The accentuation patterns of nominal compounds in Japanese: a preliminary study

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How accents are assigned in nominal compounds is a difficult question in Japanese generativist phonology. The main purpose of this paper is to provide a seminal overview of accentuation patterns observed in nominal (root-root) compounds in Japanese. Firstly, we provide descriptive overview of the phenomenon, and show what are the issues to be addressed. Second, we summarize recent OT-analyses by Kubozono (1995) and Tanaka (2001) which show that this seemingly extremely lexical phenomenon can be largely accounted in terms of phonology. Last, we evaluate the OT-analyses. In particular, we show that analysis of deaccentuation as a requirement by a phonological constraint creates serious problems, and hence such use of constraint should be ruled out in the grammar of Japanese phonology.

Accentuation of nominal compounds in Japanese has been a question of concern in generative linguistics since its inception (e.g., McCawley 1968). There have been a number of studies produced over the decades, and among them a general consensus has arisen that some regularity is exhibited in the accentuation pattern although the system is blurred by complications and irregularity.

This paper, which summarizes the ongoing research I am pursuing, does not attempt to provide a novel theoretical analysis for the phenomenon of Japanese nominal compound accentuation. Rather, its primary goal is to give a general overview of the phenomenon and to provide a critical review of some recent proposals made for the phenomenon within Optimality Theory, focusing on the accounts of Kubozono (1995) and Tanaka (2001). In examining these proposals, I also present an argument against a recent claim (Tanaka 2001: §4, Itô and Mester 2003: §3.2) that the emergence of the...
unaccented output in some compounds is a reflex of a highly ranked markedness constraint which prefers having no accent.

1. Preliminaries

This section provides some fundamental information about the accentuation patterns of Japanese (Tokyo dialect) nominals which is necessary in the rest of this paper. A reader who has basic knowledge of Japanese phonology may skip this section.

One of major defining characteristics of the accentuation pattern of Japanese nominals is that it is lexical, and hence it exhibits arbitrariness such that the pattern cannot be accounted for just by phonology. The accentually distinguished minimal pairs in (1) illustrate this point:

(1) Accentually distinguished minimal pairs: monomorphimic words

<table>
<thead>
<tr>
<th>Accent on initial syllable</th>
<th>Accent on final syllable</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kámi ‘god’</td>
<td>kamí ‘paper’</td>
</tr>
<tr>
<td>b. hási ‘chopstick’</td>
<td>hasí ‘bridge’</td>
</tr>
</tbody>
</table>

In compounds, on the other hand, both morphological and phonological factors affect the placement of accent. Some background on Japanese accentuation in general is needed before examining the patterns. First, accent is realized tonally in Japanese. While levels of both syllable and mora are important in Japanese phonology, the syllable is assumed to be the appropriate unit at which accent is associated in the Tokyo dialect (McCawley 1968). The set of examples in (2) illustrates this point:

(2)

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1 Note our primary concern is to give an overview of the compound accentuation of Tokyo Japanese and some generalizations discussed in this paper may not hold in other dialects.

2 This paper assumes the following symbols to represent Japanese phonemes:

<table>
<thead>
<tr>
<th>Plosive</th>
<th>Labial</th>
<th>Coronal</th>
<th>Palatal</th>
<th>Dorsal</th>
<th>Front</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p, b/</td>
<td>t, d</td>
<td>k, g</td>
<td>H, i</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s, z/</td>
<td>h</td>
<td></td>
<td>e, o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/m, n/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low</td>
<td>a</td>
</tr>
<tr>
<td>/r, (= ɾ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Following allophonic roles are observed: /t, d, s, z, h/ are realized as [tʃ, dz, ç, dz, ç] in front of the high front vowel /i/. Also, /t, d, h/ are realized as [ts, dz, ʃ] in front of high back vowel /u/. /g/ is often realized as [ŋ] intervocally in Tokyo Japanese. The ty (i.e., palatalized t) sequence in this paper has phonetic value of [tʃ].

3 This paper follows a relatively standard assumption that both a nucleus vowel and a coda element (i.e., moraic nasal and geminate) count as a mora. A long vowel counts two morae. See Yoshida (1990) for an alternative view. Also, note that some sequences of vowels are realized as diphthongs in actual speech (Vance 1987).
Compounding with 'city' (a period indicates moraic boundary)

Final monomoraic syllable
a. o.ka.ya.má -si  ‘City of Okayama’
b. hi.dá -si  ‘City of Hida’

Final bimoraic syllable
c. bi.zé.n -si  ‘City of Bizen’  (cf. *bi.zén-si)
d. hu.tyú.u -si  ‘City of Fuchu’  (cf. *hu.tyu.ú-si)

The examples in (2a,b) show that when 'city' appears as the second member of compounds, the accent falls on the final element of the first member of the compound. The examples in (2c,d) tell us further that an accent falls on a syllable, not on a mora; otherwise, *bi.zén-si, and *hu.tyu.ú-si would be expected.

Another point to mention is that accent is realized tonally in Japanese. Tonal assignment is roughly stated as follows: First, a tonal value of either high (H) or low (L) appears on every mora in Japanese. Every mora contains only one tonal value, and thus a contour tone is not observed. The tonal pattern depends on the position of the accent. The accented mora is always realized as H, and the subsequent morae are all realized low. The morae preceding the accented one are realized H, except the initial mora, which is always realized L unless it itself bears accent. Thus, kámi ‘god’ in (1b) is tonally realized as LH, and kámi ‘god’ (1a) as HL. okayamá-si ‘City of Okayama’ (2a) bears the pattern of LHHHL. An unaccented word bears L on its first mora, and H on the rest (i.e., LHH…H).

Tonal Realization of Accent

a. ká mi ‘god’  
   H L
b. ka mi ‘paper’  
   L H
c. o.ka.ya.má sì ‘City of Okayama’  
   L H H H L
d. ka ra si ‘mustard’  
   L H H

Although unaccented words and finally accented words seem to be indistinguishable given the description above, they are distinguished in several ways. First, they behave differently when a case-marking particle is attached to them; it has L tone when it is attached to a finally-accented word, whereas it has H tone with an unaccented one:

Finally accented ≠ Unaccented

a. ha si -ga ‘bridge-NOM’  
   L H L
b. ha si -ga ‘edge-NOM’  
   L H H

Also, Pierrehumbert and Beckman (1988) show that when a word is accented, the peak of the H-pitch appears on the accented mora. This means that a finally-accented word kataná ‘sword’ has the peak on the final mora na. On the other hand, an unaccented word, such as sakana ‘fish’, has the peak of H tone on the second mora.

With this background, let us now consider how accentuation interacts with

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The symbol ° is used to indicate an unaccented pattern in this paper.
compounding. One of the most prominent features of accentuation of nominals under compound formation is that accentuation is **culminative**; that is, a maximum of one accent is realized in the output form. This is exemplified in (5), as well as in (2) above:

(5)  

a. kágawa + kén ‘prefecture’ → kagawá-ken ‘Kagawa prefecture’  
b. okáyama → okayamá-ken ‘Okayama prefecture’  
c. saitáma → saitamá-ken ‘Saitama prefecture’  
d. okinawa° → okinawá-ken ‘Okinawa prefecture’

This paper considers only root-root compounds unless mentioned otherwise.  
Culminativity is not observed when a compound consists of more than three heads and the structure is right-branching (Itô and Mester 2003: 196).

Another characteristic of compound accentuation in Japanese is that the second member of a compound (henceforth N2) determines the accentuation pattern of the output compound. This can be seen (2) and (5) above, where in the compounds, accent falls consistently on the final syllable of the first member (henceforth N1). The phonological status of N1 seems to have no relevance in deciding accentuation pattern. This is shown in (2) and (5) and further forms illustrate the irrelevance of N1 are given in (6):

(6)  

a. dénki ‘electricity’ + kamisóri ‘shaver’ → denki-kámisori ‘electric shaver’  
b. anzen° ‘safety’ + kamisóri ‘shaver’ → anzen-kámisori ‘safe shaver’  
c. kami ‘paper’ + hukúro ‘bag’ → kami-búkuro° ‘paper bag’  
d. syúugi ‘congratulatory’ + hukúro ‘bag’ → syuugi-búkuro ‘gift envelope’  
e. pérusya ‘Persian’ + néko ‘cat’ → perusya-néko ‘Persian cat’  
f. manekì° ‘beckoning’ + néko ‘cat’ → maneki-néko ‘beckoning cat’

Furthermore, it is not the prosodic status nor the accentuation pattern of N2 which is responsible for accentuation pattern of compounds. Consider the pairs in (7):

(7)  

a. Bisyllabic words with accent on first syllable  
   i. híme ‘princess’ → oyayúbi-híme ‘Thumbelina’, sirayukí-híme ‘Snow White’  
   ii. míso ‘miso’ → hattyoo-míso ‘Hacchoo-style miso’, awase-míso ‘blended miso’

   b. Bisyllabic words with accent on second syllable  
   i. umá ‘horse’ → abaré-uma ‘restive horse’, hadaká-uma ‘unsaddled horse’  
   ii. iró ‘colour’ → oriibu-iro° ‘olive clour’, nezumi-iro° ‘grey (lit. rat-colour)’

Both N2s in (7a) consist of two light syllables and receive an accent on the initial syllable when they appear free. If the phonological information of N2 is sufficient to account for the accentuation pattern, we would expect compounds with these items to receive an

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5 More precisely this paper avoids dealing with any right branching compounds, and some compounds in this paper may be left branching; that is, some first members (non-head roots) of compounds which appear in this paper may be morphologically complex.

6 Voicing alternation observed in (3a,d) is due to Japanese-specific morpho-phonological process *rendaku*. See Itô and Mester (2003) and references cited therein for details of this phenomenon.
accent on the same location. However, that is not the case; compounds with hime ‘princess’ in N2 position receive an accent on the ante-penultimate syllable, whereas compounds with miso are accented on the penult of the compound. Similarly, umá ‘horse’ and iró have identical prosodic structure, but compounds with umá receive ante-penultimate accent, like hime, whereas compounds with iró appear unaccented. This shows us that accentuation patterns of compounds require lexical information about N2 to a certain extent.

