Stress Assignment in Tokyo Japanese (2)

—— Stress Shift, and Stress in Suffixation ——

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3.0. Stress Shift

3.1. Non-head Position

Let us look at the following compound nouns.

(43)	[[kyooiku]-[ii'n]-[kai]]	'the Board of Education'
	[[keezai]-[su'iiki]]	'economic waters'
	[[kozin]-[ke'eee]]	'private management'
	[[hai]-[ke'kkaku]]	'pulmonary tuberculosis'

All the words listed in (43) are assigned *pre*antepenultimate stress,[21] which seems to be a violation of the assumption given in (3)-(5) in Yamada (1990a) that stress is placed on the antepenultimate mora if the word is nominal. Take, for example, the words ***kyooiku-ii'nkai, keezai-su'iiki,*** and ***kozin-ke'eee*** in (43). Their metrical structure would be as shown in (44a) if the rules in (3)-(5) are applied to them. However, the correct outputs are those in (44b), respectively:

(44) *a.

```
. . . . . * . .
(. . . . . * .) .
* * * * * *[* *) .
kyo o i ku-i i n ka⟨i⟩
```

⟶

```
. . . . . * . .
(. . . . . * .) .
* * * * * *[* *) .
kyo o i ku-i i n ka⟨i⟩
```

b.

```
. . . . . * . . .
(. . . . . * . .) .
* * * * * *[* *) .
kyo o i ku-i i n ka⟨i⟩
```

line 2
line 1
line 0

```
. . . . * . .
(. . . . * .) .
** ** *[* *) .
keezai-su i i ⟨ki⟩
```

⟶

```
. . . . * . . .
(. . . . * . .) .
** ** *[* *) .
keezai-su i i ⟨ki⟩
```

line 2
line 1
line 0

```
. . . . * . .
(. . . . * .) .
* * * *[* *) .
kozi n-ke e e⟨e⟩
```

⟶

```
. . . * . . .
(. . . * . .) .
* * * *[* *) .
kozi n-ke e e⟨e⟩
```

line 2
line 1
line 0

In all the examples in (44), stress seems to be shifted one mora to the left.

According to Haraguchi (1988: 153), this phenomenon is explained by the following principle:

(45) Disallow the non-head portion of a rime to carry an accent.

This is essentially correct. However, without specific syllable structure construction procedure, we cannot tell which part of the word is the head of rime. For example, we might parse incorrectly the words *keezai-su'iiki* and *kozin-ke'eee* to be as follows, if we have no knowledge of Japanese.

(46)

```
**  * * * *' * *    * ** * *' * *   Mora
k ee za i-su i' i ki  koz i n-ke e'e e
\|/ \|/ \| \/ \|     \| \|/ \| \/ |   Syllable structure
σ   σ   σ σ  σ      σ  σ   σ σ  σ
```


Then, stress would be assigned to the antepenultimate *mora* in (46) by stress rules in (4)-(5) in Yamada (1990a). Since the antepenultimate position of mora is the head of the *rime* in the case of the examples in (46), stress remains unshifted one mora to the left, which is not a coreect result. As it stands, we cannot explain the stress shift phenomenon. In order to avoid this kind of unsatisfactory consequence, we will clarify in brief the syllable structure construction procedure of Tokyo Japanese in the next section before we go into the detailed discussion.

3.2. Mora and Syllable Structure

In order to elude unnecessary confusion and to make the argument clear, we will present here the point alone.[22] We assume that the mora and syllable structure of Tokyo Japanese is constructed by means of the following procedure:

(47)
a. Place a mora (μ) under each vowel and draw a association line.[23]
b. Spread the association line leftward according to the sonority hierarchy principle if there is (are) consonant(s) to the left of mora.
c. Make a syllable (σ) by combining each moraic consonant with the immediately preceding mora.[24]
d. Make a syllable (σ) by combining each non-consonant-bearing mora with the immediately preceding mora from left to right on condition that trimoraic syllable is not allowed and syllable may not include word boundary.
e. Create a syllable (σ) under each remaining mora.

Taking [[*kyooiku*]-[*ii'n*]-[*kai*] and [[*keezai*]-[*su'iiki*]] as examples, let us show how the moraic-syllable structure is constructed.[25]

(48) [kyōiku]-[ii'n]-[kai] ⟶ kyo i ku-i i n-ka i ⟶ kyo iku- i i n-ka i

(47a) |\ | | | | | |(47b) \\|\ | \| | | \| |

μμ μ μ μμ μ μ μμμ μ μμ μ μ

⟶ kyo i ku-i i n-ka i ⟶ kyo i ku-i i n-ka i

(47c) \\|\ | \| | | | \| |(47d) \\|\ | \| | | | \| |

μμμ μμ μ μ μ μ μμμ μ μ μ μ μ μ

|/ |/ |/ |/

σ σ σ σ

⟶ kyo i ku- i i n- ka i

(47e) \\|\ | \| | | | \| |

μμμ μ μμ μ μ μ Mora

|/ | | | |/ |/

σ σ σ σσ σ Syllable

In the case of *kyooiku-ii'n-kai* in (48), mora (μ) is placed under each vowel by (47a) and association line spreads to the left by (47b). Next, syllable (σ) is created by combining a moraic consonant with the immediately preceding mora by (47c). Then, each nonconsonant-bearing mora is combined with the immediately preceding mora *from left to right*, which prevents, for expmple, four successive vowels in *kyooiku* from being parsed incorrectly as [kyo]$_\sigma$ [oi]$_\sigma$ [ku]$_\sigma$. Notice here the string *ku-i* is not parsed into [ku-i]$_\sigma$ because a syllable may not include word boundary. By (47e), we reach the final derivation. The example *keezai-su'iiki* is equally dealt with as is illustrated in (49).

(49) [kēzai]-[su'iiki] ⟶ ke za i-su i i ki ⟶ ke za i-su i i ki

(47a) |\ | | | | | |(47b) \|\ \| | \| | | \|

μμ μ μ μ μμ μ μμ μ μ μ μμ μ

⟶ ke za i-su i i ki ⟶ ke za i-su i i ki

(47d) \|\ \| | \| | | \|(47e) \|\ \| | \| | | \|

μμ μ μ μ μμ μ μ μ μμ μ Mora

|/ |/ |/ |/ | |

σ σ σ σ σ σ Syllable

Incidentally, the appearance of a long vowel is restricted to a syllable. Therefore, the final stage of the compound word *keezai-su'iiki* in (49), for example, will be in (50a), but not in (50b).

(50) a. k e z a i-su i i ki *b. k e z a i-su i ki

\/\ \/ | \| | | \| \/\ \/ | \| /\ \|

μ μ μ μ μ μμ μ μ μ μ μ μμ μ Mora

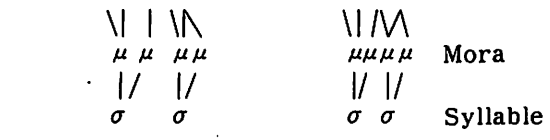
|/ |/ |/ | | |/ |/ |/ | |

σ σ σ σ σ σ σ σ σ Syllable

In (50a), the first long vowel /e/ consists of two moras dominated by a single syllable, which is permissible. The two successive vowels /i/ on the penultimate and antepenultimate moras in (50a) cannot form a long vowel such as in (50b), for they are under separate syllables.

In the case of geminates, on the other hand, there is not such a restriction. To take the word *gakkoo* 'school', for instance, the moraic-syllable structure of the word in (51a) given by rule (47) becomes (51b) after gemination.

(51) a. g a k ko ⟶ b. g a k o



3.3. Stress Shift from Non-head Position

Bearing in mind what we have seen in the previous section, let us examine the words listed in (43). All the strings in question end with the following moraic-syllable structure.

(52) .....[[i]$_{\mu}$[n]$_{\mu}$]$_{\sigma}$-[[ka]$_{\mu}$[i]$_{\mu}$]$_{\sigma}$
.....[[su]$_{\mu}$[i]$_{\mu}$]$_{\sigma}$-[[i]$_{\mu}$] [[ki]$_{\mu}$]$_{\sigma}$
.....[[ke]$_{\mu}$[e]$_{\mu}$]$_{\sigma}$-[[e]$_{\mu}$[e]$_{\mu}$]$_{\sigma}$
.....[[ke]$_{\mu}$[k]$_{\mu}$]$_{\sigma}$-[[ka]$_{\mu}$[ku]$_{\mu}$]$_{\sigma}$

Stress is given by the rules (3)-(5) to the antepenultimate mora in (52), then it is shifted one mora to the left, that is, to the first mora of a syllable, which is formalized as follows:

(53) The second mora in a syllable is nonstress-bearing.

This rule is applied obligatorily to all the cases of the syllable of this type which are categrized into the four groups shown in (54).

(54) a. Moraic nasal syllable ex. [[(C)V] [/n/]]$_{\sigma}$ *kyooiku-i*[*i'n*]$_{\sigma}$-*kai*
b. Diphthong syllable ex. [[/u/] [/i/]]$_{\sigma}$, [[/a/] [/i/]]$_{\sigma}$ *keezai*-[*su'i*]$_{\sigma}$*iki*
c. Long vowel syllable ex. [[/e/] [/e/]]$_{\sigma}$, [[/i/] [/i/]]$_{\sigma}$, [[/o/] [/o/]]$_{\sigma}$, [[/u/] [/u/]]$_{\sigma}$ etc. *kozin*-[*ke'e*]$_{\sigma}$*ee*
d. Geminated consonant syllable
ex. [[(C)V][/s/]]$_{\sigma}$, [[(C)V][/k/]]$_{\sigma}$, [[(C)V][/p/]]$_{\sigma}$ etc. *hai*-[*ke'k*]$_{\sigma}$*kaku*

3.4.0. Stress Shift by High Vowel Devoicing

Now, let us turn to another case where stress shift occurs. The examples in (55) are compound nouns which would receive stress on the antepenultimate mora by the rules (3)-(5). However, in these cases, stress is placed on *pre*antepenultimate mora, which indicates that stress is shifted one mora to the left.

