Bimoraicity and Feet in Japanese

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Bimoraicity and Feet in Japanese

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Zusammenfassung


Chapter 1

Introduction
1 Prosodic Hierarchy in Japanese and in general terms

This section will firstly present my personal stance on the concept of feet in Japanese (see subsection 1.1): the rest of subsections in this section will be used for introducing the basic concepts of foot as well as Prosodic Hierarchy. Along with those, I will outline the entire structure of this thesis in the following.

1.1 Questioning Japanese feet

The question addressed throughout this thesis is to which extent the concept of bimoraicity, which is typically regarded as closely related to the feet, can be useful for Japanese, especially Tokyo Japanese (henceforth Japanese) phonology. Now that some attempts for Japanese feet have been made after the emergence of Prosodic Hierarchy (Selkirk 1984, Nespor & Vogel 1986), the concept of feet in this language has achieved popularity among researchers. In terms of foot issues, therefore, many of them believe that there are feet in Japanese as well as in some Western languages where foot theory has generally been successfully developed. Indeed, we can find some linguistic processes in Japanese where bimoraicity is apparently involved, as I will give plenty of data in the following discussion.

Looking at Japanese in its own terms and what is dictated by the general concept of Prosodic Hierarchy, however, there are some difficulties in motivating feet in certain cases: here I will give two main problems. The first problem is the lexical accentuation system in Japanese, where it is difficult to give a consistent definition of feet, since foot structure is elsewhere intimately tied up with lexical stress and the alternating rhythm pattern made by the different degrees of stressedness (stressed vs. unstressed). While Japanese word prosody has relatively little connection to strength effects, the notion of feet has originally been developed to account for the stress-based metrical patterns in Western poetry, and was then used also to describe the lexical stress patterns in natural languages, in particular those in English (Liberman 1975, Liberman & Prince 1977, Selkirk 1984, Nespor & Vogel 1986 and others). As is well known, in these languages the alternating pattern made by relatively weak and strong syllables is obviously found.
The second problem is that the Modern Japanese lexicon contains a great number of monomoraic content words composed of simple (C)V components, which do not make up the optimal bimoraic feet; although minimal monomoraicity may coexist with the notion of feet in certain cases. It should be noted that some previous studies (such as Hayes 1995) have pointed out that the languages where monomoraic feet (degenerate feet in his study: see subsection 1.4 in this chapter) are present should have monomoraic words. Hayes (1995) discovered the correlation between the existence of subminimal feet and monomoraic words in various languages. It should be questioned, however, if his foot theory can be immediately applied to Japanese prosody as his study mainly deals with the languages which have the lexical stress, where foot structure is visible thanks to the stress pattern.

While some previous attempts to connect the bimoraicity effects with the notion of feet have been made in Japanese, there seems to be rather little evidence for the exhaustive power of bimoraic clusters supposedly found in this language. Though the exhaustivity would be, depending on the traditional claims, one of the important natures of the prosodic components, the putative evidence for feet in previous studies has been limited to morphophonological phenomena and some tendencies in accentuation patterns, with the exhaustivity having been neglected. Among the previous proposals, for example, I would mention here the study on hypocoristic formation by Poser (1990) and that on the default accentuation for foreign words by Inaba (2005). Some attempts have also been made to discover the exhaustive power in Japanese bimoraic effects, which seem, however, not to have been entirely successful.

This thesis will reinvestigate the proposed bimoraic effects in Japanese suggested by previous studies from sceptical viewpoints to the traditional understanding of feet in Japanese, while some researches in the past have construed bimoraic effects in this language as suggesting the presence of feet. This thesis will conclude, however, that bimoraic effects (or preference) are present in terms of prosody in Japanese, but the bimoraic clusters which we could term feet generally lack exhaustive nature, giving little hint of the foot structure of an entire utterance. While this thesis will not entirely deny the presence of feet (or some preference to the bimoraic structure) in Japanese, it will suggest some reconsideration for previous foot studies on this language.

After outlining the concept of Prosodic Hierarchy and of feet in the following section (see section 2 in this chapter), the key terms of this thesis, we will reinvestigate some claims
about Japanese feet made in previous studies. In later chapters thereafter, we will investigate three main issues: the minimal word constraint, the relationship between word transformation and foot structure as well as that between pitch accent and foot structure.

This thesis will be structured as follows: in chapter 2, the minimal word constraint will be the topic, which defines the smallest form of a prosodic word. There seems to be some logical difficulties between the usually binary foot structure and the fact that there are many monomoraic words in Japanese.