The examples in (2), (5), (6), and (7) make it appear that the accent pattern of a compound is morphologically determined, based solely on N2. However, further study of compound accent reveals that phonological factors are also relevant. Let us consider the example in (8) to illustrate this point:

(8)  
\[ \begin{align*}  
\text{a. } \text{pérusya ‘Persian’} & + \text{néko ‘cat’} & \rightarrow & \text{perusya-néko} & \text{‘Persian cat’} \\
\text{b. } \text{kúro ‘black’} & + \text{néko ‘cat’} & \rightarrow & \text{kuro-neko} & \text{‘black cat’} \\
\text{c. } \text{marutá ‘log’} & + \text{hasí ‘bridge’} & \rightarrow & \text{marutá-basi} & \text{‘log bridge’} \\
\text{d. } \text{isi ‘stone’} & + \text{hasí ‘bridge’} & \rightarrow & \text{isi-basi} & \text{‘stone bridge’}  
\end{align*} \]

Both (8a) and (8b) have néko ‘cat’ as N2. From what we have discussed so far, we would expect both compounds to exhibit the same accentuation pattern. That is not the case. The example in (8a) receives the accent on the penultimate syllable, while the one in (8b) is unaccented. Similarly, (8c) has an accent on the ante-penultimate syllable, but (8d) is unaccented, despite the identical N2 being used. Thus, it cannot be the case that N2 simply carries with it the accent pattern that it requires in a compound. In (8) the major difference between forms with identical N2s is the number of syllables in N1. Some (bimoraic) N2s, like néko ‘cat’ and hasí ‘bridge’, make compounds unaccented when they combine with a bimoraic N1, but they assign an accent when the N1 is longer. Note that this is not applicable to all N2s, and some N2s, like hime ‘princess’ in (7a), do not obey this phonological conditioning, and assign an accent on the same location of a compound (in case of hime, ante-penultimate syllable of the word), regardless of its prosodic structure.

(9)  
\[ \text{hime ‘princess’} \]
\[ \text{a. with bi-moraic N1: } \text{u.tá-hi.me ‘(female) singer’} \text{ mai-hime (mái-hime)} \text{7 ‘dancer’} \]
\[ \text{b. with tri-moraic N1: } \text{o.ya.yu.bi-hi.me ‘Thumbelina’,} \text{ sirayuki-hime ‘Snow White’} \]

Thus, two factors are involved in accentuation patterns of nominal compounds. On the one hand, with some nouns as N2, the accentuation pattern is consistent no matter what N1 is. One the other hand, with other nouns in N2, phonological factors come into play, with the accentuation pattern varying depending on prosodic properties of N1. Phonology thus has an impact in accounting for compound accentuation; it will become more evident in the rest of this paper.

In this section we have reviewed some fundamental pre-theoretical observations about the accentuation patterns of nominal compounds of Japanese. Lexical information

\[ ^{7} \text{The variation of mai-hime vs. mái-hime comes from the fact that the sequence of vowels ai may be analyzed either as one diphthong (hence one heavy syllable) or two light syllables in Japanese.} \]
about N2 plays a crucial role in assigning an accent to a compound. However, while the significance of lexical information is evident, we see some cases of phonology active under the shadow of the arbitrariness induced by lexical information of N2. The questions are: What is the nature of the “lexical information” we have discussed so far, and how it can be woven into a theory of phonology?


In this section, we go through the recent analyses of compound accent in Japanese proposed by Kubozono (1995) and Tanaka (2001). Both make a rigorous attempt to provide a pervasive and global analysis for the overall patterns available in nominal compound formation in Japanese, using Optimality Theory.

2.1 Kubozono (1995)

Kubozono (1995) provides his analysis of compound accent as a response to Poser’s (1990) pre-OT analysis of this phenomenon. Poser bases his analysis on the notion of foot extrametricality. Poser’s analysis roughly states that if the original accent of the second member (N2) is in the final foot (parsed right to left) of the compound or if N2 is lexically unaccented, the surface compound accent is placed at the left-edge of N2. A foot is assumed to be weight-sensitive, and maximally bi-moraic, and must align with a morphological boundary. The analysis predicts the patterns shown in (10):

(10) Patterns predicted by Poser’s analysis (o = light (mono-moraic) syllable)

\begin{align*}
\text{With 4 mora N2} & \\
\text{a. } & \ldots + \text{o0o} \rightarrow \ldots + (\text{o})(\text{o}) \\
\text{b. } & \ldots + \text{o0o} \rightarrow \ldots + (\text{o})(\text{o}) \\
\text{c. } & \ldots + \text{o0o} \rightarrow \ldots + (\text{o})(\text{o}) \\
\text{d. } & \ldots + \text{o0o} \rightarrow \ldots + (\text{o})(\text{o}) \\
\text{e. } & \ldots + \text{o0o} \rightarrow \ldots + (\text{o})(\text{o}) \\
\text{With 3 mora N2} & \\
\text{f. } & \ldots + \text{o0o} \\
\text{g. } & \ldots + \text{o0o} \\
\text{h. } & \ldots + \text{o0o} \\
\text{i. } & \ldots + \text{o0o} \\
\end{align*}

In (10a), N2 is unaccented and, as described by Poser, the compound accent falls on the first syllable of N2; (10f) is similar, differing by the length of N2. In (10b,c,g,h), where the accent of N2 is in the last foot, the compound accent also falls on the first syllable of N2. The examples in (10d,e,h) are different — here N2 is accented on the antepenult, or further back, and the accent remains in this position. If N2 has lexical accent in the final foot (two light syllables), compound accent is retracted to the left and if it has accent in the non-final foot, that accent is retained. Poser attributes the retraction to final foot extrametricality and default accent placement on the left most syllable of N2. Some cases of accent retention and retraction are illustrated in (11):

(11) a. \text{yámato ‘Japanese’ + nadésiko ‘pink (a kind of flower)’} \\
\quad \rightarrow \text{yamato-nadésiko ‘traditional Japanese lady’ (cf. 10d)} \\
\text{b. sato° ‘homeland’ + kokóro ‘heart’ } \rightarrow \text{sato-gókoro ‘homesickness’ (cf. 10h)}

(Kubozono 1995: 24)
In the compound with *nadésiko* ‘pink (of flower)’ in N2 position (11a), the original accent of N2 falls on antepenultimate position, outside of final foot (\(\text{nadé}<\text{siko}\)), and therefore the compound surfaces with no change in the output accent of N2, as in (10d). On the other hand, in case with *kokóro* ‘heart’ in N2 position (11b), the original accent falls within the final foot (\(\text{ko}<\text{kóro}\)), and thus it needs to be shifted to the left edge of the root, as in (10h).

While it seems to be generally agreed that the notion of foot plays some role in Japanese phonology, Kubozono (1995: §3) states that its strict application under derivational theory does not work. The examples in (12) show Kubozono’s evidence against Poser’s analysis, followed by explanation.

(12) Evidence against feet-based analysis (Kubozono 1995: 25–27)

a. Variation with unpredicted pattern
   \[\text{kami} \ ‘\text{paper’} + \text{omútu} \ ‘\text{diaper’} \rightarrow \text{kami-ó}<\text{mutu}> \sim \text{Kami-o}<\text{mutu}> \ ‘\text{paper diaper’}\]

b. Accent in final feet, but parsed (Kubozono 1995: 26)
   \[\text{kita}^\circ \ ‘\text{north’} + \text{derawéa} \ ‘\text{Delaware’} \rightarrow \text{kita-der}<\text{wa}> \ ‘\text{North Delaware’}\]

c. Peculiar cases with “short” (i.e., 2 morae or smaller) N2s
   i. Accent may fall on N1 (default case)
      \[\text{kuwágata} \ ‘\text{plow-shape’}+ \text{musi}^\circ \ ‘\text{insect’} \rightarrow \text{kuwagatá-}<\text{musi}> \ ‘\text{stag beetle’}\]
   ii. Unaccented cases (“deaccenting morpheme”)
      \[\text{garaguta}^\circ \ ‘\text{junk’} + \text{yamá} \ ‘\text{mountain’} \rightarrow \text{garakuta-}<\text{yama}>^\circ \ ‘\text{junk mountain/ pile’}\]
   iii. Original N2 accent retained (Less common than the other two patterns)
      \[\text{momen}^\circ \ ‘\text{cotton’} + \text{ito} \ ‘\text{thread’} \rightarrow \text{momen-}<\text{ito}> \ ‘\text{cotton thread’}\]

The example in (12a) shows that compound accent may be realized in either antepenultimate or penultimate position. This variation, particularly the availability of the penultimate accent pattern, is crucial, since Poser’s analysis would predict that compounds with an N2 with three light syllables should have an accent on the antepenultimate position, as shown in (10h). Also, there are cases like (12b) where the compound accent appears in the final foot, faithful to the original N2 accent pattern, and it is the only grammatical pattern. The analysis summarized in (10) predicts only \(\text{*kita-dér}	ext{awea}\) since the final foot should be extrametrical, rejecting accent. Finally, Poser’s analysis can account only for long (consisting of more than three morae) N2s, and it leaves the cases with short (bi-moraic or less) N2s aside. Kubozono notes several peculiar features of short compounds. First, short N2 may allow an accent to fall on N1 (12c-i). Second, some short N2s, such as *yamá* ‘mountain’ and *tamá* ‘ball’, are lexically deaccenting in a compound; that is, compounds with these items in N2 position always

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8 Extrametrical feet are enclosed in angle brackets.
appear unaccented. Finally, (12c-iii) shows that similar to the cases in (12a) and (12b), compounds with certain short N2s may retain the original accent of N2, which is inevitably contained in the final foot.

Kubozono argues that the incompatibility of Poser’s analysis to the cases summarized in (12) is due to two assumptions made by Poser. One is derivational theory, which, Kubozono argues, has less flexibility for maintaining optionality. The other is the significance of extrametricality only at the foot-level. Kubozono propose an analysis based on Optimality Theory, arguing that it accounts for the insights of final foot extrametricality without the problems of Poser’s analysis. His proposal includes the following constraints and the (default) ranking:

(13) **Constraints** (Kubozono 1995: 30)
   a. **NONFINALITY**(FOOT): Accent may not be in the final foot of the prosodic word (PrWd). (captures Poser’s foot extrametricality)
   b. **NONFINALITY**(σ): Accent may not be on the final syllable of the PrWd.
   c. **RIGHTMOSTNESS**: Put accent at the right edge of the PrWd. (violation par syllable; maximally violated when unaccented)
   d. **PARSE**(N2): Preserve the accent of the second member as the compound accent.
   e. **ALIGN-CA**.\(^9\) Align the accent with the boundary between N1 and N2. (violated when unaccented)

*Default Ranking* (Kubozono 1995: 32):

