

The Accentuation System of Japanese Inflection\*

Hideki Zamma

1. Introduction

Since Haraguchi (1977), Japanese accent has often been studied by a lot of researchers in various ways (e.g., Zubizarreta (1982), Higurashi (1983), Poser (1984), and so on). However, little discussion has been devoted so far to accent in inflection. For example, Haraguchi (1991) just says that the accent of accented verbs/adjectives falls on the final vowel of the stem (or the root), and does not give any further discussion.

Yamada (1991) is one of the comprehensive studies of this rarely discussed subject. He analyzes Japanese accent in the framework of metrical phonology as developed by Halle and Vergnaud (1987); i.e., constructing metrical structures. Although I do not disagree with this kind of approach to Japanese accent, it seems to me that, as far as accent in inflection is concerned, it can be analyzed in a much simpler way; i.e., without constructing metrical structures.

Other important studies are Tenny (1986), Clark (1987), and Tsujimura (1989). Although their studies are very insightful and interesting, I find in them some points with which I cannot fully agree. In this paper, I will propose a new system to account for the accentuation system of Japanese inflection, which differs from any previous studies in the following respects: (1) whether a word is accented or not depends on the feature <+ACC> it has, not on its underlying accent, (2) there are two lexical levels for accentuation in inflection, and (3) accent falls on the penultimate mora of the inflective word at the first level.

The accent concerned here is that of Tokyo Japanese, and the data are taken from Bunkachoo (1971), NHK (1985), and the experiment conducted in Zamma (1991).

2. Accented Words

2.1. Verbs

Below are examples of accented verbs. The left part of the columns shows the inflection of a stem which ends with a vowel (i.e., V-Verb), and the right

part with a consonant (i.e., C-Verb):

(1)	tabe- 'eat'	ugokas- 'move'
Infinitive'	ta'be	ugoka's-i
Indicative	tabe'-ru	ugoka's-u
Imperative	tabe'-ro	ugoka's-e

The mark ' expresses the place of accent; i.e., where the pitch falls. If we assume, following Haraguchi (1977), that Japanese accent has the basic tone melody HL, the examples in (1) can be represented as follows:

(2)	<sup>*</sup> tabe     HL	<sup>*</sup> tabe-ru       L HL	<sup>*</sup> tabe-ro       L HL
	<sup>*</sup> ugokas-i       L HL	<sup>*</sup> ugokas-u       L HL	<sup>*</sup> ugokas-e       L HL

The H of the basic melody is associated to the mora which has accent (accent is indicated by the mark \*), and the L to the mora following it. The H spreads leftwards to every mora except to the first one. Although I will not make further discussion, the first mora is extratonal only for spreading and thus the default tone L is assigned to the mora (cf. (22)).<sup>2</sup> Since this process is self-evident after the place of accent is calculated, I will hereafter omit describing the whole mechanism of association unless necessary.

As for the place of accent, it has been assumed that accented verbs have underlying accent on the last mora of the stem (cf. Haraguchi (1977, 1991) among others). However, according to such an analysis, the accent of *ta'be* cannot be accounted for satisfactorily, because the accent does not move in the case of *ugoka's-i* (i.e., \**ugo'kas-i*). Thus, I would like to propose a new formulation of accent assignment in the following way:

(3) Accent Assignment for Verbs

$$\phi \rightarrow * / \bar{M} M ]_V \langle +ACC \rangle$$

This rule does not refer to a stem but to a whole word and thus the place of accent can be different from form to form. An accented verb does not need to

have underlying accent by itself, but needs only to have a feature to show whether it has accent or not; i.e., <+ACC>. Thus, in the case of *ta'be*, rule (3) applies after word formation (i.e., attachment of the infinitive suffix  $\phi$  for V-Verbs). The same process applies in the case of *ugoka's-i*.

The paradigm below provides further evidence for this proposal. Each accented verb has a stem-forming suffix:<sup>3</sup>

(4)		Inf.	Ind.	Imp.
	Causative	tabe-sa'se	tabe-sase'-ru	tabe-sase'-ro
	Passive	tabe-ra're	tabe-rare'-ru	tabe-rare'-ro
	Causative	hatarak-a'se	hatarak-ase'-ru	hatarak-ase'-ro
	Passive	hatarak-a're	hatarak-are'-ru	hatarak-are'-ro
		(hatarak- 'work')		

(5)		Inf.	Ind.
	Cau.+ Pas.	tabe-sase-ra're	tabe-sase-rare'-ru
		yom-ase-ra're*	yom-ase-rare'-ru
		(yom- 'read')	

All the examples above suggest that there is no underlying accent for verb stems, and that accentuation of verbs depends on the composition of the word, i.e., which mora is penultimate in the word.

However, the paradigms below seem to be counterexamples to the claim I have just made. Accent in each form falls on the antepenultimate mora, not on the penultimate one:

(6)	Past	ta'be-ta	ugoka's-i-ta
	Gerund	ta'be-te	ugoka's-i-te
(7)	Cau.+ Pst.	tabe-sa'se-ta	yom-a'se-ta
	Cau.+ Ger.	tabe-sa'se-te	yom-a'se-te

This problem can easily be solved if, as is often said in traditional school grammar, we assume that the past suffix *ta* and the gerund suffix *te* are attached to the infinitive form. In other words, these suffixes are attached after accentuation of infinitive forms has completed, and the default tone L is as-

signed to the suffixes as it is to the extratonal first mora.

This fact implies the possibility that there are two morphological/phonological levels in Japanese inflection.<sup>5</sup> In the examples above, we can assume that suffixation of infinitive suffixes and stem-forming suffixes and accentuation of verbs take place at level 1, and suffixation of past/gerund suffixes at level 2. If this assumption is correct, the materials in Tsujimura (1989) can also be explained in a straightforward way. She discusses the difference between accents on derivational suffixes in the framework of Halle & Vergnaud (1987); i.e., she attributes the difference to the one between recessive and dominant-accented/shifting suffixes. Below are some of the materials discussed in Tsujimura:

- |        |                        |            |             |              |
|--------|------------------------|------------|-------------|--------------|
| (8) a. | tao'-re-te             | 'fall'     | tao'-s-i-te | 'throw down' |
| b.     | nao'-t-te <sup>6</sup> | 'recover'  | nao'-s-i-te | 'mend'       |
| c.     | tasuk-a'-t-te          | 'be saved' | tasu'k-e-te | 'help'       |
| d.     | o'k-i-te               | 'get up'   | ok-o's-i-te | 'raise'      |

Like stem-forming suffixes, derivational suffixes belong to level 1 and thus the accent in each case falls on the penultimate mora of the verb at level 1 before suffixation of *ta* and *te* at level 2. As we expect, the accent of their indicative forms is:

- |        |             |             |
|--------|-------------|-------------|
| (9) a. | tao-re'-ru  | tao'-s-u    |
| b.     | nao'-ru     | nao'-s-u    |
| c.     | tasuk-a'-ru | tasuk-e'-ru |
| d.     | ok-i'-ru    | ok-o's-u    |

Since (*r*)*u* is a level 1 suffix, the accent falls on the penultimate mora of the word.

Another problematic case arises in provisional forms:

- |      |             |                  |                |
|------|-------------|------------------|----------------|
| (10) | Provisional | tabe'-re-ba      | yo'm-e-ba      |
|      | Cau.+ Pro.  | tabe-sase'-re-ba | yom-ase'-re-ba |

This can also be explained if we assume the provisional conjunction *ba* is attached after accentuation.<sup>7</sup> Bloch (1946) and many others have regarded (*r*)*eba* itself as a provisional suffix, but there are cases in which (*r*)*e* and *ba* are used with other constituents independently:

- (11) a. *ik-e-domo ik-e-domo* 'how far a person go(es)'  
 b. *hitoziti o kaesi-te hosi-ku-ba* 'if you want (me) to send the  
     hostages back'  
 c. *yob-a-ba yob-e* 'call (me) so if you want'

Thus, we can say that *(r)e* is the only provisional suffix<sup>8</sup> and *ba* is another constituent. In (10), Accent Assignment takes place after the level 1 suffix *(r)e* is attached, and the conjunction *ba* is attached at another level assigning the default tone L.