(55) waribi'ki-ken 'discount ticket'
nankyo'ku-ken 'the Antarctic Circle'

As pointed out in Haraguchi (1977, 1984), this is attributed to High Vowel Devoicing which has been formalized as in (56):

(56) High Vowel Devoicing (Haraguchi: 1984)

$$\begin{bmatrix} V \\ +high \end{bmatrix} \longrightarrow [-voiced] / \begin{bmatrix} C \\ -voiced \end{bmatrix} \_\_ (\begin{bmatrix} C \\ -voiced \end{bmatrix} X)^{\#\#}$$

Rule (56) applies, for instance, to the words in (55), changing the vowels [i] and [u] to [I] and [U] as in (57), respectively.[26]

(57) waribi'kI-ken
nankyo'kU-ken

In order to explain this stress shift within the framework of Halle and Vergnaud (1987b), we need the following rule which disallows a voiceless vowel to bear stress.

(58) A voiceless vowel is nonstress-bearing.

Then, the following questions are to be raised. Is this rule applied obligatorily? Is there any case where High Vowel Devoicing does *not* occur when the condition for it is satisfied? Is stress shifted to the rihgt? What will happen if the first vowel in the environment is also [-voiced]? We will try to find the answer to them in the next sections.

3.4.1. Leftward Shift

According to Halle and Vergnaud (1987b), Vowel Deletion and Vowel Reduction trigger stress shift, which is explained by the deletion of an asterisk (or grid) on line 0, and the direction of the shift is rightward if the

constituents are left-headed, or leftward if the constituents are right-headed. An example from Tiberian Hebrew is shown in (59), where line 0 constituents are left-headed and the erasure of element 2 on line 0 caused by Vowel Reduction triggers the rightward shift of the stress.[27]

(59)

```
.  *  .        .  *    line 2
(*  *).        (*  *)   line 1
(3) (2 1)      (3) (1)  line 0
kaatabuu ⟶ kaat'buu
```

However, notice that stress is shifted to the left in the examples of (57) (one of them is repeated here with metrical constituents structure as (60)) in Japanese, although line 0 metrical constituents are left-headed.

(60)

```
. . . * . .        . . * . . .    line 2
(. . . * .) .      (. . * . .) .  line 1
* * * [* *) .      * * * [* *) .  line 0
waribi kI-ke⟨n⟩ ⟶ waribi'kI-ke⟨n⟩
```

Why is stress not shifted to the right in these cases of High Vowel Devoicing in Japanese? Explanation is straightforward. In Tokyo Japanese mora will not be deleted in any case. For example, some speakers completely drop the vowel [I] between consonants /k/ in these cases, pronouncing it like a geminate /kk/. Even in such a case, mora will not be deleted as shown in (61a), and stress is shifted one mora to the left as in (61b).

(61)

```
a. . . . * . .        b. . . * . . .   line 2
   (. . . * .) .         (. . * . .) .  line 1
   * * *[* *) .          * * *[* *) .   line 0
   waribi k-ke⟨n⟩ ⟶  waribi k-ke⟨n⟩
```

Then, how can we handle these leftward stress shift in Tokyo Japanese? In such a case as (60), where line 0 constituents structure does not change when vowel is devoiced, which induces stress to be shifted somewhere from the devoiced vowel, we assume that, in Tokyo Japanese, where line 1 constituent structure is considered to be *right*-headed, there is no *right*ward stress shift.

With this assumption, we can explain the following examples in (62).[28]

(62) si'son 'descendant'
hi'hU 'skin'
ku'sI 'making full use of something'

Their final metrical constituent structures are constructed by the rules (3) -(5) as follows:

(63)
```
  *  .  .      *  .      *  .     line 2
 (*  .) .     (*) .     (*) .     line 1
 [*  *) .     [*) .     [*) .     line 0
 si so ⟨n⟩    hi⟨hU⟩    ku⟨sI⟩
```

Though the underlined vowels all meet the condition for High Vowel Devoicing, stress is not shifted to the right in (63). If stress was permitted to shift rightward in Tokyo Japanese, the word *si'son* would be *sIso'n* with the stress shifted to the penultimate mora, which is against the fact. Let us show another example *kari-ya'kusoku* 'interim agreement' in (64). In (64a), stress is assigned by the rules (3)-(5) to the antepenultimate mora. However, as the vowel of the stress-bearing mora is devoiced, stress is

shifted one mora to the left, not to the right as in (64b) because rightward stress shift is not allowed here by the assumption.[29]

(64) a.
```
 .  .  .  *  .  .        .  .  *  .  .  .   line 2
 (.  .  .  *  .) .       (.  .  *  .  .) .   line 1
 *  *  *  [*  *) .       *  *  *  [*  *) .   line 0
 kari-yakUso⟨ku⟩ ⟶ kari-yakUso⟨ku⟩
```

*b.
```
 .  .  .  *  .  .        .  .  .  .  *  .   line 2
 (.  .  .  *  .) .       (.  .  .  .  *) .   line 1
 *  *  *  [*  *) .       *  *  *  [*  *) .   line 0
 kari-yakUso⟨ku⟩ ⟶ kari-yakUso⟨ku⟩
```

According to Haraguchi (1977: 42), however, it is pointed out by the following examples in (65) that there is rightward stress shift in Tokyo Japanese.

(65) a. atu'-ku-wa ⟶ atU-ku'-wa '— is thick'
atu'-kereba ⟶ atU-ke'reba 'thick-Conditional suffix'
atu'-katta ⟶ atU-ka'tta 'thick-Past tense suffix'

b. ti'kaku ⟶ tIka'ku 'near'

He explains the examples in (65a) as follows: stress fallen on the mora of the stem vowel /u/, which is to be devoiced by High Vowel Devoicing, is normally shifted one mora to the right. However, in *Zenkoku Akusento Ziten* (All-Japan Accent Dictionary) (1960) and *Nihongo Hatuon Akusento Ziten* (1985) (Dictionary of Japanese Pronunciation and Accent), their

stresses are described as, respectively:

(66) atU'-ku-wa
atU'-kereba
atU'-katta

Devoiced vowel [U] retains its stress in these examples. Moreover, as will be discussed in detail section 4, the conditional suffix *-kereba*, and past tense suffix *-katta* give stress to the immediately preceding mora if the adjective preceding these suffixes is Type II. The adjective *atu-i* 'thick' cited in (66) is Type II.

In the case of the example (65b), when it is considered to be a noun, the antepenultimate stress is given by the rules (4) and (5), and when it is considered to be an adverb the penultimate stress is assigned by (5). Likewise, the examples in (67) cited in Haraguchi (1988) can be handled in this way:

(67) a. tUti-tU'kazu b. tUti-tUka'zu

tUti-tU'kazu in (67a) is a compound noun, meaning 'undefeated record,' where stress is assigned to the antepenultimate mora by the rules (4) and (5); while *tUti-tUka'zu* in (67b) is a compound adjective, meaning 'undefeated,' where stress is assigned to the penultimate mora by the rules (3) and (5). What looks to be the rightward stress shift in these cases is a result of separate processes of rule application. Therefore, his argument for the rightward stress shift in Tokyo Japanese seems to be untenable.

3.4.2. Boundary Condition

As we have seen in section 3.4.0, stress is usually shifted one mora to the left if the vowel of the mora on which stress is given by rules is devoiced as in (68).

(68)
```
. . . * . .        . . * . . .
(. . . * .) .      (. . * . .) .
* * * [* *) .      * * * [* *) .
ongakU-ka⟨i⟩ ⟶ ongakU-ka ⟨i⟩   'concert'
```

The compound nouns in (69a) are assigned stress to the antepenultimate mora by the rules (4) and (5) because their last mora is extrametrical; while the compound verb in (69b) is assigned stress on the penultimate mora by the rules (3) and (5). The compound words in (69), however, retain stress on the original mora with devoiced vowel, i.e., stress is not shifted one mora to the left in these cases.

(69) a. [[seezi]-[sI'kin]] ⟶ *seezi'-sIkin 'political fund'
[[setubi]-[sI'kin]] ⟶ *setubi'-sIkin 'equipment fund'

b. [[i]-[tU'k-u]] ⟶ *i'-tUku 'to settle down'

In order to explain these examples, we postulate the following condition for the stress shift in Tokyo Japanese.

(70) Stress may not be shifted across the word boundary.

With this conditon, stress shift is blocked properly as is shown in (71).

(71) [#[#seezi#][#sI'kin#]#]
[#[#setubi#][#sI'kin#]#]
[#[#i#][#tU'k-u#]#]

3.4.3. Adjacency Condition and Landing Site Condition

Let us turn to some other examples of compound noun in (72), where stress is retained on the mora with devoiced vowel.

(72) boosI'-kake ⟶ *boo'sI-kake 'hat rack'
ninkI'-tori ⟶ *nin'ki-tori 'efforts to win public favor'

We will illustrate these examples by means of the metrical constituent structure in (73): stress is assigned on the antepenultimate mora by the rules (4) and (5), *and* it is retained on the same mora with devoiced vowel.