**NONFINALITY**(σ) » **PARSE**(N2) » **NONFINALITY**(FOOT), **ALIGN-CA** » **RIGHTMOST**

Let us consider how the grammar with the constraints and their ranking given in (13) works with some sample cases provided in (14) below. First, the proposed system dictates that the original N2 accent must not be parsed if it falls on the final syllable, as in (14c) with *koohii* ‘coffee’ being N2. The original N2 accent, on the other hand, is parsed in a compound when it is not on the final syllable, as shown in (14a) and (14b). Notice also that the original accent of N2 *kisu* ‘kiss’ in the example (14b) is parsed, indicating that the foot extrametricality is not of primary importance. This is in accordance with the ranking that has **NONFINALITY**(FOOT) ranked lower than **PARSE**(N2). When the N2 accent is on the final syllable, such as *koohii* in (14c) or *hasi* ‘bridge’ in (14d), accent must be relocated. It is relocated to the left-edge of N2 when N2 is tri-moraic or bigger, and to the right-edge of N1 when N2 is bi-moraic or smaller. In (14c), the N2 *koohii* ‘coffee’ consists of four morae; the theory predicts that an accent falls on the N2 side. On the other hand, *hasi* ‘bridge’ in (14d) consists of two morae, thus the compound accent appears on the N1 side. Under Kubozono’s analysis, this variation is accounted as interaction of **NONFINALITY**(FOOT), **ALIGN-CA**, and **RIGHTMOSTNESS**. The relative

\(^9\) CA = Compound Accent
importance of NONFINALITY(FOOT) is observed in the case of (14d), with a bi-moraic N2. Both the optimal candidate maruki-basi and suboptimal *maruki-bási satisfy ALIGN-CA, but the grammar rules out the suboptimal one, since it crucially violates NONFINALITY(FOOT), choosing maruki-basi as the winner. If the extrametricality at the foot level is completely inert in the grammar, we would observe that *maruki-bási surfaces as the preferred option. In the case of (14c), both the optimal candidate aisu-kóohii and the suboptimal candidate *aisi-kooohii satisfy both ALIGN-CA and NONFINALITY(FOOT), and thus the grammars make the choice of aisu-kóohii, on the basis of RIGHTMOSTNESS. Finally, the grammar deals with cases with an unaccented N2 such as (14e) in the same way as it does for relocated cases (14c) and (14d). One thing to note is that the faithfulness constraint PARSE(N2) is existentially sensitive to N2 accent, but not the accentual situation of N2, and it does not require to be faithful to the unaccentedness of N2; otherwise, yoo-garasi° will be chosen as a winner. ALIGN-CA basically prefers that there be an accent, and it correctly rules out the unaccented candidate.

(14) Sample tableaux\(^{10}\) (Bracket ‘( )’ is used to show word-final foot; dot ‘·’ is used to indicate syllable boundary)

a. N2 accent parsed:

\[
\text{yámato} + \text{nádesiko} \rightarrow \text{yamato-nadésiko} \text{ ‘traditional Japanese lady’}
\]

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{yáma·to-ná·de(sí·ko)} & * & \text{W} & \text{W} & \text{W} & \text{L} \\
\hline
\end{array}
\]

b. N2 accent parsed (final foot):

\[
\text{faasuto}° + \text{kísu} \rightarrow \text{faasuto-kísu} \text{ ‘first kiss’}
\]

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{faa·su·to-(kí·su)} & * & \text{L} & \text{W} & \text{L} \\
\hline
\end{array}
\]

\(^{10}\) This paper adopts a relatively unconventional, but visually clear, style of OT tableaux, which is used in McCarthy (2003). In a tableau, the desired optimum (i.e., what we wish the grammar to produce) is provided in the first row above the row stating the input and constraints. W in tableaux means “the constraint favours Winner (the desired optimum),” and L “the constraint favours Loser (the desired suboptimal candidate).” Unlike the conventional notation which only indicates number of violation, this notation allows us to make an instant comparison between the desired optimal candidate and the desired suboptimal ones. With this notation the desired optimum is selected if and only if all Ls are preceded by at least one W in each row, and thus it essentially provides a foolproof way to make sure a tableau correctly selects the optimal candidate. See Prince (2002) for the details of this convention.
(14)  c. N2 accent in final syllable, and replaced to the left edge of N2:

\[ \text{áisu + koohii} \rightarrow \text{aisu-kóohii} \text{ ‘ice coffee’} \]

<table>
<thead>
<tr>
<th>( \text{áisu + koohii} )</th>
<th>( \text{PARSE(N2)} )</th>
<th>( \text{NONFIN(FT)} )</th>
<th>( \text{ALIGN-CA} )</th>
<th>( \text{RIGHTMOST} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{áisu-koo(hii)} )</td>
<td>*</td>
<td>*</td>
<td>W</td>
<td>*****</td>
</tr>
<tr>
<td>( \text{áisu-koo(hii)} )</td>
<td>*</td>
<td>W</td>
<td>L</td>
<td>*</td>
</tr>
<tr>
<td>( \text{áisu-koo(hii)} )</td>
<td>*</td>
<td>*</td>
<td>W</td>
<td>*</td>
</tr>
</tbody>
</table>


An advantage of Kubozono’s OT analysis is its flexibility. Recall that some N2s allow optionality of an accent to fall on either the penultimate or the antepenultimate syllable of a compound, as exemplified in the case of \( \text{kami-ómutu} \sim \text{kami-omútu} \text{ ‘paper diaper’} \) in (12a). The system Kubozono proposes can easily handle such cases with notion of constraint reranking. The case in which the antepenultimate syllable is accented can be achieved by minimally reranking the faithfulness constraint \( \text{PARSE(N2)} \) lower than \( \text{NONFINALITY(FOOT)} \), as shown in (15):

(15)  d. N2 accent in final syllable, and replaced to the right edge of N1:

\[ \text{maruki° + hasi} \rightarrow \text{maruki-basi} \text{ ‘log bridge’} \]

<table>
<thead>
<tr>
<th>( \text{maruki° + hasi} )</th>
<th>( \text{NF(σ)} )</th>
<th>( \text{PARSE(N2)} )</th>
<th>( \text{NONFIN(FT)} )</th>
<th>( \text{ALIGN-CA} )</th>
<th>( \text{RIGHTMOST} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{ma·ru·ki-(ba·sí)} )</td>
<td>*</td>
<td>*</td>
<td>W</td>
<td>*****</td>
<td></td>
</tr>
<tr>
<td>( \text{ma·ru·ki-(ba·sí)} )</td>
<td>*</td>
<td>W</td>
<td>L</td>
<td>*</td>
<td>W</td>
</tr>
<tr>
<td>( \text{ma·ru·ki-(bá·sí)} )</td>
<td>*</td>
<td>*</td>
<td>W</td>
<td>*</td>
<td>W</td>
</tr>
</tbody>
</table>

\( \text{e. Unaccented N2, accent added:} \)

\[ \text{yóo + karasi°} \rightarrow \text{yoo-gárasi} \text{ ‘western mustard’} \]

<table>
<thead>
<tr>
<th>( \text{yóo + karasi°} )</th>
<th>( \text{NONFIN(σ)} )</th>
<th>( \text{PARSE(N2)} )</th>
<th>( \text{NONFIN(FT)} )</th>
<th>( \text{ALIGN-CA} )</th>
<th>( \text{RIGHTMOST} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{yoo-ga(ra·sí)} )</td>
<td>*</td>
<td>*</td>
<td>W</td>
<td>*****</td>
<td></td>
</tr>
<tr>
<td>( \text{yoo-ga(ra·sí)} )</td>
<td>*</td>
<td>W</td>
<td>*</td>
<td>W</td>
<td>*</td>
</tr>
<tr>
<td>( \text{yoo-ga(rá·sí)} )</td>
<td>*</td>
<td>W</td>
<td>*</td>
<td>W</td>
<td>*</td>
</tr>
<tr>
<td>( \text{yóo-ga(ra·sí)} )</td>
<td>***</td>
<td>*</td>
<td>W</td>
<td>**</td>
<td>W</td>
</tr>
</tbody>
</table>

An advantage of Kubozono’s OT analysis is its flexibility. Recall that some N2s allow optionality of an accent to fall on either the penultimate or the antepenultimate syllable of a compound, as exemplified in the case of \( \text{kami-ómutu} \sim \text{kami-omútu} \text{ ‘paper diaper’} \) in (12a). The system Kubozono proposes can easily handle such cases with notion of constraint reranking. The case in which the antepenultimate syllable is accented can be achieved by minimally reranking the faithfulness constraint \( \text{PARSE(N2)} \) lower than \( \text{NONFINALITY(FOOT)} \), as shown in (15):
THE ACCENTUATION PATTERNS OF NOMINAL COMPOUNDS IN JAPANESE

(15) a. Reranking Parse(N2)

\[ \text{NONFIN}(\sigma) \rightarrow \ldots \rightarrow \text{NONFIN(FT)} \rightarrow \text{PARSE(N2)} \rightarrow \text{ALIGN-CA} \rightarrow \text{RIGHTMOST} \]

b. Accounting for variation of kami-ōmutu ~ kami-omútu ‘paper diaper’

i. Default ranking

<table>
<thead>
<tr>
<th>accentuation pattern</th>
<th>NONFIN(\sigma)</th>
<th>Parse(N2)</th>
<th>NONFIN(FT)</th>
<th>ALIGN-CA</th>
<th>\text{RIGHTMOST}</th>
</tr>
</thead>
<tbody>
<tr>
<td>kami + omútu / ‘paper diaper’</td>
<td>\text{NF(\sigma)}</td>
<td>Parse(N2)</td>
<td>NONFIN(FT)</td>
<td>ALIGN-CA</td>
<td>\text{RIGHTMOST}</td>
</tr>
<tr>
<td>ka·mi-ó(mu·tu)</td>
<td>*!</td>
<td>W</td>
<td>L</td>
<td>L</td>
<td>**</td>
</tr>
</tbody>
</table>

ii. Parse(N2) demoted below NonFinality(Foot)

<table>
<thead>
<tr>
<th>accentuation pattern</th>
<th>NONFIN(\sigma)</th>
<th>NONFIN(FT)</th>
<th>Parse(N2)</th>
<th>ALIGN-CA</th>
<th>\text{RIGHTMOST}</th>
</tr>
</thead>
<tbody>
<tr>
<td>kami + omútu / ‘paper diaper’</td>
<td>\text{NF(\sigma)}</td>
<td>NONFIN(FT)</td>
<td>Parse(N2)</td>
<td>ALIGN-CA</td>
<td>\text{RIGHTMOST}</td>
</tr>
<tr>
<td>ka·mi-ó(mu·tu)</td>
<td>*!</td>
<td>W</td>
<td>L</td>
<td>*</td>
<td>W</td>
</tr>
</tbody>
</table>

Note that this variation is not available for all items in Japanese lexicon, thus some idiosyncratic specification is necessary. We will see reranking in Tanaka’s (2001) analysis as an important way of accounting for variation.

Let us summarize what we have discussed in this section. Kubozono (1995) claims that extrametricality of the syllable level is of primary importance. On the other hand, extrametricality of the foot level has less significance than Poser claims; it shows its relevance particularly when the antagonistic faithfulness constraint Parse(N2) is demoted. We may safely agree that Kubozono’s OT-based analysis can achieve wide empirical coverage without having too much of stipulation.