The last case I will mention here as problematic is the following:

- (12) a. Ind. *to'os-u* Pst. *to'os-i-ta* 'pass(intr.)'  
 b. Ind. *sinji'-ru* Pst. *si'nji-ta* 'believe'  
 c. Ind. *a'is-u* (cf. *aisu'-ru*) Pst. *a'is-i-ta* 'love'

Here the indicative forms in (12a) and (12c) and their corresponding past forms do not have accent on the mora expected from (3), i.e., accent falls not on the penultimate mora but on the antepenultimate one. However, if we assume that the last mora of a heavy syllable never carries accent in Japanese,<sup>9</sup> they are simply accounted for by the following condition:

- (13) Accent Condition for Heavy Syllables<sup>10</sup>

$$[\sigma[\text{ud}(C)V][\text{u}\{\overset{*}{V}\}_{\overset{*}{C}}]] \rightarrow [\sigma[\text{ud}(C)V][\text{u}\{\overset{*}{V}\}_{\overset{*}{C}}]]$$

But still we have words like *ka'er-u*, in which /æ/ is not usually regarded as a diphthong. I think that this comes from speakers' reanalyzing of /æ/ as a diphthong and that the reanalysis is fossilized in the lexicon, because variation can always be observed between *kanga'e-ru* and *kangae'-ru* ('think'), *matiga'e-ru* and *matigae'-ru* ('make an error') according to Bunkachoo (1971). The same is true for /oe/, because NHK (1985) includes both *totono'e-ru* and *totono'e-ru* ('arrange').<sup>11</sup>

From the discussion so far, we can arrange the suffixes and rules as in (14):

- (14) level 1:  $\phi$ /i, (r)u, ro/e, (r)e, stem-forming/derivational suffixes  
 Accent Assignment for Verbs  
 level 2: ta, te, ba  
 Default L Association

Actually, this arrangement concerning segregation of levels is not a complete one. We can revise it as we proceed with our discussion.

## 2.2. Adjectives

The same kind of approach can also be taken for the accentuation of adjectives. See the table below:

- (15) taka- 'high'<sup>12</sup>  
 Inf. ta'ka-ku  
 Ind. taka'-i  
 Pro. ta'ka-ker-e-ba  
 Pst. ta'ka-kat-ta'<sup>13</sup>

If we assume the indicative suffix *i* belongs to level 1 and other suffixes/infixes (i.e., *ku*, *kar*, and *ker*) to level 2, we can expect that accentuation of both verbs and adjectives is explained by means of the same system. Thus, I will revise (3) as follows:

- (16) Accent Assignment  

$$\phi \rightarrow * / \overline{M M} ]$$

$$\begin{array}{l} \langle +INFL \rangle \\ \langle +ACC \rangle \end{array}$$

The feature  $\langle +INFL \rangle$  indicates that words with this feature have inflection. In Japanese, only verbs and adjectives have this feature.<sup>14</sup> With this rule, they get accent on the penultimate mora at level 1.

The provisional form may be problematic because even though the suffix *e* belongs to level 1, it is attached after the level 2 infix *ker*. This may result from the fact that the adjective infixes are originally made from concatenation of the infinitive suffix *ku* and the verb stem *ar-*. The existence of the verb stem caused the suffixation of *e*, and this process has been retained even after the contraction *ku + ar- > kar (> ker before e)*. Thus, to capture this fact, we now need to make a special treatment for this *e*, that is, we need to

regard this *e* as belonging to level 2 (the suffix is distinct from the level 1 *(r)e*, which was seen in the usual verbal paradigm). So we now revise (14) as below, classifying adjective suffixes:

- (17) level 1:  $\phi/i$ , *(r)u*, *ro/e*, *(r)e*, *i*, stem-forming/  
 derivational suffixes, Accent Assignment  
 level 2: *ta*, *te*, *ba*, *ku*, *kar*, *ker*, *e* (after *ker*)  
 default L association

The quasi-bracketing-paradox concerning *e* is important because it seems to be one of the reasons which caused accent shift, which we will discuss in 4.3.

### 3. Unaccented Words

So far we have discussed accent of accented verbs/adjectives. Now let us turn our eyes on unaccented words. In (18), I give the paradigm of inflection of unaccented verbs:

- |      |      |        |       |                  |
|------|------|--------|-------|------------------|
| (18) | ake- | 'open' | kik-  | 'listen'         |
|      | Inf. | ake    | kik-  | i                |
|      | Ind. | ake-ru | kik-  | u                |
|      | Imp. | ake-ro | kik-  | e                |
|      | Pst. | ake-ta | ki-i- | ta' <sup>5</sup> |
|      | Ger. | ake-te | ki-i- | te               |

Since the words above do not have any pitch-fall, that is, they do not have accent (= the HL tone), we need a rule below for unaccented verbs/adjectives:

- (19) H-Insertion<sup>16</sup>
- $$\begin{array}{ccc}
 M \dots M ]_{\text{WORD}} & \longrightarrow & M \dots M ]_{\text{WORD}} \\
 & & | \\
 & & H
 \end{array}$$

Notice that this rule is applicable only to words which are not assigned accent by (16), that is, unaccented verbs/adjectives. After this, leftward spreading of H occurs (except to the first mora which is extratonal for spreading), because there is no mora to be associated on the right side. The word boundary in the formulation is necessary because conjunctions and particles, which are not a part of the word, never carry the H-tone:

(20) Pro.	ake-re'-ba	kik-e'-ba	conjunctions
Conditional	ake-ta'-ra	ki-i-ta'-ra	
Concessive	ake-te'-mo	ki-i-te'-mo	particles
Imp(emphasized).	ake-ro'-yo	kik-e'-yo	

This fact shows that this rule is carried out at level 2 because the suffixes *ta* and *te* carry the H-tone, and that conjunction/particle attachment and default L association take place at a later level, probably a post-lexical level as Tenny (1986) assumes. For the default tone, I will formulate a rule in the following manner:

(21) Default Tone Association<sup>17</sup>

The default tone L is assigned post-lexically to every mora which does not get any tone at earlier levels.

As I have mentioned in section 2.1., the default tone is also assigned to the extratonal first mora and suffixes which are attached after Accent Assignment (i.e., *ta*, *te*, and so on).