(73)

```
. . * . .        . . * . .
(. . * .) .      (. . * .) .
* *[* *) .       * * [* *) .
boosI-ka⟨ke⟩     ninkI-to⟨ri⟩
```

By closely looking at these examples, we can find other conditions for stress shift. Notice that their moraic-syllable structures are constructed by (47) as follows:

(74)

```
a.  . . * . .        b.  . . * . .
    (. . * .) .          (. . * .) .
    * * [* *) .          * * [* *) .
    bo sI-ka⟨ke⟩         ni n kI-to⟨ri⟩
    \|\ \| \| \|         \| | \| \| \|
    μ μ μ μ μ            μ μ μ μ μ   Mora
    |/ | | |            |/ | | |
    σ σ σ σ              σ σ σ σ     Syllable
```

Let us take (74a) as example. If stress *was* shifted one mora to the left in this case, then the second mora of the first syllable would be the landing site as in (75a). However, since this place cannot hold the stress as we have seen in section 3.3, stress would be shifted one more mora to the left, namely to the first mora of the first syllable as in (75b), which is an incorrect output as well.

(75)

```
*a.  . * . . .       *b.  * . . . .
     (. * . .) .          (* . . .) .
     * * [* *) .          * * [* *) .
     bo sI-ka⟨ke⟩         bo sI-ka⟨ke⟩
     \|\ \| \| \|         \|\ \| \| \|
     μ μ μ μ μ            μ μ μ μ μ   Mora
     |/ | | |            |/ | | |
     σ σ σ σ              σ σ σ σ     Syllable
```

In order to explain these examples, we assume the following two conditions which are relevant here; one is Adjacency Condition, and the other is Landing Site Condition. Since it is often discussed in literature, for example, in Halle and Vergnaud (1987b), and Haraguchi (1988), there will be no need for a discussion about Adjacency Condition, which will be:

(76) Landing site of the stress shift is restricted to the adjacent mora.

On the other hand, Landing Site Condition will be described as:

(77) Non-head mora is not allowed to be the landing site of stress shift.

Let us turn to the example in (75). The second mora of the first syllable in (75a) is not permitted to receive stress because of the Landing Site Condition in (77); while the first mora of the first syllable in (75b) is not also permitted to be assigned stress because of the Adjacency Condition in (76). Therefore, stress is not shifted anywhere only to remain on its original position.

Note that the following are the examples where Boundary Condition in (70) and Adjacency Condition in (76) and Landing Site Condition in (77) are all relevant. Therefore, stress is not shifted to any place.

(78) [[sinrin]-[tI'tai]] →*sinrin'-tItai or
*sinri'n-tItai 'forest area'
[[kyuusyuu]-[tI'hoo]] →*kyuusyuu'-tIhoo or
*kyuusyu'u-tIhoo 'kyusyu district'
[[sekoo]-[kI'sokU]] →*sekoo'-kIsokU or
*seko'o-kIsokU 'enforcement regulations'
[[unyoo]-[sI'kin]] →*unyoo'-sIkin or
*unyo'o-sIkin 'operationg funds'

For example, the metrical constituent structure and moraic-syllable

structure of the compound noun *sinrin-ti'tai* is shown in (79).

(79)
```
     . . . .      *  . .
    (. . . .      *  .) .
     ** **       [*  *) .
[#[#s i n r i n#]-[#t I t a 〈i〉#]#]
    \| | \| |     \| \|  | .
    μμ μμ         μ  μ  μ     Mora
    |/  |/        |  |/
    σ   σ         σ  σ        Syllable
```

As illustrated in (79), stress cannot be shifed one mora to the left, because it will violate both Boundary Condition and Landing Site Condition if it is shifted one mora to the left. Moreover, stress cannot be shifted two moras to the left, because it will violate both Boundary Condition and Adjacency Condition.

Incidentally, there seems to be a tendency for devoiced vowel and non-devoiced vowel to occur alternately when three successive vowels all meet the condition for High Vowel Devoicing as in (80).

(80) a.
```
  . . .  * .
 (. . .  * .)
  * * * [* *)
kIkisU teru   'to ignore a person's advice'
```

b.
```
  . . .  * .
 (. . .  * .)
  * ** [* *)
kIkitU keru   'to hear'
```

In each case, all the first three successive vowels, i.e., /i/ /i/ /u/, satisfy the condition for High Vowel Devoicing. However, they show the following combination of devoiced vowel and voiced vowel with stressed voiced vowel on their right.

(81)

```
                                        *        line 2
                                        *        line 1
      /I/   +    /i/   +    /U/   +    V
[+devoiced][−devoiced][+devoiced][−devoiced]
```

Since pursuing this phenomenon is beyond our present purpose, we leave it open to question.

Summarizing, we have shown in section 3 that stress is shifted one mora to the lelft in Tokyo Japanese in accordance with three conditions; namely, Boundary Condition, Adjacency Condition, and Landing Site Condition.

4.0. Suffixed Strings

The stress assignment of suffixed strings in Tokyo Japanese looks to be somewhat complicated at first sight. However, close examination reveals that the external complexity is reduced to the combination of the following three stress-defining factors of words and suffixes concatenated one after another: (a) Type I vs. Type II, (b) noncyclic vs. cyclic, and (c) underlyingly unaccented vs. underlyingly accented. In the following, therefore, let us look at how these three factors affect one another and how they are related to stress rules to give birth to a desirable stress pattern.

As pointed out in Tenny (1986), there are two types of suffix in Tokyo Japanese: recessive and dominant. Following Halle and Vergnaud (1987b), let us assume that recessive suffixes are noncyclic whereas dominant ones are cyclic. In other words, recessive suffixes are added to a word or stem on the same plane as the preceding word or stem, and at the end of the word or phrase noncyclic stress rules are operative; on the other hand, dominant suffixes are added to a separate plane from the preceding one, and cyclic stress rules apply to each cyclic constituent.[30]

We will use essentially the same kind of rules as those for words to account for the stress assignment of the suffixed strings without elaborating new rules for them. In short, word-internal stress is treated on line 1 and 2; on the other hand, word-sequence stress will be treated on line 2 and 3. Therefore, we will set the parameters of line 2 for the suffixed strings. Notice that the following is not the mere description of facts, but an explanation of the stress assignment in suffixed strings based on the theoretical assumption.

4.1. Post-nominal Suffixes

In the following, we will classify post-nominal suffixes into the two classes : Type I (or surface-stressed) suffixes in (82) and Type II (or non -surface-stressed) in (83). Each type of suffix is further divided into the two in terms of their stress behavior: Noncyclic as in (82a), (83a) and Cyclic as in (82b) and (83b). Suffixes in Noncyclic Type I in (82a) and Cyclic Type I in (82b) are assumed to be either underlyingly unaccented (represented as (U)) or underlyingly accented (represented as (A)), respectively.[31] According to Halle and Vergnaud (1987b), noncyclic suffixes

are represented on the noncyclic plane where the previously assigned stress in not deleted, whereas cyclic ones on the cyclic plane where it is deleted.

(82) Type I (surface-stressed type)

a. *Noncyclic* (i) *unaccented* (U)

made	'also'
yori	'than'
daroo	'Auxiliary; 'probably''
koso	'the very.....'
sae	'even'
dano	'and so forth'
demo	'.....or something'
yara	'What with....., and'
nado	'and the like'
nante	'and the like (colloquial)'
nanka	'.....or anything like that'
(desu	'Copula')

(ii) *accented* (A)[32]

gu̇rai	'as.....as.....'
bȧkari	'only'
yȯrika	'than'
yȯrimo	'rather.....than.....'
mi̇tai	'like.....'
(nė	'Tag question; 'isn't it?' etc.')

b. *Cyclic* (i) *unaccented* (U)

rasii 'Auxiliary adjective ; 'look like''

(ii) *accented* (A)

???

(83) Type II (non-surface-stressed type)

a. *Noncyclic*

ga	'Nominative case marker'
e	'to'
ka	'or'
sa	'indeed'
sika	'only'
to	'and'
ya	'and; or'

(da 'Copula, 'wa' Topic marker, mo 'also', kara 'from', ni 'Dative case marker', o 'Accusative case marker')

b. *Cyclic* dake 'only'

To take the three types of nouns *mi'dori, otooto'*, and *sakura* as typical examples from (1a) of unaccented Type I , (1b) of accented Type I , and (2) of Type II in Yamada (1990a), respectively, let us examine how these suffixes behave with regard to the preceding noun. First, in (84), we will show the surface stress of each string. In parentheses, the surface stress and underlying accent, if there is any, of each word and suffix in isolation are shown. Recall here the argument in section 1 in Yamada (1990a) that the word *mi'dori* in isolation surfaces with stress on the antepenultimate

mora by means of the rules (4) and (5); the word *otooto'* in isolation has an underlyingly marked accent on the ultimate mora and therefore receives stress on the very mora by the rules in (5); on the other hand, the word *sakura* in isolation surfaces with no stress because rules (3)-(5) do not apply to Type II words.

(84) a. (i) Noun+Unaccented Noncyclic Type I suffix

mi'dori-made	otooto'-made	sakura-ma'de
(<mi'dori, made)	(<otooto', made)	(<sakura, made)

(ii) Noun+Accented Noncyclic Type I suffix

mi'dori-gurai	otooto'-gurai	sakura-gu'rai
(<mi'dori, gurai)	(<otooto', gurai)	(<sakura, gurai)

b. (i) Noun+Unaccented Cyclic Type I suffix

midori-rasi'i	otooto-rasi'i	sakura-rasi'i
(<mi'dori, rasii)	(<otooto', rasii)	(<sakura, rasii)

(ii) ???