Subsequently, chapter 3 will treat the issues on relationship between word transformation and foot structure. While many of previous studies have considered that the foot structure in Japanese is evident in word transformation phenomena (such as word truncation), this thesis will question those presumptions.

In chapter 4, we will extend our investigation of foot structure to the interaction between pitch accent and foot structure. Although there being some controversy on the default pitch accent patterns particularly for the foreign word stratum, which is supposed to be reflecting latent foot structure, this thesis will present some evidence of exceptions. The exceptional cases presented in this thesis will suggest that the interaction between pitch accent and feet in Japanese is not overall effective.

Concluding our entire discussion made in this thesis in chapter 5, we will state that there will be no evident fact in terms of Modern Japanese prosody which manifests the presence of exhaustive feet despite the possibility of bimoraic preference in some phonological phenomena.

1.2 Prosodic Hierarchy

The Prosodic Hierarchy, which has been a useful tool in some fields of Generative Phonology, is roughly composed of following prosodic constituents (Selkirk 1984, Nespor and Vogel 1986) as given in (1):

\[ \text{Prosodic Hierarchy (Selkirk 1984, Nespor & Vogel 1986)} 
\begin{align*}
\text{utterance (υ)} \\
| \\
\text{intonational phrase (ι)}
\end{align*} \]
Looking at the previous studies on feet in general, it seems the foot domain has been widely accepted in various languages in the world; however, it has not been thoroughly successful to define the feet in languages where there is neither stress-based lexical accentuation system nor minimal word constraint. Despite the major features of feet which seem in harmony with stress accent rather than non-stress type accentuation system (such as pitch accent), some scholars have wondered whether the feet may be viewed as meaningful for languages such as Japanese.

In the followings in this chapter, I will outline the notion of feet in general terms and the problems in introducing it into Japanese, firstly starting with overviewing the notion of feet in general terms.

### 1.3 Binary feet

A foot in Prosodic Phonology has usually been regarded to be the prosodic unit immediately above the syllable (see (1)). A foot will integrate some syllables, typically following the concept of stress subordination (Liberman & Prince 1977), which classifies the syllables into strong (s) and weak (w) according to their relative acoustic saliency. A set of a strong and a weak syllable will create a typical trochaic foot. While this term is particularly well applicable to stress accent, prior studies on Japanese feet have argued if the binary feet is present in this language.
1.4 Degenerate feet

Besides the binary feet, it has been highly controversial if there are feet smaller than binary (degenerate feet: Hayes 1995), and when they are allowed if they are possible despite the universal binarity of feet. This concept will be meaningful in considering Japanese feet as this language has a great number of monomoraic content words (see subsection 1.1 in this chapter), which the ordinary foot structure does not expect.

In the language where the alternating pattern of relative prominence is present, the degenerate feet will be less opaque; however, it is a troublesome question whether and how the speakers of Japanese would perceive the subminimal feet without using the iterating rhythm. As to Japanese feet in particular, therefore, the majority of prior studies are in favour of the bimoraic feet despite the absence of monomoraic prosodic word circumscription. If the bimoraic feet in Japanese may be appreciated, we consequently should question how the foot structures of monomoraic content words should be treated. In order to allow monomoraic words to emerge frequently, it will be ideal if degenerate feet are freely tolerated. In Hayes (1995)' term, there will be no Foot Prohibition (Non-Prohibition) in Japanese.

\[\text{(2) Foot Prohibition (Hayes 1995)}\]
\[\text{a. Strong Prohibition: degenerate feet banned} \]
\[\text{b. Weak Prohibition: degenerate feet allowed only if they are metrically strong} \]
\[\text{c. Non-Prohibition: no degenerate feet ban} \]

Among recent studies, Crowhurst (1991:166) gives some examples for subminimal feet. She posits that there are languages where subminimal feet can freely emerge. She gives a number of data from some languages such as Tübatulabal, a branch of Uto-Aztecan language family spoken in the southern United States. The footing rules and representations in this language will be given in (3) and (4) below. In the illustration in (4), syllables are denoted with σ symbols and they are underlined if the syllables are heavy. The stressed syllable in every foot is enclosed with square brackets [ ] and each foot boundary is indicated with a pipe |. Monomoraic feet in surface forms are marked with bold font.
(3) Footing rules in Tübatulabal (Crowhurst 1991)