Now, I will show a sample derivation below. The left column is that of accented verb and the right unaccented verb:

(22)		tabe		ake	
level 1					
suffixation		tabe-re	tabe- $\phi$ <sup>18</sup>	ake-re	ake- $\phi$ <sup>18</sup>
Accent		*	*	—	—
Assignment		tabe-re	tabe- $\phi$		
		/			
		HL	HL		
level 2			*		
suffixation		—	tabe-ta	—	ake-ta
			HL		
H-Insertion		—	—	ake-re	ake-ta
(and				\	\
spreading)				H	H
post-lexical		*	*	ake-re	ake-ta
conjunction		tabe-re-ba	tabe-ta-ra	re-ba	ta-ra
attachment		/		\	\
		HL	HL	H	H
Default Tone		*	*		
Association		tabe-re-ba	tabe-ta-ra	ake-re-ba	ake-ta-ra
		/	/	\	\
		L HL L	HL L L	L H L	L H L



Verbs with stem-forming/derivational suffixes undergo the same process as those in (22). See the paradigm below. The left column shows an unaccented verb with a stem-forming suffix, and the right two columns unaccented verbs with derivational suffixes:

(23)	Inf.	ake-sase	tubu-re	tubu-s-i
	Ind.	ake-sase-ru	tubu-re-ru	tubu-s-u
	Imp.	ake-sase-ro	tubu-re-ro	tubu-s-e
	Pst.	ake-sase-ta	tubu-re-ta	tubu-s-i-ta
	Ger.	ake-sase-te	tubu-re-te	tubu-s-i-te
	Pro.	ake-sase-re'-ba''	tubu-re-re'-ba	tubu-s-e'-ba
	Cnd.	ake-sase-ta'-ra	tubu-re-ta'-ra	tubu-s-i-ta'-ra
	Cnc.	ake-sase-te'-mo	tubu-re-te'-mo	tubu-s-i-te'-mo
	Imp(emp).	ake-sase-ro'-yo	tubu-re-ro'-yo	tubu-s-e'-yo

Now we turn to cases of adjectives. Unlike verbs, the paradigm is not symmetrical enough to be explained straightforwardly:

(24)	kura-	'dark'	
	Inf.	kura-ku	
	Ind.	kura-i	
	Pro.	kura'-ker-e-ba	*kura-ker-e'-ba
	Pst.	kura'-kat-ta	*kura-kat-ta

Note that the provisional and the past forms do not have the expected unaccented pattern, which is shown on the right side of the columns. To account for this asymmetry, three approaches are possible.

The first approach is to regard the infixes as being attached post-lexically. H-Insertion is carried out at level 2 to the stem-final mora, and the default tone L is assigned to those mora attached post-lexically. However, this explanation is the least plausible because there is no syntactic evidence to regard the infixes as post-lexical, unlike *ba* and *ra* (= conjunctions). Moreover, it is odd to attach other suffixes post-lexically after infixes.

Secondly, is it possible to regard the infixes as having an accent associated with the L tone, as Clark (1987) proposes? This assumption contradicts the assumption that the Japanese basic tone melody is HL. Furthermore, the fact that the default tone is L in Japanese, and that accent associated with the L

tone disappears when the presumptive suffix *oo* is attached after the infix *kar* (cf. 4.2.), make this hypothesis less plausible.

Finally, I would like to propose the following assumption: the infixes have the feature <+ACC>. Again, this may be because the infixes are originally made from the concatenation *ku-ar-*. Because the verb stem *ar-* has the feature <+ACC>, the infixes inherit this feature. After infixation, the accent assignment rule (16) applies at level 2 in this special situation because of the feature <+ACC>. Since this process is a special one at level 2, the suffix *e* is not counted as a mora in (16) thus accentuation is carried out on the sequence *kura-ker*. This is because the Percolation Convention, which we will discuss in the next section, does not apply at level 2.

Even if this assumption is correct, a problem still remains. The accent assignment rule (16) predicts that the accent would be \**kura-ke'r-e ba* rather than *kura'-ker-e-ba*, because *ke* is the penultimate mora in the form *kura-ker*. Thus, we must revise (16) slightly, following Haraguchi (1977)'s assumption, that is, "in Japanese, tone-bearing unit is assumed to be a voiced vowel or a syllabic nasal *n*":

(16') Accent Assignment

$$\phi \rightarrow * / \overline{M} M ] \begin{array}{l} \langle +INFL \rangle \\ \langle +ACC \rangle \end{array} \quad (\text{where } M \text{ is a tone-bearing unit})$$

Being a consonant, *r* cannot be a tone-bearing unit and thus accent appears in *kura'-ker-*.

But the feature <+ACC> becomes ineffective for the accented stems given earlier. For example, a form like *ta'ka-ker-e-ba* never undergoes Accent Assignment at level 2 even though it also contains *ker*. This may be because there is a restriction for the accentuation rule not to occur more than once. I formulate this restriction as follows:

(25) Restriction on Accentuation

The accentuation rule cannot occur more than once at a later level for forms already accented at level 1.

Notice that this applies only for the infixes, because there are no level 2 suffixes which have the feature <+ACC>. This would be another reason for accent shift (cf. 4.3).

Now let us summarize this section. For unaccented words, which do not receive any tone at level 1, H-Insertion applies at level 2. Conjunctions and particles, which are attached post-lexically, receive the default tone L by (21). Only adjective infixes undergo a level 2 application of Accent Assignment (16') because of the feature <+ACC>, but (25) disables (16') from applying at level 2 for other accented adjectives. With these newly introduced rules, we can revise (17) as (26):

- (26) level 1:  $\phi$ /i, (r)u, ro/e, (r)e, i, stem-forming/  
 derivational suffixes, Accent Assignment  
 level 2: ta, te, ku, kar, ker, e (after *ker*), H-Insertion,  
 Accent Assignment (only for kar and ker)  
 post-lexical: conjunctions, particles, Default Tone Association

Some sporadic elements, i.e., *e* and Accent Assignment at level 2, would be reasons for accent shift which we discuss in 4.3.

#### 4. The Feature <+ACC>

##### 4.1. Percolation in stem-forming/derivational suffixes

As we have seen above, accentuation of words with stem-forming/derivational suffixes depends on whether the stem to which they are attached has the feature <+ACC> or not. In other words, suffixes of this kind do not originally have the feature concerning accentuation. If so, how can the accentuation rule (16') apply *after* suffixation, although the feature <+ACC> is contained only in the stem? To answer this question, I propose the following convention:

##### (27) Percolation Convention

The feature <+ACC> percolates to (stem-forming/derivational) suffixes at level 1.

Of course, this convention also applies to normal word-forming suffixes, because it is just stems that have the feature <+ACC>, while the Accent Assignment (16') refers to the penultimate mora of the word which has <+ACC>.

With this convention, I will show the course of derivation below. The left column is that of an accented verb-stem with a stem-forming suffix, and the right one that of an accented verb-root with a derivational suffix:

(28)	tabe + sase + ru	tasuk + ar + u
level 1 suffixation	tabe]-sase]-ru] <+ACC>	tasuk]-ar]-u] <+ACC>
Percolation Convention	tabe] -sase] -ru] <+ACC> <+ACC> <+ACC>	tasuk] -ar] -u] <+ACC> <+ACC> <+ACC>
Accent Assignment		
level 2 H-Insertion	_____	_____
post-lexical Default Tone Association		

In analyses like Tenny (1986), in which it is assumed that each stem-forming suffix carries underlying accent, it is hard to explain why the accent disappears when attached to unaccented stems, in other words, why *ake + sase\* + ru* becomes *ake-sase-ru* not *\*ake-sase'-ru*, while *tabe\* + sase\* + ru* becomes *tabe-sase'-ru*. In our analysis, however, this is easily explained. Below is a sample derivation of an unaccented verb-stem/-root with a stem-forming/derivational suffix:

(29)	ake + sase + ru	tubu + s + u
level 1 suffixation	ake]-sase]-ru]	tubu]-s]-u]
Percolation Convention	_____	_____
Accent Assignment	_____	_____
level 2 H-Insertion		
post-lexical Default Tone Association		

Since the stem/root does not have the feature <+ACC>, the suffixes never receive the feature by Percolation Convention and thus Accent Assignment does not apply. Instead, the words get the H tone by H-Insertion at level 2.

On the other hand, Tenny's analysis needs to delete the underlying accent

of suffixes when they are attached to unaccented stems, which is not necessary in our analysis. Moreover, the accent movement rule would be necessary to explain the accent in *tabe-sa'se-ta*, which is again unnecessary in our analysis (cf. (4) and (7)).

#### 4.2. The Hortative Suffix: (y)oo

McCawley (1977) observes that the hortative suffix (y)oo has dominant accent, and others such as Terry (1986) make the same analysis. However, they do not explain the mechanism behind this phenomenon. Here, I would like to suggest the possibility that this is because the suffix has the feature <+ACC>.