(85) a. Noun+Noncyclic Type II suffix

mi'dori-ga	otooto'-ga	sakura-ga
(<mi'dori, ga)	(<otooto', ga)	(<sakura, ga)

b. Noun+Cyclic Type II suffix

midori-dake	otooto-dake	sakura-dake
(<mi'dori, dake)	(<otooto', dake)	(<sakura, dake)

In order to account for the stress assignment of the word or string with suffix(es), we postulate the following rules in (86) in addition to a set of rules in (3)-(5):

(86) a. Line 2 parameter settings are [-BND, left-headed].
b. Construct constituent boundaries on line 2.
c. Locate the heads of line 2 constituents on line 3.
d. Conflate lines 1, 2, and 3.

Replacing rule (5h) in Yamada (1990a) with this set of rules in (86), we can appropriately account for the examples in (84) and (85).

4.1.1. Noncyclic Type I Suffixes

Now, let us look into how the stress rules in (3)-(5) in Yamada (1990a) and (86) work. The derivations for the examples in (84a(i)) are shown in (87), (88), and (89).

```
(87) a.                  b. *                 c. *  .  .   .  .  line 3
        *                   (*   . .   *  .)     (*  .  .   .  .) line 2
        *                   (*) (*  .  *  .)     (*) .  .   .  .  line 1
        * * *               [*) [* *) [*  *)     [*) *  *   *  *  line 0
      midori-made ——→      mi dori-made ——→    mi dori-made
              (5a-g), (86a-c)          (86d)

(88) a.                  b. .  . . *   .  .    c. .  . . *  .  .  line 3
               *            (.  . . *   *  .)    (.  . . *  .  .) line 2
       *  *    *            (*  *. *)  (*  .)    (.  . . *) .  .  line 1
       *  * *  *            [*) [**)[*) [*  *)     *  * * [*) *  *  line 0
      o too to-made ——→     o too to -made ——→ o too to-made
              (5a-g), (86a-c)          (86d)
```

In the case of the derivation in (87), for example, an underlyingly unaccented Noncyclic Type I suffix *made* is added to the word *mi'dori* as in (87a), and the noncyclic stress rules in (5) and (86) are applied, yielding the correct output in (87c). Likewise, in the case of the example *otooto'-made* in (88a) which consists of an underlyingly accented word *otooto'* followed by the Noncyclic Type I suffix *made*, the noncyclic stress rules in (5) and (86) are applied to yield the correct output in (88c).

Note here that the Noncyclic Type I suffix *made* is added to the preceding word on the same plane. The previously assigned grid on the word *mi'dori* remains intact through the suffixation because the suffixation is carried out on the noncyclic plane. The extrametricality given by rule (4) to the last mora of the word *mi'dori* becomes invalid in (87a), for this place is no longer at the edge of the domain of the stress rules.

In (89), we show the case where the suffix *made* is preceded by the stressless Type II word *sakura*. Since the word *sakura* is a stressless word, no grid is assigned to it when the suffix *made* is added in (89a). In (89b-c), the noncyclic stress rules in (5) and (86) apply to yield the correct output. Note here rule (4) does not apply here, because it is not nominal.

(89)

a.	b.	c.	
	. . . * .	. . . * .)	line 3
	(. . . * .)	(. . . * .)	line 2
	(* * . * .)	(. . . * .)	line 1
	[*) [* *) [* *)	* * * [* *)	line 0
sakura-made ⟶	sakura-made ⟶	sakura-made	
	(5a-g), (86a-c)	(86d)	

Let us turn to the examples in (84a(ii)), where each word is followed by

an underlyingly accented Noncyclic Type I suffix *gurai*. In (90), the

(90)

	*	*	line 3
* *	(* . . * *.)	(* . . . . .)	line 2
* *	(*) (* . *) (*.)	(*)	line 1
* * * *	[*) [* *) [*) [**)	[*) * * * * *	line 0
midori-gurai ⟶	midori-gurai ⟶	midori-gurai	
	(5a-g), (86a-c)	(86d)	

suffix *gurai* is added to the word *mi'dori*. The stress rules (5) and (86) apply to yield the correct output as illustrated. Note here that an underlyingly accented suffix such as *gurai*, for example, is represented by line 2 asterisk with two asterisks under it as is shown schematically in (91), which will be discussed later in section 4.4.

(91)

*	line 2
*	line 1
*	line 0
XXX	where XXX represents a suffix

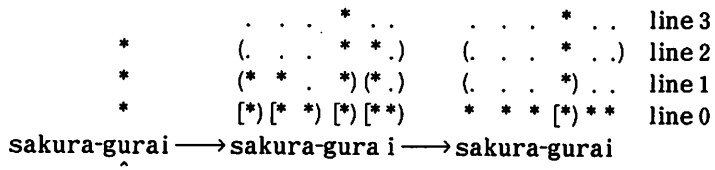
In the example (92), the accented Noncyclic Type I suffix *gurai* is added to the underlyingly accented word *otooto'*.

(92)

	(. . * . . .)	. . . * . . .	line 3
* *	(. . * * * .)	(. . . * . . .)	line 2
* * * * *	(* *. *) (*) (* .)	(. . . *) . . .	line 1
* * * * *	[*) [* *) [*) [*) [* *)	* * * [*) * * *	line 0
otooto-gurai ⟶	o too to-gura i ⟶	otooto-gurai	

In the example (93), the accented Noncyclic Type I suffix *gurai* is added to the stressless Type II word *sakura*.

(93)

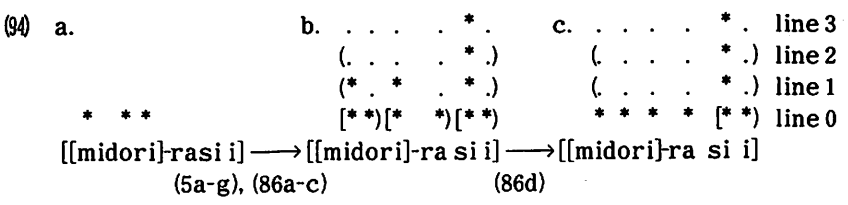


In sum, when the post-nominal Noncyclic Type I suffixes in (82a) are suffixed to three types of noun as exemplified in (84a), they show the following behavior: when the preceding noun in isolation has a surface stress, as in the word *mi'dori* and *otooto'*, the position of stress does not change after the suffixation; on the other hand, when the preceding noun in isolation has no surface stress, like the word *sakura*, stress is placed on the penultimate mora by the stress rules in the case of an unaccented Noncyclic Type I suffix such as *made*,[33] or stress is placed on the underlyingly accented position of the suffix in the case of an underlyingly accented Noncyclic Type I suffix such as *gurai*.

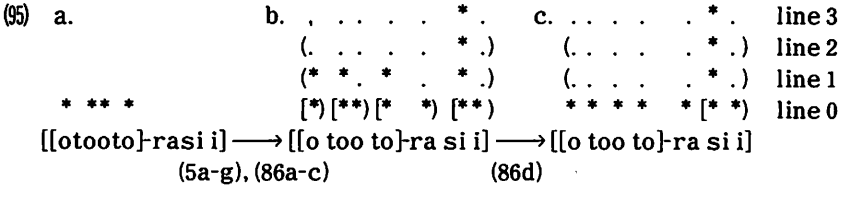
4.1.2. Cyclic Type I Suffixes

Let us look at the post-nominal Cyclic Type I suffix in (82b(i)). The suffix *rasii* shows such behavior as in (94), (95), and (96) when it is suffixed to the three different types of noun such as *mi'dori, otooto'*, and *sakura* as in (84b(i)).

(94) a. b. c.



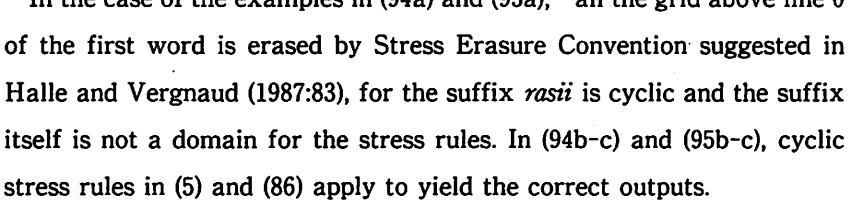
(95) a. b. c.



In the case of the examples in (94a) and (95a),[34] all the grid above line 0 of the first word is erased by Stress Erasure Convention suggested in Halle and Vergnaud (1987:83), for the suffix *rasii* is cyclic and the suffix itself is not a domain for the stress rules. In (94b-c) and (95b-c), cyclic stress rules in (5) and (86) apply to yield the correct outputs.

In the case of the example (96), stress is not assigned to the first element of the string *sakura-rasii* because the word *sakura* is a stressless Type II word. In (96b), cyclic stress rules assign stress to it as expected.

(96) a. b. c.

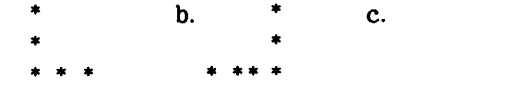


In brief, the post-nominal Cyclic Type I suffix *rasii* in (82b(i)) overrides stresses on the preceding word, determining the surface stress.