<table>
<thead>
<tr>
<th>Item</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>branching</td>
<td>syllabic</td>
</tr>
<tr>
<td>directionality</td>
<td>right to left</td>
</tr>
<tr>
<td>headedness</td>
<td>right (iambic)</td>
</tr>
<tr>
<td>vowel length</td>
<td>sensitive</td>
</tr>
<tr>
<td>coda consonant</td>
<td>weightless</td>
</tr>
<tr>
<td>minimal foot</td>
<td>$[\text{\v{u}z}]$</td>
</tr>
</tbody>
</table>

(4) Subminimal feet (Crowhurst 1991)

<table>
<thead>
<tr>
<th>Surface form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $</td>
<td>\text{'an}</td>
</tr>
<tr>
<td>b. $</td>
<td>\text{ma}</td>
</tr>
<tr>
<td>c. $</td>
<td>\text{hal}</td>
</tr>
</tbody>
</table>
Since there are languages which freely allow minimal feet to be less than binary, we may wonder whether monomoraic feet are possible in Japanese. In my perspective, however, the applicability of such feet in Japanese is dubious because the monomoraic feet in Tübatulabal (Crowhurst 1991) are defined as metrically strong (= stressed). According to Hayes’ degenerate foot constraints (see (2) in this chapter), it is explained that degenerate feet in Tübatulabal are allowed because they are metrically strong (Weak Prohibition). Likewise, within the traditional framework of defining degenerate feet, it would be supported that Japanese monomoraic content words are metrically strong, which will establish degenerate feet, whilst it is conventionally agreed that stress effect provides no meaningful function in Japanese word or sub-word level prosody.

While previous studies are commonly in favour of using the simple binary foot structure in Japanese, there have been some attempts to use the concept of degenerate feet in order to explain some phonological phenomena (Inaba 2005), which will be discussed later in this thesis (see section 4 in chapter 4).

2 Issues and problems

As the notion of feet has been introduced, this section will make brief explanation for the issues on Japanese feet which will be treated in the main body of this thesis. Therein we will investigate three main issues which the previous foot studies in Japanese have massively

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1 No metrically weak monomoraic foot is reported in Crowhurst (1991).
researched: firstly, the minimal word constraint (see below in subsection 2.1); secondly, the relationship between word transformation and foot structure (see subsection 2.2); thirdly, the relationship between pitch accent and foot structure (see subsection 2.3). Those three issues will be treated in the following chapters in this thesis after being introduced in this section respectively.

Japanese phonology is mainly treated henceforth; therefore, there should be explanations for some specific annotations and terminologies: throughout this thesis, every accented mora in Tokyo Japanese is denoted with a right square bracket ]. Since this term appears inadequate for description of Japanese pitch accent despite its frequent use especially in researches overseas, I will term this concept lowering kernel as some Japanese researchers do (下げ核 sage-kaku in Japanese: Uwano 2012 and others). Basically, this thesis does not use the most common terminology accented mora hitherto, aiming to emphasise the presence of pitch effect in Japanese word prosody rather than of strength effect.

2.1 Minimal word constraint

The first issue of this thesis will be the problems about minimal word constraint. As already mentioned, Japanese has numerous monomoraic items in its own lexicon while many languages where foot structure is observed have minimal word requirement (see chapter 2) which determines the canonical minimum of prosodic words in languages in question. Due to the binary constraint for optimal feet (Prince & Smolensky 1993: see the subsection 1.3 in this chapter), the languages where feet can be defined are expected to have minimal word requirement which rules out monomoraic prosodic words and enables every prosodic word to be immediately parsed into a binary foot.

From the view of typology, avoidance of monomoraicity and preference toward bimoraicity are widely observed in contour tone languages as well as in stress languages (see Vennemann 1988, Duanmu 1999, Gordon 2007 and others), while Japanese traditionally is not considered as being counted in either of the both typological categories in word-level prosody. The number two is said to be a magic number as the minimal words are frequently binary in the languages where the minimal word constraint is active.
Monomoraticity avoidance

a. contour tone language

Language       Minimal word size (µ)
Mandarin       2 (Duanmu 1993)
Shanghainese   2 (Duanmu 1993)

b. stress language

Language       Minimal word size (µ)
German         2 (Vennemann 1988)
Finnish        2 (Gordon 2016)

Returning to the issues on Japanese minimal word constraint, some researchers (such as Kubozono 1995: see chapter 2) have claimed that there is historical and current evidence of preference toward the bimoraic construction, which would be a positive fact for the binary feet in Japanese. However, it would be difficult, in fact, to find consistency in those claims. For example, Kubozono (1995)’s statement of heavy syllables being preferably used for foreign words (such as カット katto < eng. cut, コンビーフ kon-biihu < eng. corn(-ed) beef) seems to be merely a tendency and there are a large number of exceptions: like レインコート reen-kojoto < eng. raincoat, コーンウォール koon-woloru < eng. Cornwall, preserving trimoraic syllables instead of deforming them into bimoraic. Moreover, the richness in monomoraic vocabulary in Japanese should not be neglected.

