whole string of the base" (Tateishi 1989:387): the rightmost maximal branch unit. The melodies left behind are copied on the second bimoraic foot. In the examples below the largest rightmost constituents in question are encircled. Thus in (22c) [L[sii]] is transposed onto the first bimoraic foot creating [sii], and [L[mee]] is transposed onto the second bimoraic foot creating [mee]. These together make [sii-mee].

(22) a. 

| W 
| σ | μ | μ | μ |
|   |   | μ | μ |
| i | h | i |

→ hii-koo

b. 

| W 
| σ | μ |
|   |   |
| i | o |

→ oii-nii

(277) — 34 —
One of the problematic cases involves the words in (21d), the case involving a monomoraic word. As we see in the left-hand structure in (23), it is not possible to identify the largest (rightmost) constituent which does not cover the whole string; both $\alpha$ and $\mu$ cover the whole word. Even if we were to regard $\alpha$ or $\mu$ as the constituent to be copied, neglecting the proviso in maximality and branching, and force the process to proceed, we would not get the right form [ihiii] from [hi], but we would get the wrong form [hihiii]. There still remains the question of why the process does not copy the onset of the base.\(^{10}\)

My proposal for the solution to the problem is that [hi] undergoes the bimoraic compensation proposed above before going into the secret language formation. It will create a right-hand structure in (23). The encircled mora ($\mu$) symbol is eligible for the transposition, being the largest rightmost constituent which does not cover the whole string. Since the encircled $\mu$ does not dominate the onset [h], this analysis readily accounts for why the onset is not copied on the first bimoraic foot.

This analysis conforms with one of the important claims of the prosodic morphology: that is, the material which undergoes a prosodic process is a prosodic constituent, not a melodic segment.

In morphology, the material used in morphological processes consists of the items in the phonemic inventory of the language. In Japanese, only the moraic nasal and the moraic obstruent are listed as the moraic consonants in the phonemic inventory. As we have seen in section 1.2, the glottal epanthesis creates a moraic glottal stop. This moraic glottal stop is permitted only in low-level phonology such as the case of the deletion of a case particle, but it is not permitted in morphology.

3. Child Language Acquisition

In the early stage of child language acquisition, children tend to compensate a monomoraic
words with an extra mora. Forms in (24) are often observed.

(24) COMPENSATED
FORM
kaga
kani
kega

(25) ORIGINAL
FORM
ka
ka
ke
'mosquito'
'mosquito'
'hair'

The source of these forms seems to be adult sentences like those below. It is apparent that the items used for compensation are case particles: -ga, -ni.

a. Ka-ga iru.
   'Here is a mosquito.'
b. Ka-ni sasareta.
   '(I) was bitten by a mosquito.'
c. Ke-ga (huku-ni) tuiteiru.
   'A piece of hair is stuck (on your clothes).'

One might theorize this as children’s acquiring a monomoraic word together with a case particle attached to the word as if it were a suffix. However, there are two reasons which falsify this theory.

First, since these forms initially appear in a stage of acquisition in which the use of function words is scarce, it is unlikely for children to use function words such as case particles. The use of case particles with other longer words are not observed in this stage.

Second, when a child does acquire the use of case particles, a real case particle follows the forms in (24). Children utter sentences like those in (26). The adult forms for these should be ka-ga and ke-ga respectively with both -ga being real case particles.

   'There is a mosquito flying.'
b. Konna tokoroni kega-ga atta.
   'Here I found a piece of hair.'

These sentences are evidence that the second mora of the forms in (24) are not added for a syntactic motivation such as Case assignment. I claim that they are drawn from the adult use of case particles for the fulfillment of the bimoraic template of the language, but not for a syntactic motivation. This is another case of bimoraic compensation.

4. A Theoretical Perspective

One of our theoretical interests is that the bimoraic compensation operates in the same way in different parts of the grammar, as we have seen in the previous three sections. This suggests that the bimoraic compensation is not a particular rule relevant to a particular part of the grammar such as morphology, phonology, or phonetics.