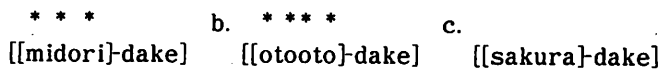
4.1.3. Type II Suffixes

Let us proceed to the post-nominal Type II suffixes exemplified in (83). They behave like those in (85) when they are preceded by the three different types of noun. Since the suffixes *ga* and *dake* belong to Type II, they never undergo the stress rules as shown in (97) and (98).

(97) a. b. c.



(98) a. b. c.



In the exapmle (97), the previously assigned stresses remain intact in the suffixation, since the suffix *ga* is noncyclic. Moreover, no stress is newly assigned to the suffixed strings because the suffix *ga* is of Type II. Recall that Type II suffixes and words do not undergo the stress rules in (5). Note that the word *sakura* in (97c) is not assigned any stress previously, for it is of Type II as well. In the case of the examples (98a-b), information about stresses assigned on previous passes is erased by Stress Erasure Convention, then only line 0 asterisks on the words *midori* and *otooto* are left behind. In the case of the word *sakura* in (98c), Stress Erasure Convention applies vacuously, for no stress is assigned to it

previously. Since the suffix *dake* belongs to Type II, no stress is newly assigned to all the exapmles in (98).

In summary, the post-nominal Noncyclic Type II suffix such as *ga* in (83a) does not affect the preceding stresses; whereas the post-nominal Cyclic Type II suffix *dake* in (83b) overrides the stresses assigned on the previous passes.

4.2. Post-verbal Suffixes

In this section we will examine the stress placement on the verbals with the following classified post-verbal suffixes.

(99) Type I

a. *Noncyclic*	(i) *unaccented* (U)	(r)eba	'Provisional'
	(ii) *accented* (A)	(a)nâkatta	'Negative past'
		rô/ê	'Imperative'
b. *Cyclic*	(i) *unaccented* (U)	(y)oo	'Tentative'
	(ii) *accented* (A)	(r)arê	'Potential/Passive'
		(s)asê	'Causative'
		(i)mâs	'Polite present'
		(μμ́ta[35]	'Past')
		(μμ́te	'Participle')
		((â)nai	'Negative non-past')

(100) Type II

a. *Noncyclic*	(r)u	'Non-past'
	to	'Conditional'
	sika	'only'
	dake[36]	'only'
b. *Cyclic*	???	

In the same fashion as post-nominal suffixes in section 4.1, post-verbal suffixes are divided into the two types as well: Type I suffixes in (99) and Type II suffixes in (100). The Type I suffixes receive a surface stress assigned by the stress rules somewhere in the suffixed string as in (101); whereas the Type II suffixes, after the suffixation, block the reapplication of the stress rules to the suffixed string as in (102). Moreover, each Type is further categorized into two groups, i.e., Noncyclic suffixes in (99a) and (100a) and Cyclic suffixes in (99b).

Notice in (101) and (102) that the two types of verb (stem), i.e., *sirabe'* 'investigate' and *kurabe* 'compare' are cited as the prototypes of the verbs (stems) followed by each suffix. The verb stem *sirabe'* is of Type I ; while the verb stem *kurabe* is of Type II. In the case of verbs, the two types are sufficient for our purpose because stress is assigned to the stem-final mora of all the verbs of Type I in Tokyo Japanese by rule (3), which is distinct from the treatment of nouns. In other words, there is no underlyingly accented verb, contrary to nouns, in this language.

(101) Type I a. (i) Verb (stem)+Unaccented Noncyclic Type I suffix

sirabe'-reba	kurabe-re'ba
(<sirabe', reba)	(<kurabe, reba)

(ii) Verb (stem)+Accented Noncyclic Type I suffix

sirabe'-nakatta	kurabe-na'katta
(<sirabe', nakatta)	(<kurabe, nakatta)

b. (i) Verb (stem)+Unaccented Cyclic Type I suffix

sirabe-yo'o	kurabe-yo'o
(<sirabe', yoo)	(<kurabe, yoo)

(ii) Verb (stem)+Accented Cyclic Type I suffix

sirabe-rare'	kurabe-rare'
(<sirabe', rare)	(<kurabe, rare)

(102) Type II a. Verb (stem)+Noncyclic Type II suffix

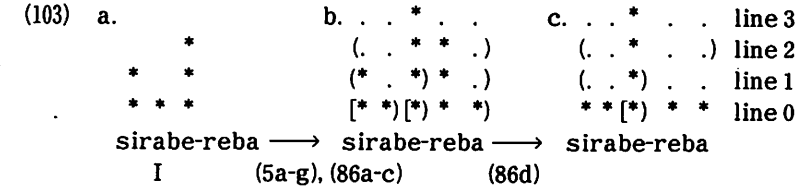
sirabe'-ru	kurabe-ru
(<sirabe', ru)	(<kurabe, ru)

b. ???

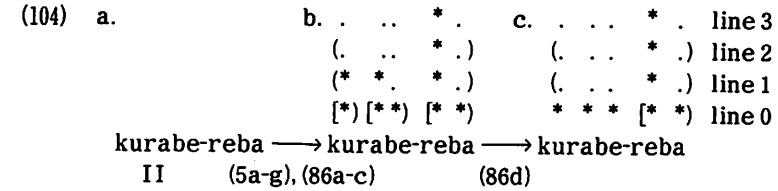
4.2.1. Noncyclic Type I Suffixes

Let us examine the stress pattern of the suffixed verb stems in (101a(i)). The verb stem *sirabe'* belongs to Toype I ; while the verb stem *kurabe* Type II. The suffix *reba* is assumed to be unaccented Noncyclic Type I . Therefore, the derivation for them is as follows:

(103)



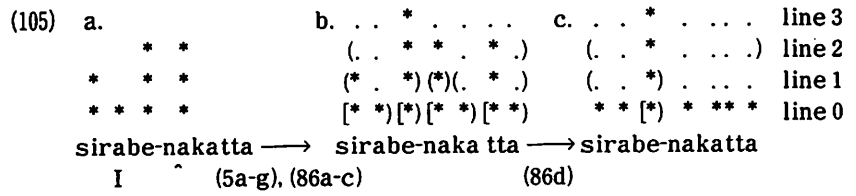
(104)



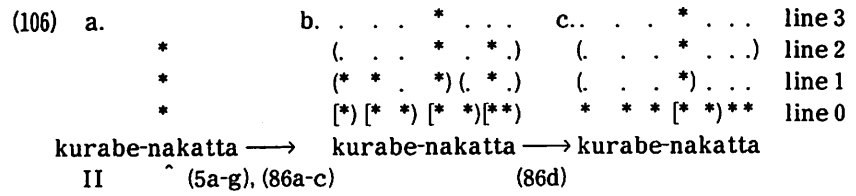
In (103a), the previously constructed grid on the verb stem *sirabe'* is not wiped out, since the suffix *reba* is considered to be noncyclic. On the other hand, no grid is assigned to the verb stem *kurabe* in (104a), because the verb stem is of Type II. In (103b) and (103c), and in (104b) and (104c) noncyclic stress rules in (5) and (86) apply to yield the correct outputs.

Let us turn to the underlyingly accented post-verbal suffix of Noncyclic Type I exemplified in (101a(ii)). Since the suffix *nakatta* is postulated to be underlyingly accented, a line 2 asterisk is placed on its first mora in (105a) and (106a) as in (91).

(105)



(106)



Then, noncyclic stress rules (5) and (86) apply, yielding the correct outputs in (105c) and (106c).

To sum up, in the case of the post-verbal Noncyclic Type I suffixes in (99a), the surface stress is placed on the stem-final mora regardless of whether the suffix is underlyingly unaccented as in (103) or underlyingly accented as in (105) when the preceding stem is of Type I ; on the other hand, the surface stress is placed on the penultimate mora of the suffix as in (104), and on the underlyingly accented mora of the suffix as in (106) when the preceding stem is of Type II.

4.2.2. Cyclic Type I Suffixes

Next, consider the examples of the post-verbal Cyclic Type I suffixation in (101b). In the suffixation of this class, the surface stress is assigned to the penultimate mora of the suffix as in (107) and (108) when the suffix

is unaccented or to the underlyingly accented mora as in (109) and (110) when the suffix is underlyingly accented regardless of whether the preceding stem is of Type I or Type II.

```
(107) a.               b. .  .  .   * .     c.  .  .  .   * .    line 3
                          (.  .  .   * .)       (.  .  .   * .)   line 2
                          (*  *  .   * .)       (.  .  .   * .)   line 1
          * * *           [*) [*  *) [* *)       *  *  *  [* *)   line 0
     [[sirabe]-yoo] ⟶ [[sirabe]-yo o] ⟶ [[sirabe]-yo o]
          I          (5a-g), (86a-c)         (86d)
```

```
(108) a.               b. .  .  .   * .     c.  .  .  .   * .    line 3
                          (.  .  .   * .)       (.  .  .   * .)   line 2
                          (*  *  .   * .)       (.  .  .   * .)   line 1
                          [*) [*  *) [* *)       *  *  *  [* *)   line 0
     [[kurabe]-yoo] ⟶ [[kurabe]-yo o] ⟶ [[kurabe]-yo o]
          II         (5a-g), (86a-c)         (86d)
```

In the example (107a), stress on the Type I verb stem *sirabe* is wiped out because of the Stress Erasure Convention which is applied to the input string to the cyclic strata. In (107b-c), cyclic stress rules in (5) and (86) apply, yielding the final result. In the case of example (108a), the Stress Erasure Convention applies here vacuously because no stress is previously assigned to the stem since the verb stem *kurabe* is of Type II. At the next stage, the cyclic stress rules in (5) and (86) apply to yield the correct outputs in (108b-c).