2.2 Word transformation

The second issue argued in chapter 3 is the relationship between feet and word transformation in Japanese. It was the word transformation issues where foot studies in Japanese firstly gained popularity (see Poser 1990 and others). The oldest studies on Japanese feet commonly claim that there are feet in this language, which are reportedly seen in some word transformation processes: such as in reduplication, hypocoristic formation (= nicknaming) and word truncation. The previous claims in favour of binary foot structure in Japanese, however, generally have some shortcomings. Some examples should be considered below.
Poser (1990) states that Japanese traditional nicknames suffixed by ちゃん -tyaN will truncate the original proper name into bimoraic, which should be evidence of Japanese foot structure. But this thesis will conclude that those theories are not persuasive in several reasons, such as they commonly ignoring the exhaustivity of foot structure. As the word transformation will occur (mostly) within a prosodic word, it will not give any information about the entire foot parsing in an utterance. While the preference toward bimoraic outputs is basically true (such as masao > maʃsa-tyaN), furthermore, the word transformation does not always prefer bimoraic, there being a type of transformation process in which the clipped word (proper noun) is supposed to be monomoraic (such as syakusi ‘rich scooper’ > syaʃ-mozi: see nyooobo-koʃoba in 2.2 in chapter 3). This fact suggests that bimoraicity is not an essencial nature of the word transformation process in general.

Pointing out further problems, some inputs may have formally varied outputs in word transformation: such as the proper name miʃtiko for which more than three different outputs are possible (e.g. miʃi-tyaN (< miʃi-tyaN), miʃko-tyaN, tiʃko-tyaN), showing inconsistency in footing direction. Moreover, the word transformation in general is subject to some kind of familiarity effect, having plenty of exceptional cases. Those facts given above will result in concluding that word transformation phenomena in Japanese do not evidently visualise the latent foot structure in this language.

As to the argumentations that the word truncation is based on foot structure, where the monosyllabic truncation is generally impossible, we may assume some alternative solutions; such as being too short to be able to avoid conflation with untruncated words (see subsection 3.8 in chapter 3). Word truncation is seemingly not the phenomenon where phonology is exclusively involved, as this thesis will propose some non-phonological factors which may influence the truncation processes (e.g. pseudo-compound effect: see subsection 3.3 in chapter 3). This thesis will emphasise that word transformation in general is not solely driven by phonology; and therefore, it cannot be direct evidence of foot structure in Japanese. On the contrary, many factors even out of phonology should be taken into consideration.

2.3 Pitch accent
Following both previous topics, the third issue is the interaction between feet and pitch accent (see chapter 4). As is well known, Japanese (including Tokyo Japanese) is a language where pitch accent is widely used. Despite the fact that some dialects have no distinctive word-level pitch accent, the most important nature of the Japanese word accentuation system (especially that of Tokyo Japanese in this thesis) is plainly expressed as “… tu[neni oto=no koote-ka]Nkee=ga moNdai=to na]ru ... [... always the relationship of pitch height is concerned ...]” (Hirayama 1968:31; author’s translation) by Teruo Hirayama.

Traditionally, the dialects in Japanese have been classified in accordance with the difference in pitch accent pattern rather than in the distribution of phonetical emphasis, as reflected in the Japanese dialect map (Hirayama 1968, Hayata 1999, Kibe 2010, Kindaichi 2011 and others: see (72) in chapter 4). Whereas the foot structure has been mainly found in languages where the word stress is used, it is unknown if the traditional understandings would be useful for the investigation on Japanese feet.

With respect to the relationship between foot structure and pitch accent in Japanese, nonetheless, there are several issues treated in this thesis as seen in chapter 4. First of all, some researchers have attempted to find the link between default accentuation and foot structure, which is supposed to become visible through analysing the pitch accent of foreign words and compound ones. While the pitch-feet interaction might suggest the existence of the exhaustive foot structure in Japanese, which has not been proved by the word transformation processes, the default accentuation issues proposed in previous studies have generally underestimated exceptions and external conditions. As to accentuation patterns for foreign and compound words, some non-prosodic factors should be taken into consideration: such as familiarity which may influence predictability of accentuation pattern of the output.