Now, observe the paradigm below. The left column shows accent of an accented verb-stem with the hortative suffix, and the right that of an unaccented verb:

(30) *tabe-yo'o*          *kik-o'o*

From the form of unaccented verb-stem, it is obvious that (y)oo has the feature <+ACC>:

(31)  $\text{kik] } \begin{array}{l} \text{-oo] } \\ \text{<+ACC>} \end{array} \longrightarrow \begin{array}{l} \text{kik-oo} \\ \text{||} \\ \text{HL} \end{array}$

Because of the feature <+ACC>, even an unaccented verb-stem acquires accent by (16').

However, when it is attached to accented stems, the feature <+ACC> seems to clash with that of the stem, so that the accentuation restriction (25) applies:

(32)  $\text{tabe] } \begin{array}{l} \text{-yoo] } \\ \text{<+ACC>} \end{array} \text{ } \begin{array}{l} \text{tabe] } \text{-sase] } \\ \text{<+ACC>} \end{array} \text{ } \begin{array}{l} \text{-yoo] } \\ \text{<+ACC>} \end{array}$

Nevertheless, if we assume that suffixation of (y)oo takes place at level 1, there can be no clash because the accentuation rule (16') applies after all suffixation. Since there seems to be no reason to believe that the suffix belongs to another level, this analysis is not dubious. Thus, we can conclude that (y)oo belongs to level 1 and that it has the feature <+ACC>.

Cases where (y)oo is attached to adjective stems, i.e., presumptive forms of adjectives, are problematic. Notice that historically, they are identical

with hortative forms of verbs, because the hortative forms sometimes have presumptive meaning:

- (33) kak-oo mono nara 'if a person dare to write'  
 kak-oo ga kak-u mai ga 'whether a person (wants to) write or not'

The fact that the presumptive forms of adjectives are made by attaching (y)oo to adjective infix *kar*, which has a verb-stem *ar-* in it, also supports this analysis. Thus, I regard the presumptive suffix of adjectives as identical with the hortative suffix of verbs.

Now let us turn to the paradigm of the presumptive forms of adjectives. In (34), the left column shows accent of the form with an accented stem, and the right with an unaccented stem:

- (34) taka-kar-o'o kura-kar-o'o

As we have seen in sections 2 and 3, the adjective infix *ker* occurs at level 2 and only in this case can the level 1 suffix *e* be attached at level 2. So we expect that the same process be carried out also in this case, since (y)oo is also a level 1 suffix as we discussed above. If we assumed that the same process was carried out in these cases, an inappropriate tone pattern would have been produced for the accented stem:

(35)	taka + kar + oo	kura + kar + oo
level 1 suffixation	taka] <+ACC>	kura]
Accent Assignment	* taka]  / HL	_____
level 2 suffixation	* taka] -kar] -oo]  / HL <+ACC> <+ACC>	kura]-kar]-oo] <+ACC> <+ACC>
Accent Assignment	_____ (restriction (25))	* kura-kar-oo       HL
post-lexical Default Tone Association	*       taka-kar-oo HL L LL	*       kura-kar-oo L HL

However, the actual accent is as indicated in (34). This must be analyzed as a special case. The presumptive (hortative) suffix prefers to belong strictly to level 1, and the adjective infix is brought into level 1 for this special condition.<sup>20</sup>

Notice here that when *kar* (and *ker*) becomes a level 1 affix through accent shift, the sporadic distribution of *kar* can get arranged because both *kar* and *(y)oo* can be attached at level 1 in such a case.

#### 4.3. The Adjective Infixes and Accent Shift

As we have seen, some suffixes and rule have sporadic distributions in the accentuation system. It is clear in the list below, which is a slightly revised version of (26).

- (26') level 1:  $\phi/i$ , (r)u, ro/e, (r)e, (y)oo, i, *kar* (before *(y)oo*)  
 stem-forming/derivational suffixes  
 Percolation Convention, Accent Assignment  
 level 2: ta, te, ku, *kar*, *ker*, e (after *ker*)  
 H-Insertion, Accent Assignment (only for *kar* and *ker*)  
 post-lexical: conjunctions, particles, Default Tone Association

Sporadic distribution can be observed in the following three points. First, although *kar* and *ker* belong to level 2, in which the accent assignment rule does not apply normally, they acquire accent because of the feature <+ACC>. Second, the provisional suffix *e* is attached at level 2 after *ker*, even though it belongs to level 1. And third, *kar* occurs at level 1 when the presumptive suffix *(y)oo* follows it.

To put this chaotic situation in order, it seems that some changes are taking place in inflection of adjectives. Here I will call it *accent shift* of adjectives. To investigate the present tendency of accent shift, Zanna (1991) conducted an experiment using Tokyo natives.<sup>21</sup> I will show the results below. In each form, the upper accent is the anticipated one, while the lower one(s) is/are not:

(36)	accented		unaccented	
Ind.	taka'-i	15 (88.2%)	aka-i	3 (17.6%)
	taka-i	2 (11.8%)	aka'-i	14 (82.4%)
Inf.	ta'ka-ku	12 (70.0%)	aka-ku	16 (94.1%)
	taka'-ku	5 (30.0%)	aka'-ku	1 (5.9%)
Ger.	ta'ka-ku-te	14 (82.4%)	aka'-ku-te	17 (100%)
	taka'-ku-te	3 (17.6%)		
Pro.	ta'ka-ker-e-ba	1 (5.9%)	aka'-ker-e-ba	17 (100%)
	taka'-ker-e-ba	16 (94.1%)		
Pst.	ta'ka-kat-ta	0 (0%)	aka'-kat-ta	17 (100%)
	taka'-kat-ta	17 (100%)		
Cnd.	ta'ka-kat-ta-ra	0 (0%)	aka'-kat-ta-ra	17 (100%)
	taka'-kat-ta-ra	17 (100%)		
Ind.	hido'-i	17 (100%)	kura-i	8 (47.1%)
			kura'-i	9 (52.9%)
Inf.	hi'do-ku	15 (88.2%)	kura-ku	17 (100%)
	hido'-ku	2 (11.8%)		
Ger.	hi'do-ku-te	14 (82.4%)	kura'-ku-te	15 (88.2%)
	hido'-ku-te	3 (17.6%)	ku'ra-ku-te	2 (11.6%)
Pro.	hi'do-ker-e-ba	9 (52.9%)	kura'-ker-e-ba	15 (88.2%)
	hido'-ker-e-ba	8 (47.1%)	ku'ra-ker-e-ba	2 (11.8%)
Pst.	hi'do-kat-ta	7 (41.2%)	kura'-kat-ta	16 (94.1%)
	hido'-kat-ta	10 (58.8%)	ku'ra-kat-ta	1 (5.9%)
Cnd.	hi'do-kat-ta-ra	3 (17.6%)	kura'-kat-ta-ra	17 (100%)
	hido'-kat-ta-ra	14 (82.4%)		
Ind.	mijika'-i	16 (94.1%)	tumeta-i	2 (11.8%)
	mijika-i	1 (5.9%)	tumeta'-i	15 (88.2%)
Inf.	miji'ka-ku	0 (0%)	tumeta-ku	14 (82.4%)
	mijika'-ku	16 (94.1%)	tumeta'-ku	3 (17.6%)
	mijika-ku	1 (5.9%)		
Ger.	miji'ka-ku-te	0 (0%)	tumeta'-ku-te	17 (100%)
	mijika'-ku-te	17 (100%)		



Pro.	miji'ka-ker-e-ba	0	(0%)	tumeta'-ker-e-ba	17	(100%)
	mijika'-ker-e-ba	17	(100%)			
Pst.	miji'ka-kat-ta	0	(0%)	tumeta'-kat-ta	17	(100%)
	mijika'-kat-ta	17	(100%)			
Cnd.	miji'ka-kat-ta-ra	0	(0%)	tumeta'-kat-ta-ra	17	(100%)
	mijika'-kat-ta-ra	17	(100%)			
	(aka- 'red,' hido- 'bad,' mijika- 'short,' and tumeta- 'cold')					

The first thing we should notice in the table is that accent shift is particularly prominent in provisional, past, and conditional forms of accented adjectives, that is, unexpected accent like *taka'-ker-e-ba* is prominent rather than expected *ta'ka-ker-e-ba*. This fact suggests that the adjective infixes are becoming level 1 affixes.