2.2 Tanaka (2001)

While Kubozono’s analysis shows improvement over previous analyses as it accounts for a larger set of data, it needs further modification to account for a more exhaustive set of data. For example, the cases of unaccented compounds, such as the ones shown in (7b-ii), (8), and (12c-ii), are impossible to derive under Kubozono’s analysis, as it predicts that only accented candidates are optimal. Tanaka (2001) also points out that some constraints that Kubozono uses are unorthodox. A particular case is Align-CA, which is satisfied if an accent is placed either side of morphological boundary. In a standard theory of alignment, the edge is set either left or right, but not both. The goal of Tanaka’s (2001) analysis thus is the following: First, his analysis aims to account for the full range of phonologically determined possible outputs, including unaccented compounds. Second, the analysis tries to restate Kubozono’s analysis with “canonical” constraints, which are independently motivated cross-linguistically. Finally, Tanaka tries to assimilate the reranking analysis for certain cases to the well-established theory of Lexical Stratification, proposed by Itô and Mester (1995, 1999, 2003).

Now let us consider the analysis. The chart in (17) gives the constraints and the
default ranking which Tanaka provides:

(17) **Constraints and Default Ranking** (Tanaka 2001: 165, 178, 179)

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. NON-FINALITY($\mu', \sigma', F'$):</td>
<td>The accented mora, syllable and foot must not be final in a domain of prosodic word (PrWd).</td>
</tr>
<tr>
<td>b. NON-FINALITY(PrWd'):</td>
<td>The accented PrWd must not be final in PrWd. (Accent must not be present in PrWd)</td>
</tr>
<tr>
<td>c. MAX(accent):</td>
<td>The accent of a head root (=N2) has a correspondent in the compound.</td>
</tr>
<tr>
<td>d. ALIGN-L($\sigma'$, root):</td>
<td>The left edge of any accented syllable is aligned with the left edge of a head root. (not violated when unaccented)</td>
</tr>
<tr>
<td>e. ALIGN-R(PrWd, $\sigma'$) (=RIGHTMOST):</td>
<td>The right edge of any PrWd is aligned with the right edge of an accented syllable. (violated when unaccented)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ranking</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NONFIN($\mu', \sigma', F'$)</td>
<td>A</td>
</tr>
<tr>
<td>Max(acc)</td>
<td>B</td>
</tr>
<tr>
<td>ALIGN-L($\sigma'$, root)</td>
<td>C</td>
</tr>
<tr>
<td>N-FIN(PrWd')</td>
<td>= rerankable</td>
</tr>
</tbody>
</table>

The ranking in the second column in (17) shows the default case, and the three dotted lines, indexed as A, B, and C, indicate possibilities of reranking, which will be discussed later.

Let us consider the significance of the constraints and their ranking in (17). The faithfulness constraint MAX(accent) essentially works same as PARSE(N2) of Kubozono’s analysis. Interestingly, Tanaka (2001) notes the importance of the notion of foot, as he states the following generalization:

(16) **Generalization** (Tanaka 2001: 164)

Compound accent falls on the penultimate foot, except for the full preservation of accent in foreign heads (or in some archaic native and Sino-Japanese heads).

Tanaka (2001) thus puts more emphasis on the notion of foot extrametricality; which is realized as NON-FINALITY($\mu', \sigma', F'$) ranked higher than MAX(accent). Under the default ranking that Tanaka proposes, it is predicted that an accent be parsed when it falls in the final foot, and it be shifted otherwise. The location of the shifted accent is determined by
alignment constraints ALIGN-L(σ', root) and ALIGN-R(PrWd, σ'), which roughly work parallel to Kubozono’s ALIGN-CA. Examples of the default ranking are given in (18):

(18) Default: NF(µ', σ', F') » MAX(acc) » NF(PrWd'), AL-L(σ', rt) » AL-R(PW, σ')

a. Accent in non-final foot—parsed

<table>
<thead>
<tr>
<th></th>
<th>*</th>
<th>**</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ yamá + árasi / <em>mountain storm</em></td>
<td>NF(µ', σ', F')</td>
<td>MAX(acc)</td>
</tr>
<tr>
<td>yamá)-(a)(rasi)</td>
<td>*! W</td>
<td>*</td>
</tr>
</tbody>
</table>

b. Accent in final foot—shifted\(^{11}\)

<table>
<thead>
<tr>
<th></th>
<th>*</th>
<th>*</th>
<th>**</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ kami + omútu / <em>paper diaper</em></td>
<td>NF(µ', σ', F')</td>
<td>MAX(acc)</td>
<td>NF(PrWd')</td>
</tr>
<tr>
<td>kami-o(mutu)</td>
<td><em>!</em>* W</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>kami-o(mutu)</td>
<td>*! W</td>
<td>L</td>
<td>*</td>
</tr>
<tr>
<td>kami-o(mutu)</td>
<td>*</td>
<td>*</td>
<td>*! W</td>
</tr>
<tr>
<td>kámí-o(mutu)</td>
<td>*</td>
<td>*</td>
<td><em>!</em> W</td>
</tr>
</tbody>
</table>

Notice that Tanaka’s account conceptually differs from Kubozono’s, and in fact Tanaka’s analysis is more of a partial revival of Poser’s (1990) analysis as the default ranking induces foot extrametricality. Therefore the predictions of Tanaka’s analysis differ from those of Kubozono’s, particularly with respect to compounds where N2 has a sequence of two light syllables in final position, and whose original accent falls on the penultimate syllable (i.e., /…+…óo/ (“o” indicates a light syllable)). Kubozono considers that the N2 accent in such a case is parsed in the output in the default case (see (14b) and (15)). On the other hand, Tanaka’s analysis would predict that the accent shifts in the default situation. This case is illustrated in (18b) with omútu ‘diaper’ in N2 position. Recall, as shown in (15), the output which Tanaka’s analysis selects (kami-ómutu) is available in Kubozono’s analysis only when the faithfulness constraint PARSE(N2) (Tanaka’s MAX(acc)) is lowered. Note, however, that it is difficult to attest which default case is empirically more adequate and independent evidence would be required to ascertain default ranking, because both Kubozono’s and Tanaka’s analyses allow constraint reranking. Kubozono’s default ranking can be achieved by promoting MAX(acc) above NON-FINALITY(µ', σ', F') in Tanaka’s analysis and Tanaka’s default ranking can be achieved by demoting PARSE(N2) below NONFINALITY(FOOT) in Kubozono’s analysis.

As is the case with Kubozono’s analysis, reranking of constraints allows us to account for the data which are not analyzable with the default ranking. Tanaka’s analysis has three reranking possibilities, which are indicated by arrows with dotted line in (17). Under Kubozono’s analysis, the penultimate accented form kami-ómutu is selected by the default ranking. As we have seen, under Tanaka’s analysis, this form is selected with the

\(^{11}\) Note that an unaccented candidate is intentionally omitted in the tableau (18b), and in fact such candidate will be preferred to antepenultimate kami-ómutu since the antepenultimate candidate has a fetal violation of NON-FINALITY(PrWd'). More on this is discussed in section 3.
ranking with MAX(accent) promoted above \( \text{NONFINALITY}(\mu', \sigma', F') \), a reranking possibility indicated by dotted arrow A in (17). In such a ranking, the most faithful candidate is selected, hence the original accent is parsed wherever it falls in the input. Tanaka observes that many cases with a foreign (loanword) N2, as well as with some Sino-Japanese and archaic yamato (native) N2s, fall into this category.

(19) **Foreign:** \( \text{MAX(ace)} \gg \text{NFIN}(\mu', \sigma', F') \gg \text{NFIN(PrWd')}, \text{AL-L}(\sigma', \text{rt}) \gg \text{AL-R}(\text{PW}, \sigma') \)

a. **Parsed accent on the final syllable**

<table>
<thead>
<tr>
<th>( \text{cafe} )-(baa)</th>
<th>( /\text{kafe} + \text{baa}/ ) ‘café bar’</th>
<th>( \text{kafe} )-(baa)</th>
<th>*</th>
<th>*</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX(acc)</td>
<td>NF(( \mu' ), ( \sigma' ), F')</td>
<td>NF(PrWd')</td>
<td>AL-L(( \sigma' ), \text{rt})</td>
<td>AL-R(\text{PW}, \sigma')</td>
</tr>
</tbody>
</table>

b. **Variation with default case**

<table>
<thead>
<tr>
<th>( \text{kami-o(mutu)} )</th>
<th>( /\text{kami} + \text{omutu}/ ) ‘paper diaper’</th>
<th>( \text{kami-ó(mutu)} )</th>
<th>*</th>
<th>*</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX(acc)</td>
<td>NF(( \mu' ), ( \sigma' ), F')</td>
<td>NF(PrWd')</td>
<td>AL-L(( \sigma' ), \text{rt})</td>
<td>AL-R(\text{PW}, \sigma')</td>
</tr>
</tbody>
</table>

Notice that the case in (19a) is not expected under Kubozono’s analysis. In (19a), the N2 accent is parsed even though it falls in the final syllable position, which is achieved by having \( \text{MAX(ace)} \gg \text{NONFINALITY}(\mu', \sigma', F') \) under Tanaka’s analysis. Kubozono, on the other hand, does not posit that the faithfulness constraint may be promoted above \( \text{NONFINALITY}(\sigma') \).