Although some presumably foot-based pitch accent predictions have been proposed for foreign words and compound words (such as Inaba 1997, 1998, 2005: see subsection 3.4 in chapter 4), their prediction is not always correct and there are some cases where even non-foot-based analysis is possible (such as -ingu compound words: see subsection 2.7 in chapter 4 and Giriko 2010). Since there are those further putative default patterns in terms of the pitch accent, it is difficult to conclude that the default accentuation pattern is reliant upon the latent foot structure.
Previous studies have assumed that the lowering kernels can be treated as parallel to the stressed syllables which may serve the heads of trochaic bimoraic feet. Considering the phonetical and phonological facts on the lowering kernels, however, Japanese pitch accent should not be conflated with English-like stress accent. Despite the possibility of natural periodic pattern in articulation (Tajima 1998, 1999, Lerdahl & Jackendoff 1983: see subsection 5.1 in chapter 4), it is not clear if this natural iterativity is phonologically meaningful. If the strong-weak stress hierarchy is indefinable in Japanese, it is also difficult to assume the feet in this language. Moreover, degenerate feet are also difficult to define due to lack of metrical stress, while it could account for the presence of monomoraic words in Japanese.

Taking all those facts into consideration, we will conclude that there is no evident link between feet and pitch accent in Japanese, on the contrary to the popular claims in previous studies.
Chapter 2

Minimal word constraint
1  Feet and minimal word constraint in Japanese

As the first research question about Japanese feet, this chapter will treat the concept of minimal word constraint in Japanese. According to the traditional assumption of Prosodic Hierarchy, there should be minimal word constraint in Japanese, which prevents a prosodic word from being sub-bimoraic. It will be the simplest model of the foot structure in Japanese that a minimally bimoraic prosodic word will directly establish a bimoraic foot.

Despite the fact of minimal monomoraicity of Japanese prosodic words, some previous studies consider the preference of bimoraicity in terms of the smallest size of a prosodic word (Kubozono 1994 and others). This fact could be positive evidence of the foot structure in Japanese, which however will be critically investigated in this chapter.

In subsection 1.1, we will consider if the unmarked syllable structure in historical and current Japanese may reflect the presence of feet (such as Kubozono 1994). Some previous studies have argued that the tentative minimal bimoraicity seen in certain word-level phenomena may suggest the latent structure of feet.

The following subsection 1.2 will treat the phenomenon of lengthening where the monomoraic prosodic word is lengthend into bimoraic. This chapter in common will be an argument on the issue whether the presence of those bimoraic preferences could be evidence of the foot structure in Japanese.

1.1  Unmarked syllable in Japanese

The first of the three main topics in this thesis is the minimal word constraint, which usually prohibits any prosodic word to be less than bimoraic (see subsection 2.1 in chapter 1). To define the exhaustive foot structure in Japanese, this concept appears to be a great obstacle, as the word inventory in Japanese has a great number of monomoraic items. In accordance with general understandings on minimal word constraint and on universal foot structure, monomoraic words cannot make up optimal bimoraic feet.
With respect to this issue, however, Kubozono (1994) claims that the Japanese word prosody has diachronically and synchronically preferred heavy syllable structure\(^2\), while the basic phonological form of Japanese content words has consistently been the light syllable, and while there was no phonemic discrimination in vowel quantity in Old Japanese (pre-Sino-Japanese period). He claims that the diachronic phonological processes in Japanese have commonly been used to change the CV sequences (light syllables) into heavy syllables: such as the historical assimilation phenomenon in phonetics known as おんべん ‘tonal convenience’, which, for example, has changed the traditional form of the past verb *kakita* ‘wrote’ into *kajitata* with deleting the intervocal /kl/. Some examples are given in (1) below, where the accentuation patterns of the pre-modern (non-assimilated) words are omitted for the sake of convenience.