When this shift has completed, although it has not yet completed as we can see from the result of *hido-i*, the accentuation system seems to get arranged enough to abolish some of special treatments, that is, Accent Assignment at level 2 and bringing level 2 infix *kar* into level 1 before (y)oo.

I will show the course of derivation, assuming that accent shift has completed. Of course, *taka-* is an accented adjective stem and *kura-* an unaccented one:

(37)	taka + kar + ta	kura + kar + ta
level 1 suffixation	taka]-[kar] <+ACC> <+ACC>	kura]-[kar] <+ACC>
Accent Assignment	* taka-kar   / HL	* kura-kar   / HL
level 2 suffixation	* taka-kar-ta   / HL	* kura-kar-ta   / HL
H-Insertion	-----	-----
post-lexical Default Tone Association	* taka-kat-ta     /	* kura-kat-ta     /
(and <i>onbin</i> )	L HL L	L HL L

As we have discussed in section 3, the *r* of infixes are not counted as a mora in Accent Assignment, because it is not a tone-bearing unit and thus accent

falls on the penultimate mora counting from the mora before the *r*.

However, the provisional form remains problematic. Even if the infix became a level 1 affix and still contained the feature <+ACC>, inappropriate accent patterns would be produced.

(38)	taka + ker + e + ba	kura + ker + e + ba
level 1 suffixation	taka] -ker] -e] <+ACC> <+ACC>	kura] -ker] -e] <+ACC>
Percolation Convention	taka] -ker] -e] <+ACC> <+ACC> <+ACC>	kura] -ker] -e] <+ACC> <+ACC>
Accent Assignment	* taka-ker-e                 HL	* kura-ker-e                 HL
level 2 H-Insertion	_____	_____
post-lexical suffixation	* taka-ker-e-ba                       HL	* kura-ker-e-ba                       HL
Default Tone Association	*taka-ker-e-ba            L  HL  L	*kura-ker-e-ba            L  HL  L

To produce the correct accent pattern *taka'-ker-e-ba*, we have to analyze *e* as a level 2 suffix, as we did before, so that the accent falls on the penultimate mora of the sequence *taka-ker* at level 1. Although it still seems to be sporadic, it is not so when we think about the following fact.

First, let me present a list of suffixes and rules which get arranged through accent shift.

- (39) level 1 :  $\phi/i$ , (r)u, ro/e, (r)e, (y)oo, i, ku, kar, ker,  
stem-forming/derivational suffix  
Percolation Convention, Accent Assignment
- level 2 : ta, te, e (after *ker*), H-Insertion
- post-lexical: conjunctions, particles, Default Tone Association

We notice here that only three suffixes *ta*, *te*, and *e* (after *ker*) belong to level 2. Notice that all these suffixes are attached to a form that has already one suffix; i.e., *ta* is attached to infinitive forms of verbs (=  $\phi/i$ ) or to adjective infix *kar*, *te* to infinitive forms of verbs/adjectives (=  $\phi/i$ , *ku*),

and *e* to *ker*. Thus, it may be possible for us to revise (39) as below:

- (40) level 1 : one word-forming suffix, (y)oo  
                   stem-forming/derivational suffixes  
                   Percolation Convention, Accent Assignment  
   level 2 : other word-forming suffix(es), H-Insertion  
   post-lexical: conjunctions, particles, Default Tone Association

In this analysis, only one word-forming suffix of a form belongs to level 1, while other(s) attached after it to level 2 (although (y)oo belongs strictly to level 1 because it is attached to *kar*, the first suffix of the presumptive form of adjectives). If this assumption is correct, then all of the sporadic elements I have listed at the beginning of this section can be abolished.

Of course, we cannot go further to eliminate the feature <+ACC> of infixes, because unaccented adjectives get accent when they have one of these infixes. In the same way, the <+ACC> of the hortative suffix cannot be eliminated, because unaccented adjectives seem to get accent when they follow it, although the experiment above does not include this form.

Another point we should notice in the results of the experiment is that the infinitive suffix *ku* is also becoming a level 1 suffix (but again, it has not completed the process as we can see from the result of *hido-*). But this suffix, unlike the infixes, does not seem to have the feature <+ACC>, <sup>22</sup> because most of the examinees did not place accent on infinitive forms of unaccented adjectives. As for accent of gerund forms, we will discuss it in the next section as one of the remaining problems.

One more thing we should notice here is that indicative forms of unaccented adjectives tend to have accent. Although I have not yet investigated the case of attributive usage, this tendency seems to be remarkable when it is used predicatively, e.g., *Ano sha' tu wa aka'-i* 'That shirt is red' (= accented), but *aka-i sha' tu* 'a red shirt' (= unaccented). However, we do not further discuss this problem here, and leave it open to debate.

## 5. Remaining Problems

### 5.1. The Adjective Gerund Form: *ku-te*

One of the most important problems which remain unsolved in our analysis is

the gerund form of unaccented adjectives. As shown in (41), accent appears in the gerund form while it does not in the infinitive form (accent shift is irrelevant here because this form is of an unaccented adjective and thus never undergoes Accent Assignment at level 1):

- (41) Inf. kura-ku  
 Ger. kura'-ku-te      \*kura-ku-te

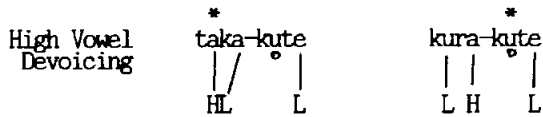
In our analysis, we expect the inappropriate pattern, which is shown in the right side of the columns above, where the level 2 suffix *te* is attached and H tone is inserted by (19). Although one might think that this is because the infinitive suffix has the feature <+ACC>, it is impossible to assume so because the infinitive form does not have accent; e.g., *kura-ku* but \**kura'-ku*.

Tenny (1986) assumes that the gerund suffix of the adjective is *kute*, not *ku-te*. She says that this is because the gerund suffix *te* cannot be attached directly to the adjective stems:

- (42) taka-kute      \*taka-te

If this is true, it may be possible for us to assume that the accent in the gerund form of unaccented adjectives results from the feature <+ACC> which the gerund suffix has, and from Accent Assignment which is applied at level 2 in this special case. (43) is a sample derivation under this assumption, before accent shift:

(43)	taka + kute	kura + kute
level 1 Accent Assignment	* taka  / HL	_____
level 2 suffixation	* taka-kute  / HL	kura-kute] <+ACC>
Accent Assignment	_____ (restriction (23))	* kura-kute  / HL
post-lexical Default Tone Association	* taka-kute  /   HL L L	* kura-kute    / L HL



As described in the case of *kura-kute*, the H tone of the basic melody associated to the accent is deleted by High Vowel Devoicing (cf. Haraguchi (1977)). And we have to assume that this suffix belongs to level 2 because the feature <+ACC> is ineffective for accented adjectives because of the restriction (25).

However, this assumption is implausible in the following respects.