Tanaka also finds a type of variation which neither Kubozono’s or Poser’s analyses can account for:

(20) a. \( \text{neri}^{\circ} \) ‘kneaded’ + \( \text{hamigaki} \) ‘tooth-brushing’

\[ \rightarrow \text{neri-hamigaki} \sim \text{neri-hámigaki} \ ‘\text{toothpaste}’ \]

b. \( \text{áka} \) ‘red’ + \( \text{murásaki} \) ‘purple’

\[ \rightarrow \text{aka-murásaki} \sim \text{aka-múrasaki} \ ‘\text{red purple}’ \]

c. \( \text{dénki} \) ‘electricity’ + \( \text{kamisóri} \) ‘shaver’

\[ \rightarrow (*\text{denki-kamísori}) \sim \text{denki-kámisori} \ ‘\text{electric shaver}’ \]

(Tanaka 2001: 169)

Tanaka states that the variation in (20a,b) involves quadramoraic N2s whose original accent falls on antepenultimate position, and crucially quadramoraic N2s whose original accent falls on any other location do not exhibit this variation, as illustrated in (20c). This variation is not predictable under Kubozono’s approach since the original N2 accent should be parsed if it falls on the antepenultimate syllable, and nothing motivates a shift of accent to the left edge of N2. Tanaka claims that this is due to \( \text{ALIGN-L}(\sigma', \text{root}) \), which is assumed to be freely rerankable with MAX(accent) (indicated by arrow B in (17)). The form that accent appear on the initial syllable of N2 thus emerges when MAX(accent) is ranked lower than \( \text{ALIGN-L}(\sigma', \text{root}) \), whereas realization of antepenultimate form is
analyzed with the default ranking, as illustrated in (21a,b). On the other hand, the analysis correctly predicts that compounds with a quadramoraic N2 whose original accent falls in non-antepenultimate position invariably surface with accent on the first syllable of N2, as shown in (21c,d):

(21) Quadraramoraic heads and Free Ranking:

a. \( \text{NONFIN}(\mu', \sigma', F') \rightarrow \text{MAX}(\text{acc}) \rightarrow \text{NONFIN(PrWd')} \), \( \text{AL-L}(\sigma', \text{rt}) \rightarrow \text{AL-R}(\text{PW}, \sigma') \)

<table>
<thead>
<tr>
<th>/neri° + hamígaki/</th>
<th>NF((\mu', \sigma', F'))</th>
<th>MAX(acc)</th>
<th>NF(PrWd')</th>
<th>AL-L((\sigma', \text{rt}))</th>
<th>AL-R((\text{PW}, \sigma'))</th>
</tr>
</thead>
<tbody>
<tr>
<td>nerī-(hám i)(gaki)</td>
<td>*</td>
<td>*</td>
<td>**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. \( \text{NONFIN}(\mu', \sigma', F') \rightarrow \text{AL-L}(\sigma', \text{rt}) \rightarrow \text{MAX}(\text{acc}) \rightarrow \text{NONFIN(PrWd')} \rightarrow \text{AL-R}(\text{PW}, \sigma') \)

<table>
<thead>
<tr>
<th>/neri° + hamígaki/</th>
<th>NF((\mu', \sigma', F'))</th>
<th>AL-L((\sigma', \text{rt}))</th>
<th>MAX(acc)</th>
<th>NF(PrWd')</th>
<th>AL-R((\text{PW}, \sigma'))</th>
</tr>
</thead>
<tbody>
<tr>
<td>nerī-(hám i)(gaki)</td>
<td>*</td>
<td>*</td>
<td>L</td>
<td>*</td>
<td>**</td>
</tr>
</tbody>
</table>

(c) \( \text{NONFIN}(\mu', \sigma', F') \rightarrow \text{MAX}(\text{acc}) \rightarrow \text{NONFIN(PrWd')} \rightarrow \text{AL-L}(\sigma', \text{rt}) \rightarrow \text{AL-R}(\text{PW}, \sigma') \)

<table>
<thead>
<tr>
<th>/děnki + kamisóri/</th>
<th>NF((\mu', \sigma', F'))</th>
<th>MAX(acc)</th>
<th>NF(PrWd')</th>
<th>AL-L((\sigma', \text{rt}))</th>
<th>AL-R((\text{PW}, \sigma'))</th>
</tr>
</thead>
<tbody>
<tr>
<td>děnki-kamisóri</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>**</td>
</tr>
</tbody>
</table>

(d) \( \text{NONFIN}(\mu', \sigma', F') \rightarrow \text{AL-L}(\sigma', \text{rt}) \rightarrow \text{MAX}(\text{acc}) \rightarrow \text{NONFIN(PrWd')} \rightarrow \text{AL-R}(\text{PW}, \sigma') \)

<table>
<thead>
<tr>
<th>/děnki + kamisóri/</th>
<th>NF((\mu', \sigma', F'))</th>
<th>AL-L((\sigma', \text{rt}))</th>
<th>MAX(acc)</th>
<th>NF(PrWd')</th>
<th>AL-R((\text{PW}, \sigma'))</th>
</tr>
</thead>
<tbody>
<tr>
<td>děnki-kamisóri</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>**</td>
</tr>
</tbody>
</table>

The third case of reranking involves unaccented compounds. As mentioned earlier, there are quite a few cases in which an unaccented pattern emerges. For example, as discussed in section 1, a quadramoraic compound with a bimoraic N2 often appear unaccented (cf., (8)). Also, Kubozono (1995) has indicated that some N2s such as \( \text{iró} \) ‘colour’ (7b) and \( \text{yamá} \) ‘mountain’ (12c-ii) lexically force the unaccented pattern. Tanaka (2001) considers that this is due to a markedness constraint \( \text{NON-FINALITY(PrWd')} \), which bans an occurrence of an accented prosodic word within a domain of prosodic word: This, essentially, prohibits an accent. Tanaka’s analysis ranks this constraint lower than \( \text{MAX(\text{accent})} \) in the default case, so that its effect is nullified in usual cases. However, once \( \text{MAX(\text{accent})} \) is demoted below \( \text{NON-FINALITY(PrWd')} \), as indicated by arrow C in (17), the unaccented pattern emerges, as illustrated by the tableau in (22):
Now let us consider the overall architecture of Tanaka’s analysis. The analysis requires minimal reranking of the faithfulness constraint $\text{MAX}(\text{accent})$ and antagonistic markedness constraints, as shown in (23):

\begin{enumerate}
\item \text{Accentuation Patterns and Stratification} (Tanaka 2001: 186)
\item\textbf{Max}(\text{accent})
\end{enumerate}

\begin{itemize}
\item \text{(A)} = accent parsed (mainly foreign)
\item \text{(B)} = accent in penultimate foot (mainly native, Sino-Japanese)
\item \text{(C)} = unaccented (mainly mimetic and acronyms)
\end{itemize}

The analysis predicts that accent appears in the penultimate foot in the default situation (Position B in (23)), and that is usually the case with compounds with a \textit{yamato} (native) or Sino-Japanese N2. When \text{MAX}(\text{accent}) is reranked above $\text{NON-FINALITY}(\mu', \sigma', F')$, to the position A in (23), the accentuation pattern is maximally faithful to the original N2 accent, and hence it is parsed at any cost. Tanaka notes that this is generally the case with a compound with a foreign N2, which recently entered into Japanese vocabulary. Finally when \text{MAX}(\text{accent}) is demoted to the C position, markedness is maximally enhanced, resulting with an unaccented form. The situation is very similar to the Lexical Stratification Analysis (Itô and Mester 1995, 1999, 2003). Thus, each morpheme carries a tag to indicate which ranking of \text{MAX}(\text{accent}) it is associated with. To this extent, the compound accentuation pattern is morphological but only a limited number of patterns are possible. Hence, the analysis reduces a great deal of potential redundancy which may arise under an analysis which claims that the lexical information of N2 tells, aside its original accentuation pattern, exactly where the compound accent should appear (pace Asano 2002: p. 332ff). For example, such an analysis would predict that there be an item which would require its compound accent to appear in the final syllable, while its original accent is in the penultimate syllable (i.e., / ... + ...óo / \rightarrow ...-...óó), or vice versa (i.e., / ... + ...óó / \rightarrow ...-...óó). However, such cases are never attested, to my understanding, and the unavailability of such forms would be a peculiar gap for an analysis which relies

\text{12} The chart in (30) below shows more available and unavailable patterns.
too heavily on lexical information.

3. Problems of the OT based analyses

The analyses of Japanese nominal compound accentuation under Optimality Theory made significant progress in accounting for the overall patterns of compound accentuation in Japanese. Kubozono’s (1995) and Tanaka’s (2001) analyses do not differ drastically since Tanaka’s analysis is essentially based on Kubozono’s, as we saw in the previous section. One of the biggest advancements of Tanaka’s analysis is that it provides an account for unaccented compounds as well the accented cases, through the introduction of a deaccenting constraint, NON-FINALITY(PrWd’). Independently, Itô and Mester (2003: §3.2) suggest a self-conjoined version of a deaccenting constraint NO-HL. This constraint prohibits the occurrence of accent in order to account for culminativity of Japanese accentuation. While an extension of the theory to account for the unaccented patterns is welcome, further examination of the analysis which posits that deaccentuation is the unmarked case reveals a number of critical pitfalls; some of which are empirical, and some conceptual. In this section, we evaluate the adequacy of an analysis which employs a deaccenting markedness constraint.

3.1 Empirical Problems

Let us first consider the empirical problems that arise from the analysis Tanaka proposes. We will observe in this section that the analysis faces empirical difficulties in two ways. The analysis cannot produce certain empirically expected outputs, on the one hand, and it predicts some empirically unexpected patterns, on the other. Crucially, the problems are often, if not always, related to the assumption of deaccenting NON-FINALITY(PrWd’).

3.1.1 Over-emergence of unaccented

Let us begin with cases where the analysis predicts the emergence of the unaccented pattern even when the actual data prefers an accented form to the unaccented one. We will see the cases that are exhibited in this subsection crucially cannot be rescued by reranking.

First consider compounds with N2s which are originally unaccented, such as okinawa and amerika in (24) below:

(24) Compounds with Unaccented Roots

a. nisi° ‘west’ + okinawa° ‘Okinawa’ → nisi-òkinawa
b. minami° ‘south’ + okinawa° → minami-òkinawa
c. kita° ‘north’ + amerika° ‘America’ → kita-ámerika
d. minami° ‘south’ + amerika° → minami-ámerika

---

13 Itô and Mester (2003) view accent as falling contour of tone (hence HL), based on the fact that accent is tonally realized in Japanese (see section 1).
Notice that both N1 and N2 are originally unaccented in the examples in (24), and thus there is no accent to be faithful to in the input. We would then expect the compounds to be unaccented, as *nisi-okinawa°, *kita-amerika°, and so forth. However, this is not the case as all the compounds in (24) are accented. The emergence of the accented pattern under this circumstance cannot be explained with the analysis which we have seen, since there is nothing in the set of proposed constraints which motivates accented forms other than ALIGN-R(PrWd, σ'), which is assumed to be always ranked the lowest within the set of constraints employed for the analysis. The low ranking of ALIGN-R(PrWd, σ') entails that reranking is no help, as the unaccented candidate will be selected invariably with any ranking.\(^{14}\) The tableaux, with various possible rankings, in (25) show this:

\(^{14}\) Note that reanalyzing the position of ALIGN-R(PrWd, σ') cannot solve problems. See section 3.2.2.

\[\text{(25) a.} \]

\[
\begin{array}{|c|c|}
\hline
\circ nisi)-(óki)(nawa) & *! & *** \\
\hline
\hline
/\text{nisi}^\circ + \text{okinawa}^\circ/ & NF(\mu', \sigma', F') & \text{MAX(acc)} \\
\hline
\circ nisi)-(okí)(nawa)^\circ & L & ***** W \\
\hline
\end{array}
\]

\[\text{(25) b.} \]

\[
\begin{array}{|c|c|}
\hline
\circ nisi)-(óki)(nawa) & *! & *** \\
\hline
\hline
/\text{nisi} + \text{okinawa}/ & \text{MAX(acc)} & NF(\mu', \sigma', F') \\
\hline
\circ nisi)-(okí)(nawa)^\circ & L & ***** W \\
\hline
\end{array}
\]

\[\text{(25) c.} \]

\[
\begin{array}{|c|c|}
\hline
\circ nisi)-(óki)(nawa) & *! & *** \\
\hline
\hline
/\text{nisi} + \text{okinawa}/ & NF(\mu', \sigma', F') & NF(PrWd') \\
\hline
\circ nisi)-(okí)(nawa)^\circ & L & ***** W \\
\hline
\end{array}
\]

\[\text{(25) d.} \]

\[
\begin{array}{|c|c|}
\hline
\circ nisi)-(óki)(nawa) & *! & *** \\
\hline
\hline
/\text{nisi} + \text{okinawa}/ & NF(\mu', \sigma', F') & AL-L(\sigma', rt) \\
\hline
\circ nisi)-(okí)(nawa)^\circ & L & ***** W \\
\hline
\end{array}
\]

Notice that none of the candidates in (25) violates MAX(accent), the rerankable constraint in Tanaka’s analysis, as there is no accent in the input which is required to be maximally expressed in the output, and thus all the candidates are on a par with regard to this constraint. This is clear from the Princean notation of the tableau, as there is no W or L marking with MAX(accent) for this case, entailing that the constraint is entirely inert for
this particular case of evaluation. Thus, we expect that the reranking of Max(accent) cannot lead to a correct output for this case, as we observe in the tableaux (25b-d), that this constraint simply plays no role when the input is unaccented.