(1) Preference to bimoraic structure

<table>
<thead>
<tr>
<th>Original</th>
<th>Assimilated</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>kaʃi</em></td>
<td><em>kaʃi</em></td>
<td>‘shellfish’</td>
</tr>
<tr>
<td><em>towo</em></td>
<td><em>toʃo</em></td>
<td>‘ten’</td>
</tr>
<tr>
<td><em>yomite</em></td>
<td><em>yoʃnde</em></td>
<td>‘to read’ (連用形 <em>ren’yookee</em>: an inflected form)</td>
</tr>
<tr>
<td><em>gakukoo</em></td>
<td><em>gakkoo</em></td>
<td>‘school’</td>
</tr>
</tbody>
</table>

As to the diachronic change of Japanese language, it seems true that there has been some effect of phonetical assimilation which has changed light syllables into heavy ones. Looking at the phonology of Modern Japanese, in addition, Kubozono (1994) asserts that the preference toward the bimoraic structure is present in foreign words in this language, claiming that trimoraic (superheavy) syllables are tendentially shortened into bimoraic and that moraic geminates (transcribed with つ or 𢽒) are epenthesised between a short vowel and a non-nasal coda consonant. Giving an example for the latter case, the English word *can* is imported into Japanese as キャン *kyaʃN* and the word *cat* will be transcribed into キャット *kyaʃt.to*, having the heavy (bimoraic) structure in the initial syllables in both data.

---

\(^2\) If there would be the preference rule to the bimoraic structure in Japanese, it would remind us of the syllable size adjustment into bimoraic in stressed syllables in stress accent (Vennemann 1988).
However, the trimoraic syllable shortening is not overall influential on Japanese phonology, since such syllables are even easy to find (see (3)). Moreover, the geminate epenthesis may be blocked in certain cases rather than undergoing heavy syllable production (see (2) and (3)). The following fact will demonstrate that the geminate epenthesis is not an obligatory process in word borrowing in general; different conventions of transcription being used from languages to languages instead.

Here, we can briefly look at the conventional transcription of Korean words into Japanese, as this language is one of those which may be systematically transcribed in accordance with Japanese phonology and orthography. In this language, interestingly, the syllable-final consonant usually does not require preceding geminate\(^3\). The Korean word 볼고기 pul-koki (Korean dish), for example, is transcribed as ブルコギ pu.ru.ko.gi in Japanese, instead of *プッルコギ pur.ru.ko.gi. This is a non-Western convention of transcription into Japanese which previous studies have not well considered, and which does not require the bimoraic structure.

Generally speaking, the argumentation of Kubozono (1994) does not account for the simple fact that the word-level phonology in Japanese is rich in monomoraic items. While there has been certain preference toward bimoraicity in the earlier phase of Japanese language history, it would be true that the CV syllable has the unmarked status in Modern Japanese. The following data in (2) will present regular cases of transcription, while (3) will be counterexamples where the bimoraic preference is absent or selective. In both data, deformable and deformed syllables are denoted with bold font.

(2) Heavy syllable preference

<table>
<thead>
<tr>
<th>Original</th>
<th>Shortened</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>*aisu-kuri</td>
<td>N</td>
<td>aisu-ku</td>
</tr>
<tr>
<td>gura</td>
<td>ndo</td>
<td>gura</td>
</tr>
</tbody>
</table>

\(^3\) It seems the absence of moraic geminate in transcribed Korean coda consonants (particularly stops) may be reflecting their unreleased nature, where the trimoraic transcription might sound too long to native speakers of Japanese. As a result, the process of regular transcription may require even word-final stops, which are highly unfavorable in Japanese phonology. The Korean word-final coronal stop (-t), therefore, may be transcribed with the single geminate letter ツ; thus, the regular transcription of atron kas [kat] ‘Korean traditional hat’ in Japanese will be カッ. In this case, the pronunciation of the geminate letter is almost identical to the source word.
kooN-bijihu  koN-bijihu  ‘corned beef’
dorejEN  dorejN  ‘drain’
b.  geminate epenthesis
    -Epenthesis  +Epenthesis  Gloss
    paN  *paNN  ‘bread’
    *kapu  kappu  ‘cup’
    *hiio  hiiito  ‘hit’
    *baha  baijha  ‘Bach’
    *bagu  balggu  ‘bag’