First, since the units *ku* and *te* have an independent syntactic role (i.e., the former is used for infinitive forms and the latter for gerund forms), there is no necessity to regard the whole *kute* as a single unit. Second, *te* seems to be attached to infinitive forms also in cases of verbs:

(44) ugokas-i-te      tabe- $\phi$ -te

And this may be the reason why *te* (and *ta*) belongs to level 2 as shown in (40), i.e., suffixation to already suffixed stems occurs at level 2. And third, it is not a natural assumption because *kute* does not include any accented stems (cf. *kar*, which includes *ar*-).

Then, how gerund forms of unaccented adjectives are explained? Here, I just suggest the following possibility: in this case *te* belongs to the post-lexical class, i.e., *te* is not a part of the adjective but another constituent, probably a particle. Notice that what is attached after *ku* is usually regarded as another word since it has an independent accent:

(45) ta'ka-ku na'-i      'not tall'  
       ha'ya-ku hasi'-ru    'run fast'

Since Tokyo Japanese never has more than one accent in a word, the phrases shown above are regarded as consisting of two words. Thus, we have to conclude that nothing can be attached after *ku* as a part of the adjective and that *te* is a particle.<sup>23</sup>

If this assumption is correct, we can explain the accent of gerund forms of adjectives in such a way as we did in (43), i.e., at post-lexical level the High Vowel Devoicing deleted the H-tone which is assigned to *ku* at level 2:<sup>24</sup>

(46)	taka + ku + te	kura + ku + te
level 1	*	
Accent	taka	—
Assignment	/	
	HL	
level 2	*	
suffixation	taka-ku	kura-ku
	/	
	HL	
H-Insertion	—	kura-ku
		H
post-lexical	*	
particle	taka-ku-te	kura-ku-te
attachment	/	
	HL	H
Default Tone	*	
Association	taka-ku-te	kura-ku-te
	/	
	HL L L	L H L
High Vowel	*	
Devoicing	taka-ku-te	kura-ku-te
	/ °	
	HL L	L H L

After accent shift, the suffix *ku* is attached at level 1 and accent falls on *taka'*-*ku* for accented adjectives, which is not problematic because the process after level 1 is the same as in (46).

## 5.2. The Negative Suffix: *na-i*

Another important problem concerns the negative suffix *na-i*. This is a kind of stem-forming suffix in the sense that it can be attached to every verb-stem, making the whole part an adjective stem. But it differs from other stem-forming suffixes in three respects. First, it seems that the suffix can be attached to adjective stems as well. Second, it does not undergo the regular application of the accentuation rule. And third, it is not attached directly to verb/adjective stem but to forms which already have a suffix.<sup>25</sup>

The third point cannot be a problem when we think about cases like desiring forms, e.g., *kik-i-ta-i*. In such cases, the infinitive suffix *i* appears before the stem-forming suffix *ta-*. Because there are many stem-forming suffixes with this kind of characteristic, it is not a problematic phenomenon (although it is

not clear why the incomplete (= *mizenkei* in traditional Japanese grammar) suffix *a-* not the infinitive suffix appears before *na-*).

For the first two points, see the paradigm below now:

(47) accented verb stems

Inf.	tabe'-na-ku	yom-a'-na-ku
Ind.	tabe'-na-i	yom-a'-na-i
Pro.	tabe'-na-ker-e-ba	yom-a'-na-ker-e-ba
Pve.	tabe-na-kar-o'o	yom-a-na-kar-o'o
Pst.	tabe'-na-kat-ta	yom-a'-na-kat-ta
Ger.	tabe'-na-ku-te	yom-a'-na-ku-te

(48) unaccented verb stems

Inf.	ake-na-ku	kik-a-na-ku
Ind.	ake-na-i	kik-a-na-i
Pro.	ake-na'-ker-e-ba	kik-a-na'-ker-e-ba
Hor.	ake-na-kar-o'o	kik-a-na-kar-o'o
Pst.	ake-na'-kat-ta	kik-a-na'-kat-ta
Ger.	ake-na'-ku-te	kik-a-na'-ku-te

(49) accented/unaccented adjective stems

Inf.	ta'ka-ku na'-ku	kura-ku na'-ku
Ind.	ta'ka-ku na'-i	kura-ku na'-i
Pro.	ta'ka-ku na'-ker-e-ba	kura-ku na'-ker-e-ba
Hor.	ta'ka-ku na-kar-o'o	kura-ku na-kar-o'o
Pst.	ta'ka-ku na'-kat-ta	kura-ku na'-kat-ta
Ger.	ta'ka-ku na'-ku-te	kura-ku na'-ku-te

As for the cases of adjectives (i.e., (49)), *na-* actually is another word (i.e., an independent adjective) because the concatenation has two accents, which is prohibited in a single word, as we can see in the table of *taka-i*. It is not so in the cases of verbs because there is at most one accent in each form.

Now let us discuss the very first point we listed above, which is the main problem of this section. The table of unaccented verbs (i.e., (48)) shows the fact that *na-* inherits the stem's unaccentedness, which guarantees that this is a stem-forming suffix. Being a stem-forming suffix, *na-* is attached at level 1

and Accent Assignment applies after suffixation. However, there emerges a problem here. Although we have defined in (40) that the suffix *i* belongs to level 1 because it is the first word-forming suffix after a stem-forming suffix *na-*. The accentuation rule ignores the suffix and places the accent for just *tabe' -na-*.

To explain this phenomenon, I would like to propose the following assumption: *na-* in fact consists of *n-* + *a-*, i.e., only *n* is a stem-forming suffix and *a* is a word-forming suffix. Notice that *n-* inflects in the same way that verbs do, with its allomorph *z-*:

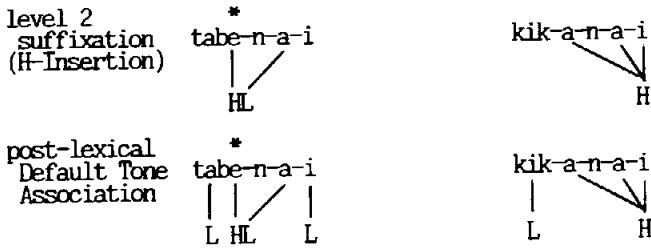
- (50) Incompletive *kak-a- n- a(-i, -ku, -kar, etc.)*<sup>26</sup>  
 Inf. *kak-a- z- i*  
 Ind. *kak-a- n- u(-na-ra, etc.)*  
       *kak-a- z- u(-ni, etc.)*  
 Cnd. *kak-a- n- e(-ba)*

There is no imperative form because of the existence of imperative-negation particle *na*.<sup>27</sup> And past and gerund forms are made in the same way as normal adjectives, i.e., attaching *ta* after *kar* and *te* after *ku*, although it is not clear why we cannot make a form like *\*kak-a-z-i-ta*, where we attach *ta* to the infinitive form, as we do with verbs. (Moreover, it is not obvious why the incompletive forms inflect like adjectives. Although we can assume that it may result by analogy with the inflection of adjective *na-i*, we will leave this question open.)

If this analysis is correct, that is, *na-* in fact consists of *n-* and *a-* and inflects like verbs, it may be easy to solve the problem. In the assumption we made in (40), only one word-forming suffix can be attached at level 1 and other suffix(es) thereafter at level 2. Thus, in this case, *i-* belongs to level 2 while *a-* to level 1. I will show the course of derivation below:

- |                           |                                              |                            |
|---------------------------|----------------------------------------------|----------------------------|
| (51)                      | <i>tabe + n + a + i</i>                      | <i>kik + a + n + a + i</i> |
| level 1<br>suffixation    | <i>tabe]-n]-a]</i><br><+ACC>                 | <i>kik]-a]-n]-a]</i>       |
| Percolation<br>Convention | <i>tabe] -n] -a]</i><br><+ACC> <+ACC> <+ACC> | <i>kik]-a]-n]-a]</i>       |
| Accent<br>Assignment      | *<br><i>tabe-n-a</i><br>  /<br>HL            | _____                      |





The same is true for other forms in (50): accent of every forms falls on *a-*, which is the penultimate mora at level 1.