In the case of the accented Cyclic Type I suffixes exemplified in (101b(ii)), we can account for them in the same way as the unaccented

Cyclic Type I suffixes mentioned above. The two cases are different in that the surface stress is placed on the underlyingly accented mora in the case of the accented Cyclic Type I suffixes as illustrated in (109) and (110); whereas stress is placed on the penultimate mora in the case of the unaccented Cyclic Type I suffixes as in (107) and (108).

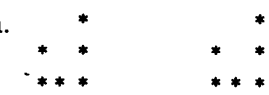
```
(109) a.               b. .  .  .  .   *     c.  .  .  .  .   *    line 3
               *          (.  .  .  .   *)       (.  .  .  .   *)   line 2
               *          (*  .  *  .   *)       (.  .  .  .   *)   line 1
               *          [*  *) [*  *) [*)       *  *  *  *  [*)   line 0
     [[sirabe]-rare] ⟶ [[sirabe]-rare] ⟶ [[sirabe]-rare]
          I       ^
```

```
(110) a.               b. .  .  .  .   *     c.  .  .  .  .   *    line 3
               *          (.  .  .  .   *)       (.  .  .  .   *)   line 2
               *          (*  .  *  .   *)       (.  .  .  .   *)   line 1
               *          [*  *) [*  *) [*)       *  *  *  *  [*)   line 0
     [[kurabe]-rare] ⟶ [[kurabe]-rare] ⟶ [[kurabe]-rare]
          II      ^
```

4.2.3. Type II Suffixes and Type II verb stem

Concerning the post-verbal Type II suffixes in (100), we need no special treatment. As is shown in (102) and (111), the surface stress is assigned to the stem-final mora when the preceding stem is of Type I;[37] while no stress is assigned when the preceding stem is of Type II because the suffixes in (100a) are assumed to be noncyclic.

(111) a.



b.

Notice that some of the suffixes in (99b(ii)), i.e., *μμta, μμte, (a)nai,* need some careful treatment. To take the suffix *μμta*, for example, the surface stress is:

(112) a. sira'be-ta (I) b. kurabe-ta (II)

Then, if this class of suffixes was considered to be Type II because of the fact that the example in (112b) has no surface stress such as one in (111b), we would have the following derivations, where only (113b) is correct.

(113) *a.

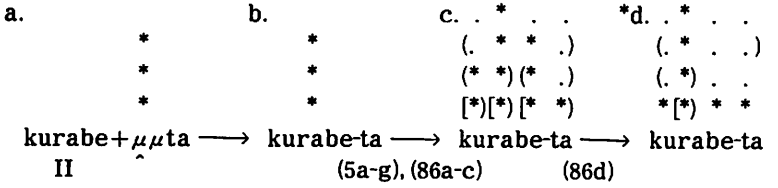
b.

In the case of incorrect (113a), the grid assigned to the stem would remain unchanged if the suffix *ta* is noncyclic, and the noncyclic stress rules could not apply to the suffixed string *sirabe-ta* because the suffix *ta* is now incorrectly assumed to be Type II. By contrast, if the suffix *ta* is cyclic, stress falls on the last mora of the stem incorrectly. On the other hand, no stress is assigned to either the suffix *kurabe* and the suffixed string *kurabe*

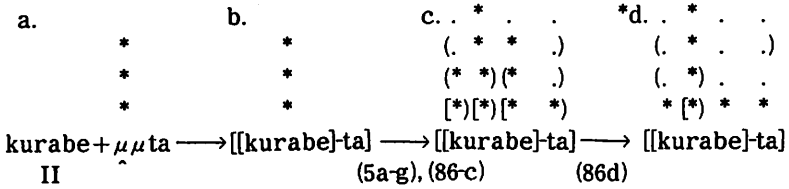
-ta in (113b) because they both are now considered to be Type II. Notice, however, this analysis is not correct, for stress must be assigned not to the penultimate mora of the stem as in the incorrect example (113a) but to the antepenultimate mora as in (112a) when the preceding stem is of Type I in the case of these suffixes, i.e., *μμta, μμte, (a)nai.*[38]

However, if these suffixes are considered to be pre-stressing suffixes, we will have the following incorrect derivation again when the preceding stem is of Type II regardless of whether the suffix is noncyclic as in (114) or cyclic as in (115). On the contrary, the fact is that no stress is assigned to the string *kurabe-ta* as in (112b).

(114) a. b. c. *d.



(115) a. b. c. *d.



In order to assure the correct output, therefore, we have to impose such restriction on grid construction that the Type II verb stems may not receive the surface stress. This solution for this problem is less implau-

sible, although we leave it open to question.

To sum, in the case of post-verbal Type II suffixes in (100), stress is assigned to the stem-final mora when the preceding stem is Type I; while no stress is assigned when the stem is Type II. Moreover, we have shown a possibility of imposing a restriction on grid construction that the Type II verb stem may not receive the surface stress.

4.3. Post-adjectival Suffixes

In the same way as the post-verbal suffixes, we first categorize the post-adjectival suffixes into each class in terms of their stress behavior with regard to the preceding word as in the following.

(116) Type I

a. *Noncyclic* (i) *unaccented* (U) ???

(ii) *accented* (A) kunai 'Negative'
kunaru 'become'
μkatta 'Past'
μkereba 'Provisional'
μkute 'Participle'

b. *Cyclic* (i) *unaccented* (U) i-rasii 'look like'
karoo 'Tentative'

(ii) *accented* (A) ???

(117) Type II

a. *Noncyclic* i 'Non-past'

b. ???

Notice also in (118) and (119) that the two types of adjective (stem), i.e., *ao'* 'blue' of Type I and *asa* 'shallow' of Type II alone are cited as the prototypes of the adjectives (stems) followed by each suffix, which is sufficient for our present purpose because there is no underlyingly accented adjective in Tokyo Japanese as discussed in section 1.2.1 in Yamada (1990a).

(118) Type I a. (i) ???

(ii) Adjective (stem)+Accented Noncyclic Type I suffix

ao'-kunai	asa-kuna'i
(<ao', kuna'i)	(<asa, kuna'i)

b. (i) Adjective (stem)+Unaccented Cyclic Type I suffix

ao-irasi'i	asa-irasi'i
(<ao', irasii)	(<asa, irasii)

(ii) ???

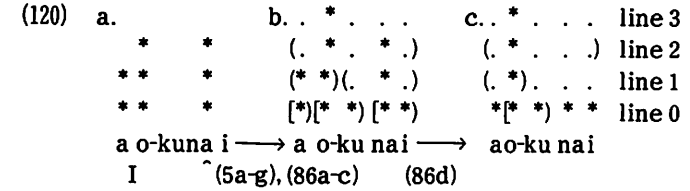
(119) Type II a. Adjective (stem)+Noncyclic Type II suffix

ao'-i	asa-i
(<ao', i)	(<asa, i)

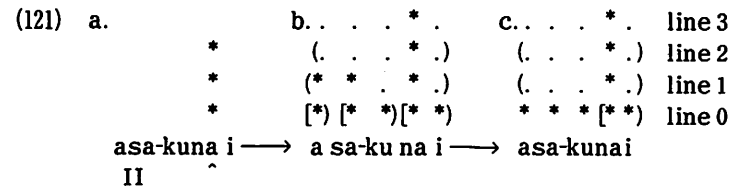
b. ???

4.3.1. *Noncyclic Type I Suffixes*

Let us examine the cases where an adjectival stem is followed by an accented Noncyclic Type I suffix exemplified in (118a(ii)). In the case of the string *ao'-kunai,* stress is assigned as follows:



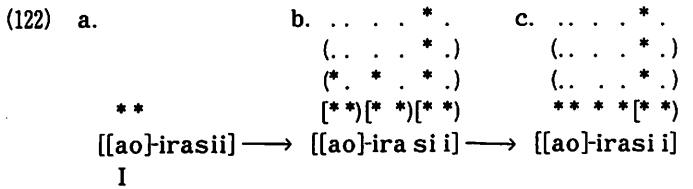
In (120a), the stress assigned previously to the adjectival stem *ao* of Type I is not wiped out, because the suffix *kunai* is assumed to be a noncyclic suffix. The suffix *kunai* is assigned a line 2 asterisk on the penultimate mora because it is postulated to be underlyingly accented. In (120b-c), noncyclic stress rules in (5) and (86) apply to yield the correct output. On the other hand, no stress was previously assigned to the adjectival stem *asa* of Type II in the case of example in (121a) when the underlyingly accented Type I suffix *kunai* is suffixed. In (121b-c), noncyclic stress rules in (5) and (86) apply, yielding the output correctly.

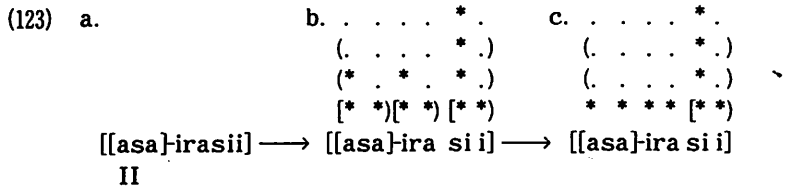


Therefore, in the case of the post-adjectival Noncyclic Type I suffixes in (116a(ii)) and (118a(ii)), the surface stress is placed on the stem-final mora as in (120) when the preceding stem is of Type I ; on the other hand, the surface stress is placed on the underlyingly accented mora of the suffix as in (121) when the preceding stem is of Type II.