(3)  Exceptions
    a.  superheavy vowel shortening
    Original  Shortened  Gloss
    sijiN  *siN  ‘scene’
    rauNdo  *raNdo  ‘round’
    kojON  *koN  ‘corn’
    rejEN  *reN  ‘lane’
    zijinzu  *zijnzu  ‘jeans’
    sukurijiN  *sukurIN  ‘screen’
    b.  geminate epenthesis
        -Epenthesis  +Epenthesis  Gloss
        paku-tyoʃni  *pakku-tyonhi  ‘Park Chung-Hee’ (kor. 박정희 pak ceng-hui)
        teʃto  *tetto  ‘Vietnamese New Year’ (vie. Tết 𨀰)
        hiʃtoraa  hiʃtoraa  ‘Hitler’
        essyeʃnbaha  essyeʃnbaijha  ‘Eschenbach’
        baiʃgu  *baggu  ‘bug’
        buʃru  *burrri  ‘bull’

While it is suspicious that the bimoraic structure is preferred in Modern Japanese phonology, the fact of richness in monomoraic words could be a hint of monomoraic feet (degenerate feet: see subsection 1.4 in chapter 1) which violate the general definition of feet
suggested in UG: however, the majority of previous studies on feet have mostly been presuming that the feet in Japanese are bimoraic rather than monomoraic (Poser 1990 and others).

Taking the condition of Foot Prohibition into account (see (2) in chapter 1), on the other hand, some recent studies such as Inaba (2005) claim that there is the Weak Prohibition effect in Japanese (see section 4 in this chapter), which is obviously against the common agreement on Japanese word prosody where there is no stress-based function.

At the first glance, Weak Prohibition may be a too strong constraint for Japanese prosody because of preference of monomoraic words. Previous studies have generally lacked the empirical evidence for the statement that the proposed degenerate feet in Japanese are metrically strong. Moreover, the direction of foot parsing may be a further problem (see chapter 3): there is apparently no clear consensus on Japanese footing direction among previous studies, while some researchers are in suspicion of establishing uniform directionality of feet. Kubozono (1998), for example, wonders why the foot structure used for some morphological purposes (see chapter 3) are tendentially requiring the left-to-right parsing direction, while accentuation-related phenomena are overwhelmingly employing the right-to-left footing. Detailed discussions on the relationship between pitch accent and footing will be made in chapter 4.

1.2 Preference to minimal binary structure

Despite some difficulties, however, there are a certain number of lexical items in Japanese which seemingly have a close relationship to bimoraicity. For example, interjections do not prefer monomoraic structure, even using uncommon coda glottal stops (e.g. あっ aʔ ‘ah’, げっ geʔ ‘yuck’, ちっ tiʔ ‘tsk’, ああ aa ‘yeah’, うん uN ‘yeah’: see Nasu 1994, 2001, 2002). Moreover, it is widely known that monomoraic numbers are lengthened to bimoraic if bare numbers are counted in enumeration: like 一, 二, 三, 四 i[i], ni[i] (< ni), saN, si[i] (< si) ‘one, two, three, four’ (e.g. Itô 1990). This so-called one-mora avoidance is frequently observed in enumeration of natural nouns (such as zodiac symbols and weekdays) as well as numbers despite some exceptions. As exceptional cases, we can consider 水, 金, 地, 火, 木, 土, 天, 海, 冥 su[i], kiN, ti-kal-moku, do-teN, kai-mee (an older solar system planet enumeration from Mercury (水 su[i] < 水星 sui-see) to Pluto (冥 me]e < 冥王星 meeeoo-see)) and あいうえお a-i-u/-e-o (Japanese alphabet enumeration).
These phenomena, of course, neither are overall effective on any prosodic word nor provide any evidence of foot exhaustivity. This is a common problem of word-level analyses made before.

1.3 Conclusion

Looking over above-mentioned facts in Contemporary Japanese, it seems difficult to find consistent preference toward bimoraicity. While there is no uniform phonological rule which prohibits or avoids monomoraicity for prosodic words (such as the minimal word constraint), there are a huge number of monomoraic words in this language. Despite the presumptions above, therefore, it is not evident if the tentative minimal bimoraicity found in some phonological phenomena is a trace of invisible feet in Japanese.

As seen later, it is also difficult to define degenerate (monomoraic) feet in Japanese because of lacking evidence of strength effect on prosodic words (see section 4 in chapter 4). It seems true, therefore, that Japanese feet are bimoraic if there are, as previous studies have mostly agreed.
Chapter 3

Bimoraicity and word transformation
This chapter will treat the issues about the possibility of interaction between bimoraicity and word transformation phenomena (such as nicknaming and clipping) in Japanese. As shown below, these issues are one of the oldest research questions about Japanese feet. After some pioneering studies such as Poser (1990), it has been widely argued whether there is foot structure in this language, which the concept of Prosodic Hierarchy presumes.