## 6. Concluding Remarks

In this section, I will briefly summarize what I have proposed in this paper.

The main proposal is that there is no underlying accent in each verb/adjective. Moreover, whether the verb/adjective is accented or not depends on the presence or absence of the feature <+ ACC>. In this analysis, we can explain why stem-forming/derivational suffixes inherit the same accentedness, using Percolation Convention.

The problem why accent moves from form to form can be attributed to the assumption that there are two lexical levels in Japanese inflection. Because Accent Assignment is assumed to apply at level 1, accent depends on the form of the word at level 1.

Furthermore, another problem, where accent seems to appear in some forms of unaccented words, is explained by H-Insertion and Default Tone Association. Conjunctions and particles never get the H tone by H-Insertion because they are attached post-lexically, and thus they are assigned the default tone L. Combination of these independent rules causes unaccented words to have an accent-like tone pattern.

We can attribute accent shift in adjectives to sporadic distribution of suffixes and rules in level segregation. Below is a list of the distribution before accent shift:

- (26'') level 1 :  $\phi/i$ , (r)u, ro/e, (r)e, (y)oo,  $\phi/a$ , i  
kar (before (y)oo)  
stem-forming/derivational suffixes  
Percolation Convention, Accent Assignment
- level 2 : ta, te, ku, kar, ker, e (after *ker*)  
H-Insertion, Accent Assignment (for *kar* and *ker*)
- post-lexical: conjunctions, particles, Default Tone Association

There are three sporadic suffixes/rule, i.e., *kar* at level 1, *e* at level 2, and Accent Assignment at level 2. When accent shift has completed, two of these elements will be eliminated.

- (39') level 1 :  $\phi/i$ , (r)u, ro/e, (r)e, (y)oo,  $\phi/a$ , i, ku, kar, ker,  
stem-forming/derivational suffix  
Percolation Convention, Accent Assignment
- level 2 : ta, te, (r)e after *ker*, H-Insertion
- post-lexical: conjunctions, particles, Default Tone Association

Notice that *kar* and Accent Assignment is not sporadic any longer; i.e., they occur once in derivation. The only problem that remains is *ker* at level 2. However, this is also solved if we assume a following distribution.

- (40') level 1 : one word-forming suffix, (y)oo  
stem-forming/derivational suffixes  
Percolation Convention, Accent Assignment
- level 2 : other word-forming suffix(es), H-Insertion
- post-lexical: conjunctions, particles, Default Tone Association

In (40'), we can see no sporadic elements. This assumption implies that only the first suffix attached to a stem belongs to level 1, while others after it to level 2 (except for (y)oo, which belongs strictly to level 1). This is not unnatural when we notice that all the level 2 suffixes in (39') are attached to the forms which have already obtained another suffix at level 1, although this kind of classification differs from those proposed in traditional lexical phonology.

## Notes

\* I would like to express my deepest gratitude to Yukio Hirose, Shin-ichi Tanaka, Yukiko Kazumi, Toru Nakashima, June-ko Matsui, and Noriko Yamane for their valuable comments and suggestions on an earlier version of this paper. Any remaining errors are, of course, my own.

<sup>1</sup> This form is used particularly in a case like below:

- (i) Taro-wa momo-o ta'be, Jiro-wa ringo-o tabe-ta.  
'Taro → peach, and Jiro an apple.'

This form also appears before some suffixes; e.g., *ugokas-i-te* or *ugokas-i-ta-i*.

<sup>2</sup> It is not always the case that the first mora is extratonal (although Tenny (1986) proposes it is), because there are many nouns which have accent on this mora; e.g., *ta'masii* 'soul,' *ka'makiri* 'mantis,' and so on (I am grateful to Shin-ichi Tanaka for pointing out this fact to me).

Haraguchi (1977)'s Initial Lowering, i.e., a lowering of initial H tone, may be essentially same as my treatment, but my treatment will be easier for derivation because we can derive all the L tone altogether (cf. (21)).

<sup>3</sup> We can define stem-forming suffixes as following: it can be attached to every verb giving the same meaning. On the other hand, derivational suffixes cannot be attached to every verb and the type is different from verbs to verbs: cf. (8) and (9).

<sup>4</sup> There is also a similar form: *yom-as-are-*. In this case *-as-* can be analyzed as a derivational suffix.

<sup>5</sup> A similar proposal is made in Clark (1987). But she only refers to the difference between *ru* and *ta*.

<sup>6</sup> The derivational suffix *-t-* is originally *-r-*, and so-called *onbin* alternation changes the suffix as such. Notice the form before *onbin* is presumed as being *nao-r-i-te*.

<sup>7</sup> Tenny (1986) says that "'ra', 'ri', and 'ba' are in COMP rather than INFL position."

<sup>8</sup> Of course, this suffix is not identical with the imperative suffix. If so, there would be a form like: *\*tabe'-ro-ba*.

<sup>9</sup> I have not yet investigated this though. Tateishi (1989) says "we do not find any word that has an accent on *i* of *ui* ." Consider the following words: *koose' inen* 'good young man,' *san-ne' nsei* 'third-grader.' Many Japanese nouns have accent on the antepenultimate mora, which is the last mora excluding the extratonal unit for nouns: *foot* (cf. Tanaka (1990, 1992)). But in these cases, accent falls on the fourth-to-last mora. This phenomenon can be attributed to the rule (13).

<sup>10</sup> If we assume that accent is assigned to the syllable which contains the penultimate mora, this condition is unnecessary. However, such a rule is hard to formulate.

This condition can be unnecessary if we take the analysis with metrical structures, which we ignore in this paper.

<sup>11</sup> I am grateful to Shin-ichi Tanaka for suggesting this fact to me.

<sup>12</sup> Haraguchi (1977) regards the stem of this adjective as *takak-*. But consider the following forms:

(ii) Nominative	taka-s-a
Predictive	taka-s-i
Supposative	taka-s-oo

Although it is possible to think *k* constitutes a suffix as *s* does, it may be impossible to regard it as a part of the stem.

<sup>13</sup> The *kat* may be resulted from *kar* by *ombin* alternation.

<sup>14</sup> Although adjective-verbs are said to have inflection in traditional school grammar, it does not seem to be so because they can be analyzed as consisting of a noun and the copular *da* (or *na* ); e.g., *sizuka-da* 'silent,' *asahaka-da* 'shallow.'

<sup>15</sup> This form is derived after *ombin* alternation: *kik-i-ta* > *ki-i-ta*.

<sup>16</sup> Clark (1987) proposes a similar analysis, although her formulation slightly differs from the one I propose here in that she gives two steps for unaccented words to have the H tone, one of which is H-Insertion in her terminology, and the other Free Tone Association associating the H tone to every mora with no tones. Haraguchi (1977) and Tenny (1986) also assume the same kind of rules, the former of which differs from that of mine in that the H tone associated to unaccented words is that of the basic melody HL, and the latter in that the H tone is assigned to accent as well as to the last mora of unaccented

words (i.e., she does not assume the basic melody HL).

<sup>17</sup> The basic idea of this rule is the same as that of Tenny (1986: 3), although her analysis differs from that of mine in that she assigns the default tone in the same level as other tones; i.e., she assigns all melodies post-lexically. Clark (1987: 69) also proposes a similar analysis which has little difference from that of mine, that is, she uses the word "phrase-level," not "post-lexical."

<sup>18</sup> As we have seen, the  $\phi$  stands for an infinitive suffix, which is an allomorph of *i*. In the case of C-Verb, which is not included in (22), the suffix *i* emerges in this position: e.g., *kak-i*.