4.3.2. *Cyclic Type I Suffixes*

Let us turn to the case in (118b(i)), where an adjectival stem is followed by an unaccented Cyclic Type I suffix *i-rasii*. Since this suffix is assumed to be cyclic, the previously assigned stress on the stem *ao* in (122a) is wiped out because of the Stress Erasure Convention. In the case of the stem *asa* in (123a), no stress is previously assigned because it is of Type II. Then, in (122b-c) and (123b-c), cyclic stress rules in (5) apply to yield the correct outputs.





In short, the post-adjectival Cyclic Type I suffix *i-rasii* overrides

stress on the preceding stem and always determines the surface stress as in (122) and (123).

4.3.3. Type II Suffixes

In the case of the post-adjectival Type II suffix *-i* exemplified in (119), the adjectival stems keep unchanged the previously assigned stress, if there is any on the stem, as in (124).

(124) a.
```
 *      *
 **     **
 **     **
ao-i ⟶ ao-i
 I II
```
b.
```
asa-i ⟶ asa-i
 II  II
```

In (124a), the stem *ao* is assigned stress by the noncyclic stress rules in (3) and (5). However, no stress rules apply again to the string *ao-i* after the *-i* suffixation since the adjectival suffix *-i* is assumed to be Type II; on the other hand, in the case of (124b), where both adjectival stem *asa* and suffix *-i* are held to be Type II, no stress rules apply either to the stem or to the suffixed string *asa-i*.

In the case of the post-adjectival Type II suffixes, stress is assigned to the stem-final mora when the stem is of Type I as in (124a). When it is of Type II, stress is not assigned to any position as in (124b).

4.3.4. Occupied Position

Now, let us further examine some of the accented Noncyclic Type I suffixes listed in (116a(ii)). Consider the following in (125) in particular.

(125) $\hat{\mu}$katta
$\hat{\mu}$kereba
$\hat{\mu}$kute

As is mentioned in footnote 35, all the suffixes in (125) give a line 2 asterisk to the final mora, represented by (μ), of the preceding stem, which will be formalized as follows:

(126) $\phi \longrightarrow$ * line 2 / $\underset{\mu}{\left\{\begin{matrix}\text{katta}\\ \text{kereba}\\ \text{kute}\end{matrix}\right\}}$

To take a suffix *katta*, for example, let us look at their exceptional behavior and our treatment, showing why they are assumed to be accented Noncyclic Type I with regard to the stress assignment.

First, look at the fact. Stress surfaces in different places in suffixation, depending on whether the preceding stem is of Type I or Type II, as follows:

(127) a. a'o-katta
I
b. asa'-katta
II

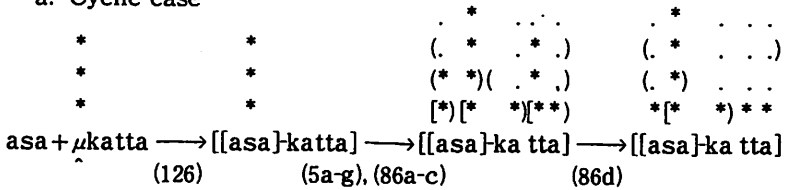
If the suffix *katta* belonged to Type II, their surface stress would be:

(128) *a. ao'-katta　　*b. asa-katta
　　I　II　　II　II

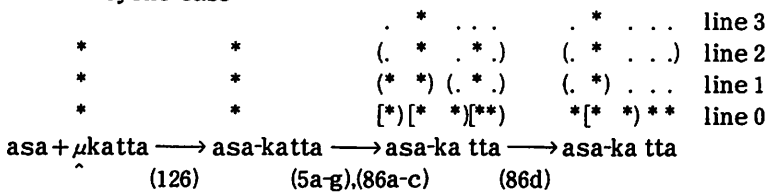
Their stress contours, however, are contradictory to the fact in (127). Therefore, the suffix should belong to Type I. What is more, it cannot be an unaccented Type I suffix, since if it was unaccented then it would receive the surface stress on the penultimate mora (or in this particular case, on the antepenultimate mora after the stress shift because the penultimate position of the suffix *katta* is a moraic consonant). This will not lead us to the desirable way.

Thus, choice is alternative: the suffix is accented Cyclic Type I or accented Noncyclic Type I. In the case of example (127b), where the preceding stem is of Type II, the result is the same no matter which alternative we take, as in (129), where we have the correct outputs.

(129) a. Cyclic case

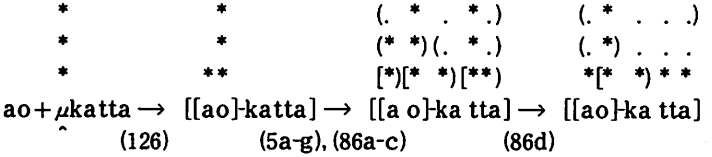


b. Noncyclic case



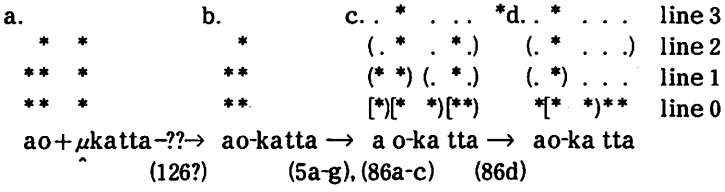
In the case of the example in (127a), where the preceding stem is of Type I, if we assume the suffix to be cyclic, we have the following derivation whose final output is not correct.

(130) a. b. c. *d.



Then, if we assume the suffix to be noncyclic, we have the following derivation, which shows an incorrect output as well.

(131) a. b. c. *d.



Notice, however, that rule (126) are applied vacuously in the derivation (131). What will happen if we assume that rule (126) does apply here to affect the grid of the preceding stem and that putting an asterisk on line 3 is not allowed on the phrasal level? Rule (126) tries to give a line 2 asterisk to the final mora of the preceding stem. This place has been already occupied, however, by an asterisk. Therefore, the asterisk lands on one more position to the left as is shown in (132b). Then, rules (5) and

(86) apply to yield the correct output. This is, however, a speculative explanation. Therefore, we leave it open to question for the present.

(132)

a.	b.	c.	d.	
* *	**	(* * . * .)	(*)	line 3
** *	**	(*)(*) (. * .)	(*)	line 2
** *	**	[*)[* *)[* *)	[*) * * * *	line 1
				line 0

ao+μ̂katta → ao-katta → a o-ka tta → a o-ka tta

4.4. Line 2 Asterisk

We have tacitly assumed that the underlyingly accented suffixes hold a line 2 asterisk or assign a line 2 asterisk to the preceding stem; while a line 1 asterisk is assigned to accented stems and words. If the asterisk was assigned to the suffixes on line 1 like stems and words, the derivation of the string *asa-katta* in (129), for example, would be:

(133)

a.	b.	c.	d.	
		(. . . * .)	(. . * ..)	line 3
		(* * . * .)	(. . * ..)	line 2
*	*	(* * . * .)	(. . * ..)	line 1
*	*	[*) [* *)[**)	* * *[**)	line 0

asa+μ̂katta → asa-katta → a sa-katta → asa-ka tta
(5a-f), (86a-c) (86b),(53)

The output in (133) is not correct. This is the evidence for the assumption that a line 2 asterisk is assigned to the suffix or the preceding stem in suffixation. This point is open to question as well, however, for all other suffixes can be equally accounted for by means of assigning a line 1

asterisk, except for the suffixes *μ̂μta*, *μ̂μte*, and *(a)nai* in the accented Cyclic Type I post-verbal suffix in (99b(ii)) and *μ̂katta*, *μ̂kereba*, *μ̂kute* in the accented Noncyclic Type I post-adjectival suffix in (116a(ii)).

4.5. Word-Suffix Concatenation

Now, let us look at the cases where a verb stem is followed by more than one suffix as exemplified in (134).

(134)

a.	b.	c.
sirabe-rare'-ru	sirabe-rare'-ru-to	sirabe-rare'-ru-dake
sirabe-sase'-ru	sirabe-sase'-ru-to	sirabe-sase'-ru-dake

In our analysis, the suffixes *(r)are'* and *(s)ase'* belong to accented Cyclic Type I ; while the suffixes *(r)u, to,* and *dake* belong to Noncyclic Type II.[39] Therefore, we can properly account for the stress placement for them. To take, for example, the string *sirabe-rare'-ru-to* in (134b), its derivation is as follows:

(135)

a.	b.	
	. . . . *	line 3
*	(. . . . *)	line 2
*	(* . * . *)	line 1
* * * *	[* *) [* *] [*)	line 0

[[sirabe]-rare]-ru-to ⟶ [[sirabe]-rare]-ru-to
I I

c.	d.	
. . . . *	*	line 3
(. . . . *)	*	line 2
(. . . . *)	*	line 1
* * * * [*)	* * * * *	line 0

⟶[[sirabe]-rare]-ru-to ⟶ sirabe-rare-ru-to
I I II II

In (135a), the stress previously assigned on the stem *sirabe* is wiped out because of the Stress Erasure Convention. A line 2 asterisk is automatically assigned to the last mora of the suffix *rare* in (135a) because this place is underlyingly accented. In (135b), the stress rules in (5) and (86) apply, yielding the stress pattern in (135c). In (135d), no stress is assigned anew because the suffixes *(r)u* and *to* are assumed to be the Noncyclic Type II suffixes which do not affect the preceding stress. As for the suffixes we have examined thus far, the stress pattern of the word-suffix concatenation can be well accounted for even if two or more suffixes are added to the stem. We can find more interesting facts if we pursue our analysis, since there are about ninety suffixes in Japanese.