If we assume that prosodic principles are independent of traditional distinctions of parts of the grammar, the seeming categorization such as prosodic morphology and prosodic
phonology will prove to be merely a convenient terminology for the interaction of the prosodic theories and morphological and phonological processes. Prosodic principles will superficially work differently because of the conditions and principles imposed in each part of the grammar.

Association and epenthesis are the two typical maintenance strategies commonly found in other languages as well. In the cases I described in the previous sections, these principles operate alternatively according to the conditions which are relevant to that particular part of the grammar. Thus the glottal epenthesis is prohibited in the part where the illegal consonant clusters are checked and ruled out, or in the part where the material used there must be drawn from the phonemic inventory.

If we further investigate the interaction of prosodic principles and other principles of the grammar, we will be able to elucidate a prosodic principle as clitical as ECP in syntax, which extensively accounts for the motivation for morphological and phonological operations.

Notes
1 Excluded from the list in (1) are those Sino-Japanese morphemes which specifically participate in Sino-Japanese compound formation. Among those, some seem to have been lexicalized as stand-alone words. They may be directly followed by a case particle, as the other native Yamato morphemes are. They commonly appear in fixed expressions. For example, a Sino-Japanese morpheme ri ('reason') is commonly used as a stand-alone word in the expression ri-ri kara 'be reasonable'.

2 In Tagalog, a loan-word from English or Spanish may be monosyllabic as a non-clitic word, and the vowel of such a loan word is lengthened. Schachter and Orantes(1972: §1.12) treat this vowel length as "Inherent Length," but I propose that the vowel of a monosyllabic loan word is underlyingly short and that it is lengthened as a result of prosodic compensation so that the word may meet a prosodic requirement for a content word.

3 The use of -te ending for the imperative is colloquial. Kire ('Cut') is the authentic imperative form. Since the omission of case particle -o is colloquial, *ki kire ('Cut the wood') sounds awkward.

4 Here, for the ease of notation, I use a double segments [ii] to indicate the long vowel of [i] in (3a). Likewise, I use [kk] and [tt] to indicate the geminate of [k] and [t] respectively in (3). In prosodic terms, these will be a single segment dominated by two mora (u) symbols.

5 In the following discussion, I will indicate a Wd symbol (a foot or a binomic minimal word) only for the relevant part of the structure neglecting the rest of the structure. The relationship among Wd symbols, when there are more than one, is yet to be studied.

6 (11c) is acceptable if it is syntactically preposed. In this case, the glottal stop serves as a phrasal pause to indicate that the phrase is preposed. In this case, the orthography will require a comma. The function of this preposed phrase is to attract an attention of the hearer by pointing out the thing or person in question. I exclude this reading in (11c).

This preposition is not interchangeable with a topic preposition marked with the particle wa. (i) *Kido-wa, abete. Whatever the syntactic characteristic of such preposition is, preposing a phrase with the case particle -o is unacceptable. (ii) *Kido-o, abete. Therefore, the glottal stops in (11a,b) are not able to function as a phrasal pause.

7 I assume, following Katada(1990), that a mora (u) symbol dominates the onset consonant. Under this
assumption, the second μ in (14) possibly dominates either a vowel or a consonant. For the constituency of the onset, see also Broselow (1995: §2.1.1).

8 (17a,b,d) are from Poser (1990: 94). The parenthesized main verbs are added by the author of this article. The precise nature of this renyookei reduplication is still to be investigated, due to the unclarity of the data judgment. Poser put no question on the acceptability of the data (17d), where the stem renyookei forms consist of more than two moras, but I would put a question mark (?) on this and (17c). For me, there is a clear distinction on the acceptability between (17a,b) and (17c,d), if not the latter is entirely unacceptable.

9 Zujuja-go is from jyauzu-go (meaning 'jazz language'). The part zujuja is a form created from jyauzu ('jazz') by the secret language formation discussed here.

10 My solution here is different from the description by Poser (1990: 96), which takes the lengthened rhyme for the constituent to be copied. Poser seems to assume the onset-rhyme dichotomy, which Tateishi (1989: 394) explicitly denies as a consequence of his analysis of the musician's secret language.

References