<sup>19</sup> Although the experiment in Zamma (1991) does not include it, one of the examinees pointed out to me that there is a pattern like *ake-sase'-re-ba*, which implies that stem-forming suffixes sometimes have the feature <+ACC>. This tendency seems to be prominent when the word which contains stem-forming suffix(es) has a long form: cf. *ake-sase-rare'-re ba*.

<sup>20</sup> There may be another possibility that this is because accent shift (cf. 4.3.) has completed in this form first, reanalyzing *kar* as a level 1 affix.

<sup>21</sup> The experiment involved asking 17 speakers to read 36 sentences which include adjectives (6 forms of 6 adjectives). The table below gives example sentences:

(iii) a. *Bukka-wa nen-nen taka-ku nat-te ki-te iru.*

'Prices are getting higher every year.'

b. *Kondo-wa kami-o mizika-ku site-miyoo.*

'I'll cut my hair short next time.'

c. *Kono-sakuhin-wa irozukai-ga kura-i .*

'The color of this work is gloomy.'

The italicized words are the ones in question (of course, the words are not italicized in the examples which the examinees were supposed to read).

The examinees were not informed of the aim of the experiment in advance, and they were all born and brought up in Tokyo. They were young persons whose age were 20-24, plus one over-forty woman (but she showed no difference in accentuation). The experimental data were recorded and transcribed by the examiner (the writer).

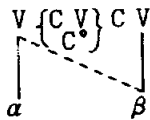
<sup>22</sup> Recall the fact that the <+ACC> of infixes comes from that of the origi-

nal verb *ar-*, which the suffix *ku* does not have.

<sup>23</sup> However, there seems to be patterns like *ta'ka-ku naru* 'become high,' in which *nar-* seems to be a stem-forming suffix because there is only one accent in the form. In such a case, we cannot conclude that the item after *ku* is another word. But this pattern seems to be a variation from *ta'ka-ku na'r-u*, in which *nar-* can be analyzed as another word, because such a pattern can sometimes be observed. The same is true for *ta'ka-ku su-ru* 'make high,' where the tone pattern can be both HLLL and HLLH (I am grateful to Shin-ichi Tanaka who pointed out this problem to me).

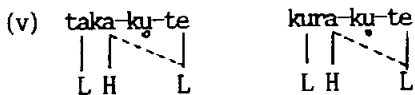
<sup>24</sup> Notice that devoiced vowels cannot be a tone-bearing unit in our analysis. However, one may feel that these vowels seem to carry some tones. For such an intuition I will propose the following rule, following Haraguchi (1977):

(iv) Flop Rule



(where *a* and *β* imply a tone)

As a result of this, it forms falling/rising tone on the mora preceding the devoiced mora. Although in Haraguchi (1977) the tone to be flopped is only H, it seems to me that the rule can also apply to L. Thus, the following structure may be under the intuition:



If a speaker feels that *ku* has the L tone, that is due to the fact that the preceding mora has a falling tone.

<sup>25</sup> As we have seen in the discussion of *ba* (cf. (11c)), *a* may be a distinct suffix, not a part of the stem-forming suffix; i.e., *kik-a-na-i* but *\*kik-ana-i*. This suffix also seems to appear with another negative suffix *zu*; e.g., *yom-a-zu*, which I do not discuss in this paper. If this segmentation is correct, the asymmetric distribution of the negative suffix in de Chene (1988, 1989) will get arranged, that is, C-Verbs have longer forms of the suffix *ana-* while they usually have shorter ones; e.g., *ase-* for C-Verbs while *sase* for V-Verbs.

<sup>26</sup> One may think that forms like *kak-a-zaru*, *kak-a-zari* are the incomple-

tive forms with the allomorph *z-*. However, the last part of the forms are divided in the following way: *-z-ar-u* or *-z-ar-i*, but *\*-z-a-ru*, which means *ar-* is a stem-forming suffix. This is obvious from the incompleted form of the whole stem: *kak-a-z-ar-a(-ba)* but *\*kak-a-z-a(-ba)*.

<sup>27</sup> Notice that this is distinct from the stem-forming suffix *n-* in the following points. (1) Historically, this is attached before the target word; e.g., *na okosi-so* 'Do not wake a person up.' (2) It is attached to indicative forms, not incompleted forms; e.g., *kak-u-na* but *\*kak-a-na*. (3) This may also be in COMP position, not in INFL position.

#### References

- Bloch, B. (1946) "Studies in Colloquial Japanese I: Inflection." *Journal of the American Oriental Society* 66. [References are to the version in Millar (1970).]
- Bunkachoo. (1971) *Onsei to Onsei-Kyooiku*. Tokyo: Ookurashoo.
- Clark, M. M. (1987) "Japanese as a Tone Language." in T. Imai et al., eds., *Issues in Japanese Linguistics*. Dordrecht: Foris.
- de Chene, B. (1987) "Keitai-On'inron ni Okeru Shinriteki-Jitsuzai." in Y. Ootsu, ed., *Kotoba kara Mita Kokoro*. Tokyo: Tokyo University Press.
- . (1988) "Japanese r-Epenthesis and Inflectional Boundary Buffer-Segments." (paper presented at the Annual Meeting of the Linguistic Society of America.)
- Halle, M. and J.-R. Vergnaud. (1987) *An Essay on Stress*. Cambridge, MA: MIT Press.
- Haraguchi, S. (1977) *The Tone Pattern of Japanese: An Autosegmental Theory of Tonology*. Tokyo: Kaitakusha.
- . (1991) *A Theory of Stress and Accent*. Dordrecht: Foris.
- Higurashi, Y. (1983) *The Accent of Extended Word Structures in Tokyo Standard Japanese*. Tokyo: EDUKA.
- McCawley, J. D. (1977) "Accent in Japanese." in L. M. Hyman., ed., *Studies in Stress and Accent (SCOPIL 4)*. Los Angeles: University of South California Department of Linguistics.
- Miller, R. A., ed. (1970) *Bernard Bloch on Japanese*. New Haven: Yale University Press.
- NHK, ed. (1985) *Hatsuon Akusento Jiten (Revised Edition)*. Tokyo: NHK Press.

- Poser, W. (1984) *The Phonetics and Phonology of Tone and Intonation in Japanese*.  
 Doctoral Dissertation, MIT.
- Tanaka, S. (1990) "Intrasyllabic Boundaries: A Violation of the Strict Layer Hypothesis." *Tsukuba English Studies* 9.
- . (1992) "Accentuation and Prosodic Constituenthood in Japanese." *Tokyo Linguistic Forum* 5.
- Tateishi, K. (1989) "Theoretical Implications of the Japanese Musician's Language." *WCCFL* 8.
- Tenny, C. (1986) "Tone and Cyclicity in Japanese," ms. MIT.
- Tsujimura, N. (1989) "Some Accentuation Properties in Japanese and Lexical Phonology," *LI* 20.
- Yamada, E. (1990a) "Stress Assignment in Tokyo Japanese: Parameter Settings and Compound Words." *Fukuoka Daigaku Jinbun Ronsoo* 21.
- . (1990b) "Stress Assignment in Tokyo Japanese: Stress Shift, and Stress in Inflection." *Fukuoka Daigaku Jinbun Ronsoo* 22.
- Zamma, H. (1991) *The Morphophonemics of Japanese Inflection*. unpublished BA thesis, Waseda University.
- Zubizarreta, M. L. (1982) "The Formal Interaction of Harmony and Accent: The Tone Pattern of Japanese." in H. van Hulst et al., eds., *The Structure of Phonological Representations (Part II)*. Dordrecht: Foris.

Doctoral Program in Literature and Linguistics  
 University of Tsukuba