3.1.2 Preaccenting cases with short N2

As we have seen, compounds may be realized as preaccented (accent falling on the last syllable of N1, instead of N2) when a short stem, consisting of two or fewer morae, appears as N2:

(26) a. nágoya ‘Nagoya’ + sí ‘city’→ nagoyá-si ‘City of Nagoya’ (Tanaka 2001: 174)
   b. hirosima° ‘Hiroshima’ + kén ‘prefecture’→ hirosimá-ken ‘Pref. of Hiroshima’

In this situation, the analysis wrongly predicts only forms with no accent, or those with the original accent, and the form in which the accent shifts onto the final syllable of N1 is never available, as exhibited in (27), showing the ranking which yields the unaccented form:

(27)

<table>
<thead>
<tr>
<th>Compound</th>
<th>*</th>
<th>!</th>
<th>*</th>
<th>*</th>
</tr>
</thead>
<tbody>
<tr>
<td>/nágoya + sí/</td>
<td>NF(µ', σ', F')</td>
<td>MAX(acc)</td>
<td>NF(PrWd')</td>
<td>AL-L(σ', rt)</td>
</tr>
<tr>
<td>‘City of Nagoya’</td>
<td>*</td>
<td>L</td>
<td>L</td>
<td>****</td>
</tr>
<tr>
<td>nágoya-(si)°</td>
<td>*</td>
<td>L</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>nagóya-(si)</td>
<td>!</td>
<td>W</td>
<td>L</td>
<td>*</td>
</tr>
<tr>
<td>nágoya-(si)</td>
<td>*</td>
<td>!</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

Any ranking situation is again fatal, as reranking of the faithfulness constraint Max(accent) does not provide an acceptable candidate. Reranking of this constraint to a higher position would simply predict the maximally faithful (i.e., final accented) candidate. Demotion to any lower position has no effect since both the desired optimal candidate and the unaccented candidate are on a par with respect to faithfulness; hence, NON-FINALITY(PrWd') (and ALIGN-L(σ', root)) force to select the unaccented candidate. One may say that this may be overcome by claiming that Max(accent) cares only about the existence of the corresponding accent in the output form, and the faithfulness of accentual location is dealt with by some other constraint. While such analysis in fact can handle the cases like (27), it still leaves the cases like (25) unaccounted for since Max(accent) is simply irrelevant in this situation.

3.1.3 Unexpected Variations

So far we have looked at cases where Tanaka’s analysis simply cannot derive the correct output regardless of ranking, assuming that ALIGN-R(PrWd, σ'), the only constraint which favours accented candidates, is low ranked. The cases we consider in
this section, on the other hand, are analyzable by the theory proposed by Kubozono (1995) and Tanaka (2001), but with some questions unanswered.

Let us first recall a type of variation that was discussed in the first section of this paper: It often appears that quadramoraic compounds with bimoraic N2 appear unaccented, even though compounds with the same N2 may be accented when they consist of five morae or more. See data in (28), as well as (8):

(28) Conditioned occurrence of unaccented pattern: (bimoraic) N1 + bimoraic N2
a. kúro + néko → kuro-neko° ‘black cat’ 4 morae
b. pérusya + néko → perusya-néko ‘Persian cat’ 5 morae

Kubozono and Fujiura (2004: Table 2) show this is statistically significant, as 73% (67% after omitting N2s which are arguably lexically deaccenting) of four mora compounds appear unaccented. Also, Katayama (1998: 214) observes 45% of loanwords which consist of four light syllables, such as sutere° ‘stereo’ and igirisu° ‘England’, are unaccented. Similarly, Kubozono and Ogawa (2004) find that 80% of two letter acronyms whose second letter consists of two light syllables, such as CM (sii-emu), FM (efu-emu), LL (erus-eru), SL (esu-eru), are unaccented. Moreover, Kubozono and Fukui (2004) conducted statistical research on a Japanese accentuation dictionary, and find that the ratio of quadramoraic entries increased to 29% in the 1998 edition of NHK Accent Dictionary from 19% in 1985. These statistical data suggest that deaccentuation of quadramoraic words is active and is becoming stronger in current Japanese phonology. Although no satisfactory analysis has been proposed for this odd phonological context, at least to my knowledge, this phenomenon is crucial to the analysis along the line of Tanaka (2001). We have seen earlier that some cases of variation, such as kami-ómutu ~ kami-omútu ‘paper diaper’, are handled as a case of reranking. Similarly we can derive both kuro-neko° ‘black cat’ and perusya-néko ‘Persian cat’ by stipulating that MAX(accent) is reranked above NON-FINALITY(µ', σ', F') when the N2 néko ‘cat’ forms a compound of 5 morae, and MAX(accent) is demoted below NON-FINALITY(PrWd') (or in its default place) when the N2 forms a quadramoraic compound.

(29) a. kuro-neko°

<table>
<thead>
<tr>
<th></th>
<th>kuro-neko°</th>
</tr>
</thead>
<tbody>
<tr>
<td>/kuro + néko/ ‘black cat’</td>
<td></td>
</tr>
<tr>
<td>kuro-néko</td>
<td>*!</td>
</tr>
</tbody>
</table>

b. perusya-néko

<table>
<thead>
<tr>
<th></th>
<th>perusya-néko</th>
</tr>
</thead>
<tbody>
<tr>
<td>/pérusya + néko/ ‘Persian cat’</td>
<td></td>
</tr>
<tr>
<td>perusya-neko°</td>
<td>*!</td>
</tr>
</tbody>
</table>

However, such ad hoc reranking cannot be motivated for this four mora deaccentuation, as it is assumed that faithfulness may be specific to lexical sub-classes, and reranking of a
The accentuation patterns of nominal compounds in Japanese

faithfulness constraint due to phonological factors is simply unattested.\textsuperscript{15} Also, such an analysis overlooks the fact that the deaccented pattern appears only when a short N2 forms a quadramoraic compound. If we were to say that the variation of the sort is indeed due to free reranking, we should expect that \textit{*kuro-néko} and \textit{*perusya-neko}\textsuperscript{o} would be equally as well-formed as the examples in (28).

In addition, the reranking model predicts cases of compounds with short N2 that are never attested. Kubozono and Fujiura (2004) find that permissible cases of compounds of five light syllables with short \textit{yamato} (native) N2 are very limited, as summarized in (30) (with cases of our concern boldfaced):

\begin{center}
\textit{(30) Possible patterns of compound accentuation with ‘short’ N2 and ‘long’ N1 (Kubozono and Fujiura, 2004) (o = light syllables)}
\begin{tabular}{llll}
  a. & ooo + oo\textsuperscript{o} & $\rightarrow$ & ooó + oo  \\
  & Attested & & Unattested \\
  & & & *ooo + óo  \\
  & & & *ooo + oó  \\
  & & & \textbf{*ooo + oo}\textsuperscript{o}  \\
  b. & ooo + oó & $\rightarrow$ & ooó + oo  \\
  & & & Unattested  \\
  & & & *ooo + oó  \\
  & & & *ooo + óo  \\
  & & & \textbf{ooo + oo}\textsuperscript{o}  \\
  c. & ooo + óo & $\rightarrow$ & ooó + oo  \\
  & & & Unattested  \\
  & & & *ooo + óo  \\
  & & & \textbf{*ooo + oo}\textsuperscript{o}  \\
\end{tabular}
\end{center}

We see that five mora compounds with originally unaccented N2 are always realized with antepenultimate accent (30a). However, the analysis with reranking would wrongly predict that they would always appear unaccented, as we have seen in section 3.1.1. The problem is serious since there are no unaccented compounds attested with N2s in this category. Similarly, compounds with short N2 with the original accent on the final syllable are realized either with accent on the antepenultimate syllable or with no accent (30b), and they never retain the original N2 accent on the final syllable. This is odd, since the theory predicts that final syllable accent is possible when the faithfulness constraint is ranked higher than the NON-FINALITY constraint family. One may argue that this is due to class-specific faithfulness constraints which are ranked low, but such an argument does not hold, since the original accent of \textit{yamato} N2 may be fully parsed when the N2’s original accent is on the first syllable, as we have seen in the cases with \textit{miso} ‘miso paste’ in (7a-i) and \textit{néko} ‘cat’ (28). Finally, five mora compounds with short N2 whose original N2 accent is on the first syllable, shown in (30c), may have either ante-penultimate accent or penult (parsed) accent. The unaccented pattern is not attested here, even though the demotion of MAX(accent) should be equally available to the compounds in this category. To sum up, the unavailability of these empirically unattested cases under Tanaka’s analysis is nothing but a pure lexical accident.

\textsuperscript{15} In fact, Itô and Mester (1995, 1999) model Japanese phonological lexicon in set-theoretic terms, and they consider that markedness constraints are an Optimality Theoretic predication of various domains. On the other hand, they consider that faithfulness constraints mark where lexical entities are located in the domains. Thus, reranking is restricted by lexical subclasses.
3.2 Conceptual Problems

In this subsection, we consider more conceptual problems of the system which Tanaka proposes. Notice that the problems discussed in the previous subsection are related to the deaccenting constraint NON-FINALITY(PrWd') being relatively freely available in the phonological system, and/or the Lexical Stratification theory of Itô and Mester (1995, 1999, 2003).