5. Conclusion

We have examined the stress assignment mechanism of Tokyo Japanese within the framework of Halle and Vergnaud (1987b), and have postulated stress rules and parameter settings that account for the stress placement behavior of words, compounds, and suffixed strings.

The external intricacy of the stress assignment, especially in suffixed strings, has been properly explained in the light of the combination of three stress-defining factors of words and suffixes and their relation to the stress rules.

The words and suffixes in Tokyo Japanese are divided into the two types: Type I (surface-stressed type) or Type II (non-surface-stressed type). Each type is further categorized into the two groups: noncyclic or cyclic. Furthermore, each group is again calssified into the two classes: those underlyingly unaccented or those underlyingly accented. The dis-

tinction between Type I and II is empirical; while the distinction between noncyclic and cyclic and one between underlyingly unaccented and underlyingly accented are based on theoretical assumptions. With these three distinctions and the cyclic/noncyclic properties of stress rules, their stress patterns have been satisfactorily explained by the stress rules (3)-(5) and (86).

In table (136) below we list the words, compounds, and suffixes according to their stress assignment behavior. In the case of the Noncyclic Type I suffixes of table (136), stress is assigned to the preceding stem by the stress rules (3)-(5) and (86) when the stem is of Type I ; on the other hand, stress is assigned by the stress rules (3)-(5) and (86) to the suffix or to the position determined by the suffix when the preceding stem is of Type II. In the case of the Cyclic Type I suffixes and compounds with [+stress] compound stresshood in their last element, the stress of the suffix or the last element overrides the stress of the first element regardless of whether the first element is of Type I or Type II, and stress is always determined by the stress rules (3)-(5) and (86), depending on whether the last element is underlyingly unaccented or underlyingly accented.

In the case of the Noncyclic Type II suffixes of the table, the stress of the first element remains unchanged because no stress rule is assigned to the suffixed strings. On the other hand, in the case of the Cyclic Type II suffixes and compounds with [-stress] compound stresshood in their last element, the properties of the suffix or the last element override the stress of the first element, i.e., the whole string is treated as Type II.

(136)

			Post-N	Post-V	Post-A	Compound	S.Word
I	N	U	made yori daroo koso sae dano demo yara nado nante nanka (desu)	(r)eba	???	- - - - - -	midori haru ki, etc.
		A	gurai yorika mitai bakari yorimo (ne)	(a)nakatta ro/e	kunai kunaru μkatta μkereba μkute	- - - - - -	otooto kokoro kawa etc.
	C	U	rasii	(y)oo	i-rasii karoo	yuuki-situ zyooki- -kikansya dooka-sayoo etc.	- - -
		A	???	(r)are (s)ase (i)mas μμta μμte (a)nai	???	ree-gi kahee-kati niwaka-ame etc.	- - -
II	N		ga e ka sa sika to ya (da wa mo kara ni o)	(r)u to sika dake	i	- - - - - -	sakura sakana mizu etc.
	C		dake	???	???	seeyoo-huu keezi-ban gaikoku-see etc.	- - -

(where I = Type I, II = Type II, N = Noncyclic, C = Cyclic, U = unaccented, A = accented, Post-N = Post-nominal, Post-V = Post-verbal, Post-A = Post-adjectival, S.Word = Single word)

Notes

*Parts of this paper and Yamada (1990a) were presented at the symposium "New Trends in Phonological Theory" in the 62nd general meeting of the English Literary Society of Japan, May 19, 1990, in Okayama, Japan, and at the 9th general meeting of the Circle of Phonological Studies, November 18, 1989 in Kobe, Japan. I thank the audiences at each meeting for their comments and questions.

21. With regard to loan words, McCawley (1968: 134) points out the fact that stress falls on "the fourth mora from the end if the third mora from the end happens to be the second mora of a long syllable," citing the example *erebe'etaa* 'elevator'. The same kind of observation can be seen in Chew (1973: 31) that "when an accent (=stress, in our view) is expected on the last mora of a form, and that mora is the second mora of a syllable, the accent (=stress) is moved to the first mora of the syllable."

22. For a detailed discussion, see Yamada (1990, in preparation).

23. A long vowel requires two moras being associated with it.

24. In Tokyo Japanense, the consonant /n/ followed by a word boundary (#) or by a consonant, and /p, t, k/ followed by a consonant become moraic consonant, namely

$$/n/ \left\{ \begin{matrix} \# \\ C \end{matrix} \right\}, \left\{ \begin{matrix} /p/ \\ /t/ \\ /k/ \end{matrix} \right\} C$$

25. In (48), the adjacent identical vowels within the word *iin* and each mora associated with them do not violate OCP, for the noun *inn* is also composed of Sino-Jananese words *i* and *in*. For that matter, we will have to add a condition to the rule (47) that the syllable structure of the previous tier is respected. Moreover, we will need to clarify the relationship between morphology and phonology with regard to the syllable construction procedure, which is not our concern here.

26. The vowels [I] and [U] represent voiceless vowels [i] and [u], respectively.

27. For a detailed disccussion, see Halle and Vergnaud (1987: 65). Note in this example that a reduced vowel is transcribed with an apostrophe (').

28. The underlined vowel in each example represents the vowel which is not

devoiced though it satisfies the condition for High Vowel Devoicing.

29. Technically, as M. Halle (personal communication) has suggested, when High Vowel Devoicing occurs, line 0 constituent boundaries will be deleted by a readiustment rule, followed by leftward stress shift due to rule (58) and the assumption here.

30. For a detailed discussion, see section 3 in Halle and Vergnaud (1987b).

31. As is shown in section 1 in Yamada (1990a), the term "underlyingly unaccented" means that the position of stress is not marked in the lexicon, therefore, it is determined by stress rules (3)-(5). On the other hand, the term "underlyingly accented" means that the position of stress is marked in the lexicon.

32. The diacritic (ˆ) under the mora indicates the place where accent is marked in the lexicon. One might think this mark is redundant because the underlying accent is represented by an asterisk on line 1 in the grid and that surface stress is represented by the diacritic ('). In the ensuing discussion, however, in order to avoid a possible confusion between rule-generated surface stress and lexically governed surface stress when the grid structure is not shown, we will use this diacritic if necessary.

33. The suffixes *nante* and *nanka* in (82a(i)) receive stress on the penultimate mora by the stress rules (5) and (86), then the stress is subject to the stress shift discussed in section 3.3.

34. Square brackets represent a domain for cyclic stress rules.

35. The symbol (μ) represents a mora of the preceding stem. Therefore, in these cases, the suffixes *ta* and *te* give a line 2 asterisk to the penultimate mora of the preceding stem. We call them pre-stressing suffixes.

36. We suppose that this post-verbal suffix *dake* is different from the post-nominal suffix *dake* discussed in section 4.1.3.

37. In the examples (111a), (113a), and (124a), we will need some rule to reduce the stress on the first mora, for there is no subsidiary stress in Tokyo Japanese and rule (86d) does not apply in these examples as well because the rule cannot apply to the Type II strings ending in *-ru*.

38. Interestingly, if we assume that rule (4) exceptionally applies to these suffixes

and they are cyclic, we can get the correct result. This alternative is open to question.

39. Our analysis is different from those in Tenny (1986) and Tsujimura (1989). They categorize the suffixes *(r)are, (s)ase,* and *(r)u* into the dominant suffixes, i.e., cyclic suffixes.

Additional Note on page 17 in Yamada (1990a). M. Halle (personal communication) has shown me the following alternative. "Compound nouns in (20) are similar to English *salesman*: i.e., one of the two nouns is demoted to affix status and therefore not stressed; it is a class II (noncyclic) affix and therefore does not affect stress. In Japanese, suffix is class I (cyclic) and deletes stress. Examples in (20c) are exceptions to the readjustment (demotion) rule." In the case of [[zyooki]-[kikansya]], for example, the second constituent [kikansya] is demoted to affix status by the readjustment rule, which erases the brackets, resulting in [[zyooki]-kikansya]. Then, cyclic application of stress rules deletes the stress over the first constituent, and assigns stress to the antepenultimate mora like [zyooki-kika'nsya], provided that in Japanese the second constituent demoted from noun to suffix status is cyclic. Although this alternative supportiong the Stress Erasure Convention is very attractive, we leave this point open to question for further research.

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Errata to Yamada (1990a)/ "Stress Assignment in Tokyo Japanese (1): Parameter Settings and Compound Words"

p. 2, line 3: Replace "is" by "becomes"
p. 2, line 5: Replace "becomes" by "is"
p. 9, (12): Replace "• • • (• •) (• •) (. •) line 1" by "• • • (• •) (. •) (. •) line 1"
p. 14, (22c): Above "[[zyooki]-[kikan<sya>]]" replace the sequence "(• . • .)• . ." on line 1 by "(• . • . • .) ."
p. 16, (25): Replace "•a'kusento-ziten correct: akusent-zi'ten" by "•a'kusento-ziten correct: akusento-zi'ten"
p. 20, (33): Replace "(<yoozi+ki')" by "(<yo'ozi+ki')"
p. 21, (36): Replace "(<keeri 'accounting'+si' 'person')"by "(<ke'eri 'accounting'+si' 'person')"
p.28, note 20: Add "The fact that more and more TypeII words tend to be pronounced as Type I strengthens the validity of the assumption set in (3)-(5) for Type I words."

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