3.2.1 Complication of Lexical Stratification

One of the tenets of Tanaka’s analysis is a reliance on Lexical Stratification and the claim that when N2 is more novel, such as recent loanwords from English, a compound is more likely to inherit N2’s accentual pattern, whereas the accent of a native N2 tends to shift.

Let us briefly review how the Lexical Stratification analysis works. Itô and Mester (2003: 130) discuss that some phonological requirements in Japanese phonology exhibit an implicational relation. For instance, some lexical items (namely, yamato vocabularies) obey the requirement that postnasal obstruents must be voiced, and also undergo the process of rendaku (sequential voicing; see footnote 5), which requires the first segment of N2 in a compound to be voiced if it is an obstruent. Furthermore, lexical items (yamato vocabularies and a subset of Sino-Japanese vocabularies) which obey rendaku, which necessarily include the ones follows postnasal voicing requirement, must also obey Lyman’s Law, a ban on having two voiced obstruents within a certain domain. Finally, another subset of Sino-Japanese vocabularies obeys only the ban on multiple voiced obstruents, and loanwords recently entered into Japanese lexicon (mostly from Western European languages) do not obey any of those phonological restrictions. To account for this implicational relation, or called harmonic completeness, Itô and Mester rely on three non-faithfulness constraints, NO-D\textsubscript{2}\textsubscript{m} (bans multiple occurrence of voiced obstruents in a morpheme), REALIZEM (promotes rendaku), and NO-NC\textsubscript{8} (bans postnasal occurrence of voiceless obstruents), with a fixed ranking NO-D\textsubscript{2}\textsubscript{m} » REALIZEM » NO-NC\textsubscript{8}. An antagonistic faithfulness constraint IDENT is lexical-class specific and it may be inserted at various locations, as shown in (31):

(31) Deriving Harmonic Completeness (Itô and Mester, 2003: 152)

\[
\text{IDENT\textsubscript{FOREIGN}} \gg \text{NO-D}^2_\text{m} \gg \text{IDENT\textsubscript{SINO-JP1}} \gg \text{REALIZEM} \gg \text{IDENT\textsubscript{SINO-JP2}} \gg \text{NO-NC}\textsubscript{8} \gg \text{IDENT\textsubscript{YAMATO}}
\]

Thus, the ranking predicts that yamato items obey all three requirements as IDENT\textsubscript{YAMATO} is ranked below all the relevant markedness constraints, while a subset of Sino-Japanese (expressed as IDENT\textsubscript{SINO-JP2}) items obey rendaku and multiple voicing prohibition but not postnasal voicing, and so on. The system rules out a class which obeys only rendaku REALIZEM but no other constraints regarding obstruent voicing, or one which obeys multiple voicing prohibition and postnasal voicing but not rendaku. Thus, harmonic completeness is a product of the fixed ranking of non-faithfulness constraints. The advantage of this analysis, Itô and Mester claim, is that it allows one to deal with the morphophonological phenomena such as rendaku as active phonological processes within
THE ACCENTUATION PATTERNS OF NOMINAL COMPOUNDS IN JAPANESE

One phonological system.\(^{16}\)

Tanaka’s analysis synchronizes with the analysis of Itô and Mester, and compound accentuation generally exhibits lexical subclasses similar to what Itô and Mester observe. However, unlike the very strict subclass distinction observed for *rendaku*, which *yamato* words strictly obey whereas foreign words completely ignore, compound accentuation does not show such strong rigidity of lexical classes. For example, while a compound with an arguably *yamato* word *omútu* ‘diaper’ in N2 position may have a fully parsed variant (e.g., *kami-omútu* ‘paper diaper’), compounds with some obviously foreign words, such as *koohii*, in N2 position may undergo accent shift (e.g., *miruku-kóohii* ‘milk coffee’). Note that this does not necessarily mean that words like *koohii* are completely nativized, as it does not undergo *rendaku*; *miruku-góohii* (cf. *miruku-kóohii* ‘milk coffee’). Thus, we need to posit that the ‘tags’ to indicate which subclass a lexical item belongs to in terms of the voice-related phenomena in (31) are possibly distinct from those used for compound accentuation. For example, *koohii* ‘coffee’ is tagged with IDENT\(_{\text{FOREIGN}}\) for the phonological system of obstruent voicing while it is tagged to the default setting of MAX(accent) for compound accentuation, but not to the setting above all the NON-FINALITY constraints, which are assumed to be more foreign-like. Also, Tanaka mentions that some archaic *yamato* items require accent to be fully parsed (i.e., MAX(accent) is promoted highest). Thus, the faithfulness placement for compound accentuation is independent of the voice-related Lexical Stratification patterns proposed by Itô and Mester (1995, 1999, 2003). What is concluded from Tanaka’s system is that there is not just one stratification system in the lexicon, but there are multiple stratifications within the lexicon of Japanese morphophonology. While nothing denies the possibility of such structure of lexicon, it seems to diminish the advantage of Lexical Stratification theory.

Furthermore, there are quite a few cases where variant forms are available, like the cases with *omútu* ‘diaper’, or the ones which involve the reranking of ALIGN-L(\(\sigma^{\prime}\), root) shown in (21). In fact, Tanaka notes variations may be of various sorts, as some N2s, such as *syó* ‘place’, allow a variation which cannot be explained by locally promoting or demoting the faithfulness constraint:

\[(32) \quad \begin{align*}
\text{a. } & \quad \textit{keisatu}^{\circ} \text{ ‘police’ + syó ‘place’} \rightarrow \textit{keisatu-syó}, \textit{keisatu-syo}^{\circ} \text{ ‘police station’} \\
\text{b. } & \quad \textit{sáiban ‘court’ + syó ‘place’} \rightarrow \textit{saiban-syó}, \textit{saiban-syo}^{\circ} \text{ ‘court’} \\
\text{c. } & \quad \textit{*keisatú-syo}, \textit{*saibán-syo}
\end{align*} \text{ (Tanaka 2001: 182)}\]

The examples (32) show variants with a final parsed accent, and in order to achieve this output, it is necessary to promote MAX(accent) above NON-FINALITY(\(\mu^{\prime}, \sigma^{\prime}, F^{\prime}\)). These examples also include unaccented variants, and it is required that MAX(accent) appear below NON-FINALITY(PrWd') to achieve this result. Crucially, a variation where the penultimate syllable is accented (32c) is not available, and thus MAX(accent) cannot appear between NON-FINALITY(\(\mu^{\prime}, \sigma^{\prime}, F^{\prime}\)) and NON-FINALITY(PrWd'). Thus, it is necessary to have a reranking of MAX(accent) system shown in (33) for lexical items like *syó* ‘place’:\(^{17}\)

---

\(^{16}\) See Rice (1997) and Tateishi (2005) for an alternative view.

\(^{17}\) Note that the N2 *syó* for *keisatu-syó / keisatu-syo*\(^{\circ}\) and *saiban-syó, saiban-syo*\(^{\circ}\) are likely to be lexically
The concern here is not just that this case is non-local (i.e., reranking may skip a possible intermediate ranking position), but the amount of stipulation required to account for variations of this sort and to have a vast set of data at the same time. Thus, certain items, like syó ‘place’ or omútu ‘diaper’, may be tagged with more than one position of MAX(accent), and any combinations of tags are allowed and stipulated in the lexical information. Furthermore, each lexical item has specific information about the tagging, and the information not associated with the information of the segment-related stratification. Thus, while it may be descriptively adequate, the Stratification-based analysis cannot provide an explanatorily adequate account for Japanese compound accentuation.

While it initially appears that the extension of the Lexical Stratification analysis to Japanese compound accent provides external independent support for the Lexical Stratification analysis, the application results in necessitating another independent stratification specific to compound accentuation, and it also requires a rather intolerable amount of stipulation. Although these undesired outcomes might not necessarily lead to the conclusion that the Lexical Stratification theory itself is inadequate, they nonetheless weaken the theory.

### 3.2.2 Achieving Accented Patterns

Recall that in section 3.1.1, we have discussed that compounds in which both N1 and N2 are unaccented are realized accented, contrary to the prediction which Tanaka’s analysis makes. Similarly, we have seen in section 3.1.2 that preaccented compounds (i.e., compounds in which accent falls in N1) with short N2s cannot be achieved through the analysis. The requirement of accented outputs, particularly for unaccented root-root compounds, motivates some constraint which prefers accented outputs over unaccented ones. Further scrutiny along this line questions the legitimacy of any deaccenting markedness constraint.

Let us consider how an accenting constraint, which is required to account for the different items as they are written with distinct Chinese characters, although they may be phonologically identical; “署” is used for ‘police station’ (警察署) and “所” for ‘court’ (裁判所). Note also that syó, at least the one used for saiban-syó / saiban-syo° ‘court’, is a bound root. It may be used as a free root only in a colloquial speech (or cliché speech in police movie), and it unambiguously means ‘police station’:

i) **yoogisya-o** syo-ni renkou siro!
   suspect-ACC syo-to take do.IMP
   ‘Take the suspect to the police station!’ (*‘Take the suspect to the court!’*)

Such use of the word in daily speech is extremely rare and marked for an average speaker of Japanese. Note also that Tanaka’s analysis does not differentiate between free and bound roots, and thus it does not have any impact to the analysis whether syó is bound.
cases observed in sections 3.1.1 and 3.1.2, and \textsc{non-finality}(PrWd') intersect with one another. The exact nature of the accenting constraint is not our concern in this paper, and it is simply indicated as \textsc{accent}!; its job is to rule out any unaccented candidates. The hypothetical constraint \textsc{accent}! requires an accent even if N2 is originally unaccented. Thus, its antagonistic faithfulness constraint is not \textsc{max}(accent), which prohibits deletion of accent observed in the input, but it is \textsc{dep}(accent), which militates against insertion of an accent not present in the input. Thus, we observe two different rankings, one to ensure deaccenting cases and the other accenting cases, as shown in (34):

(34) \textit{Partial Ranking to Account for Accented and Unaccented Cases}

\begin{tabular}{|l|l|l|}
\hline
 & ACCENT! & DEP(accent) \\
\hline /unaccented/ & \*! & * \\
\hline unaccented & \*! & \* \\
\hline \*! accented & & \\
\hline
\end{tabular}

Problems arise when both rankings are put together, as \textsc{accent}! and \textsc{non-finality}(PrWd') militate against each other:

(35) a. \textsc{accent}! \(\gg\) \textsc{non-finality}(PrWd'), \textsc{dep}(accent): Output always accented

\begin{tabular}{|l|l|l|}
\hline & ACCENT! & \textsc{non-finality}(PrWd') & \textsc{dep}(accent) \\
\hline unaccented & \*! & * & * \\
\hline \*! accented & & & \\
\hline
\end{tabular}

b. \textsc{non-finality}(PrWd') \(\gg\) \textsc{accent}! , \textsc{max}(accent): Output always unaccented

\begin{tabular}{|l|l|l|}
\hline & \textsc{non-finality}(PrWd') & ACCENT! & \textsc{max}(accent) \\
\hline \*! unaccented & & \* & * \\
\hline accented & \*! & & \\
\hline
\end{tabular}

Now we are in jeopardy of reranking markedness constraints. On the one hand, if we keep the ranking \textsc{accent}! above \textsc{non-finality}(PrWd') (35a), there is no way to derive unaccented outputs; thus the grammar cannot account for cases like \textit{nihón} + \textit{gó} \(\rightarrow\) \textit{nihon-go}° ‘Japanese language’ (cf. (22)) or \textit{kūro} + \textit{nēko} \(\rightarrow\) \textit{kuro-neko}° ‘black cat’. On the other hand, if we decide to put \textsc{accent}! below \textsc{non-finality}(PrWd') (35b), we will not be able to deal with cases where N2 is originally unaccented, like \textit{nisi}° + \textit{okinawa}° \(\rightarrow\) \textit{nisi-ōkinawa}° ‘west Okinawa’ in (25), or cases where accent falls in N1 such as \textit{nagoya} + \textit{si} \(\rightarrow\) \textit{nagoyá-si} ‘City of Nagoya’ in (26). The only solution to maintain Tanaka’s original scenario of demoting \textsc{max}(accent) involves ensuring that \textsc{accent}! is also demoted. Although pied-piping of a constraint might not be ruled out by any theoretical
assumptions, once we allow reranking of non-faithfulness constraints within a grammar, the Lexical Stratification account of harmonic completeness is jeopardized, as there is always a chance of having non-faithfulness constraints move around, and we would then have to either come up with other reasons for why harmonic completeness is observed for voice-related phenomenon, or to assume that harmonic completeness is just a matter of lexical coincidence. Moreover, if we allow non-faithfulness constraints to be mobile, the grammar loses simplicity as it requires morphological stipulation for which lexical item to be associated with which ranking of NON-FINALITY(PrWd') and ACCENT!. Furthermore, such a system leaves us with the very peculiar coincidence that long (i.e., bigger than three morae) unaccented N2s all have ACCENT! ranked higher than NON-FINALITY(PrWd'). In fact, aside from some peculiar cases, a deaccenting long N2 is not attested to my knowledge.  

Note that the problem cannot be mitigated by doing without ACCENT!. It is true that ALIGN-R(PrWd, σ') also disfavors an unaccented candidate over accented ones, and thus, it may appear that reanalyzing ALIGN-R(PrWd, σ') in some other place in the ranking is able to provide a way to do away with ACCENT!. Let us consider the tableau in (34), which is copied from (25a) for convenience, to see this point:

\[(36) \text{nisi}^{\circ} \text{‘west’} + \text{okinawa}^{\circ} \text{‘Okinawa’} \rightarrow \text{nisi-ókinawa} \]

<table>
<thead>
<tr>
<th>/nisi + okinawa/ 'West Okinawa'</th>
<th>NF(μ', σ', F')</th>
<th>Max(ace)</th>
<th>NF(PrWd')</th>
<th>AL-R(PW, σ')</th>
</tr>
</thead>
<tbody>
<tr>
<td>/nisi-(óki)(nawa)/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nisi-(óki)(nawa)°</td>
<td>![L]****W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nisi-(óki)(nawa)</td>
<td>![L]****W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nisi-(óki)(nawa)</td>
<td>![L]****W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nisi-(óki)(nawa)</td>
<td>![L]****W</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We see that in (36) ALIGN-R(PrWd, σ') is the only constraint which prefers accented candidates over the unaccented one, but it is ranked lowest in the system. Promotion of ALIGN-R(PrWd, σ') to somewhere above NON-FINALITY(PrWd') and ALIGN-L(σ', rt) can allow the right evaluation for cases with unaccented N2s, as in (37):  

\[\text{karihorunia}^{\circ} \text{‘California’ is consistently deaccenting, as kita-karihorunia}^{\circ} \text{‘North California’}. However, Kubozono and Fujiura (2004) note that place names which ends with -(nia) sequence are unaccented, as in arubania° ‘Albania’, baazinia° ‘Virginia’, and babironia° ‘Babylonia’. From this, Kubozono and Fujiura consider that the -nia sequence acts as a quasi-morpheme, thus it is hasty to conclude that kita-karihorunia° is a genuine case of a root-root compound. Note also that kita-karihorunia and kita-kárihorunia are acceptable as well for many speakers.

\[18\text{ For example, karihorunia}^{\circ} \text{‘California’ is consistently deaccenting, as kita-karihorunia}^{\circ} \text{‘North California’}. However, Kubozono and Fujiura (2004) note that place names which ends with -(nia) sequence are unaccented, as in arubania° ‘Albania’, baazinia° ‘Virginia’, and babironia° ‘Babylonia’. From this, Kubozono and Fujiura consider that the -nia sequence acts as a quasi-morpheme, thus it is hasty to conclude that kita-karihorunia° is a genuine case of a root-root compound. Note also that kita-karihorunia and kita-kárihorunia are acceptable as well for many speakers.  

\[19\text{ Also ALIGN-R(PrWd, σ') needs to appear also above ALIGN-L(σ', rt) to account for the preaccenting cases in section 3.1.2, but we will ignore this to simplify the discussion.} \]
THE ACCENTUATION PATTERNS OF NOMINAL COMPOUNDS IN JAPANESE

(37) nisi° ‘west’ + okinawa° ‘Okinawa’ → nisi-okinawa° ‘West Okinawa’

<table>
<thead>
<tr>
<th>/nisi + okinawa/ ‘West Okinawa’</th>
<th>NF(μ', σ', F')</th>
<th>MX(acc)</th>
<th>AL-R(PW, σ')</th>
<th>NF(PrWd')</th>
</tr>
</thead>
<tbody>
<tr>
<td>nisi)-(oki)(nawa)°</td>
<td>***</td>
<td>***</td>
<td>W</td>
<td>L</td>
</tr>
<tr>
<td>nisi)-(oki)(nawá)</td>
<td><em>!</em>**</td>
<td>W</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>nisi)-(oki)(náwa)</td>
<td>*!</td>
<td>W</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>nisi)-(oki)(nawa)</td>
<td>**</td>
<td>L</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>nisi)-(oki)(nawa)</td>
<td>****</td>
<td>W</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

Notice that we are now facing the same problem as with ACCENT!. We still have to posit lexical-class specific reranking of the non-faithfulness constraint ALIGN-R(PrWd, σ'). For example, it is necessary to make an arbitrary claim that somehow ALIGN-R(PrWd, σ'), as well as MAX(accent), is ranked lower than NON-FINALITY(PrWd') to achieve unaccented output. Otherwise, the grammar does not provide the right output, as exemplified in (38):

(38) garasu° ‘glass’ + tamá° ‘ball’ → garasu-dama° ‘glass ball’

<table>
<thead>
<tr>
<th>/garasu° + tamá° / ‘glass ball’</th>
<th>NF(μ', σ', F')</th>
<th>AL-R(PW, σ')</th>
<th>NF(PrWd')</th>
<th>MAX(acc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>garasu)-(damá)</td>
<td><em><strong>!</strong></em></td>
<td>W</td>
<td>L</td>
<td>W</td>
</tr>
<tr>
<td>garasú)-(dama)</td>
<td>**</td>
<td>L</td>
<td>*</td>
<td>W</td>
</tr>
</tbody>
</table>

Thus, we conclude that the introduction of a deaccenting markedness constraint, such as NON-FINALITY(PrWd'), to the grammar of Japanese compound accentuation results in the unwanted consequence of creating the possibility of having mobile non-faithfulness constraints, and reranking of multiple constraints for certain lexical subclasses. Hence, as a consequence, we may argue that the deaccenting constraint NON-FINALITY(PrWd') should be ruled out from the grammar of Japanese compound accent.

The discussion so far in this section leads us to conclude that we are better off without NON-FINALITY(PrWd'). However, if we cannot provide with some alternative way to achieve unaccented compounds, NON-FINALITY(PrWd'), or some deaccenting constraint, cannot be completely ruled out in empirical terms. While we do not provide a fully developed analysis in this paper, we may see an analysis without NON-FINALITY(PrWd') is on the right track. Reconsider the two cases in which unaccented compounds are observed. The first case is that of certain short nouns, such as yamá ‘mountain’ or tamá ‘ball’, where accents on the final syllable when they appear free (cf. (30)). These cases may be purely morphological, and they may thus not fall in the domain of phonological operations at all. The second case is that when we have quadramoraic output, as shown in (8) and section 3.1.3. This case is defined by a very narrow phonological context, and thus it is very suspicious if a constraint like NON-FINALITY(PrWd') alone would be entirely responsible for unaccented outputs. Thus, we may safely conclude that NON-FINALITY(PrWd') or any general deaccenting
markedness constraint is inadequate for Japanese phonology.

4. Conclusion

This paper is not an attempt to present a novel analysis of nominal (root-root) compound accentuation in Japanese, but rather it provides some general discussion to sort out the issues around the phenomenon. On the other hand, we have observed that accentuation patterns are driven by morphology, as we see phonologically unexplainable cases. On the other hand, we have also observed that phonology does play a very crucial role in determining where to place accent in a compound, although the nature of this phonological role is not always transparent. Thus, we define the task of figuring out accentuation patterns of Japanese nominal compound as deciphering what is in the domain of phonology and what is absolutely necessary to stipulate in morphology, and what exactly is encoded in the lexical entries.

We have looked at recent OT analyses made by Kubozono (1995) and Tanaka (2001). Both analyses claim that compound accentuation can be largely dealt with in terms of phonology and in fact morphological idiosyncrasy is very minimal, a welcome result. One of the central issues for both analyses is reranking of constraints. Tanaka’s analysis makes reranking explicit in line with the theory of Lexical Stratification proposed by Itô and Mester (1995, 1999, 2003), and provides an analysis for unaccented compounds.

While we may agree that the OT based analyses are on the right track, we have seen that they are still far from being perfect. In particular, we have evaluated Tanaka’s approach to unaccented compounds, and shown that the analysis cannot account for several cases. We have farther considered the legitimacy of the deaccenting constraint NON-FINALITY(PrWd’), and concluded that the deaccenting constraint should be eliminated from Japanese phonology. However, one should not make a hasty conclusion that this rejection of a piece of Tanaka’s analysis is fatal and an OT analysis is not tenable. In fact, Kubozono’s and Tanaka’s analyses have achieved an account for cases which had been simply unanalyzable before due to flexibility and violability of constraint-based theory.

References

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An analysis of ‘short’ compounds.” ms. [To appear in Onsei Kenkyuu (Phonological Studies) 7.]