In the first section in this chapter, we propose to revise the bimoraic effect proposed in previous foot studies in Japanese, questioning consistent relationship between feet and word transformation. Although general assumptions of Prosodic Morphology (McCarthy and Prince 1986) may tie up morphophonological phenomena with components of prosody, we can still investigate how consistent the interactivity between feet and word transformation is (see section 1 in this chapter).

As a common problem of lexically based theories in terms of the relationship between bimoraic effect and foot structure in Japanese, this thesis will give three points of views: the bimoraic effect seen in word transformation phenomena is either *non-exhaustive, complex* (the outputs are possibly not purely reliant upon prosody) or *irregular* (no uniform rules in the output production) (see (2) in this chapter).

As the beginning of our main investigation in this chapter, section 2 will be focused on the relationship between some word transformation phenomena (excluding word truncation) and foot structure. While some phenomena such as proper name nicknaming (e.g. *ta/jroo* → *ta/jro-tyaN*) has tendency of being minimally bimoraic instead of monomoraic, this thesis will point out shortcomings of prior studies.

The main theme of chapter 3 will be the single word truncation. Despite the fact that foreign word truncation has a certain tendency of preferring supermonomoraic outputs (such as *sutora/jiki* ‘(labour) strike’ → *su/jto*), this thesis will make some arguments if this monomoraic circumscription is solely based on prosody. If some external variables are found, the relationship between truncation templates and feet should be reconsidered.

Subsequently from the argument in section 3, the fourth section will contain the entire investigations on the compound word truncation whose basic templates may behave slightly different from the single word truncation.
1 Revising the bimoraic effect

In this section, we propose to reconsider the basic concept of bimoraic effect or preference. As seen below, a great number of previous studies have presumed bimoraic feet in Japanese, claiming that the templates of word transformation are evidence for this prosodic unit. Even if bimoraicity is visible under certain conditions, we will not entirely agree with the traditional view of Japanese feet. The consistent claim of this chapter is that the templates may be controlled by different variables, some of which are not necessarily relied on prosody.

As far as previous studies have successfully demonstrated, the bimoraic effect in Japanese seems strongly tied to certain morphophonological processes, which has been said to be evidence for the binary foot structure in this language. To account for the interactive relationship between morphological phenomena and phonological output, the theory of Prosodic Morphology (McCarthy & Prince 1986) has been developed. In McCarthy & Prince (1993:1), three essential principles are stated as in (1):

\[(1) \text{ Prosodic Morphology (McCarthy & Prince 1986)}\]

a. Prosodic Morphology Hypothesis

Templates are defined in terms of the authentic units of prosody: mora (μ), syllable (σ), foot (Ft), prosodic word (PrWd).

b. Template Satisfaction

Satisfaction of templatic constraints is obligatory and is determined by the principles of prosody, both universal and language-specific.

c. Prosodic Circumscription

The domain to which morphological operations apply may be circumscribed by prosodic criteria as well as by the more familiar morphological ones.

As the clause (1a) states, their original idea premises that the prosodic domains are available for morphological phenomena as well as for metrical analysis, making no clear distinction between the both processes while they belong to “different grammatical components (Crowhurst 1991:2)”.

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Despite some suggestions for refinement, the principles of Prosodic Morphology have been widely accepted since recent decades, which has influenced many researchers concerned with Japanese phonology as well. Since Poser (1990) has established the basic concept of feet in Japanese, further reportedly positive evidence for binary foot structure has been discovered in some subsequent studies (such as Itô 1990, Kubozono 1995, 1998).

Looking at the accumulation of previous studies, there would be no telling objection against the presence of bimoraic effect or preference in Japanese, while the possibility of bimoraic effect being triggered by non-prosodic reasons has been generally ignored. Furthermore, we should take some additional information into account; first, the bimoraic effect for the morphological processes does not divide the entire structure of an utterance into feet; second, the process of word transformation does not permit all the formally well-formed outputs to be freely realised. For example, the hypocoristic suffix -tyaN may be placed directly after the truncated proper name, while not every proper name has a well-formed truncated form (e.g. zyejemuzu ‘James’ > *zyee-tyaN: see subsection 2.4 in this chapter).

Through the entire discussions in this chapter, we will investigate putative foot structure found in some morphological processes in Japanese, which could be called morphological feet in Crowhurst (1991)’s term. Here we are primarily concerned with certain word transformation processes such as hypocoristic formation and word truncation. While those phenomena are believed to be reflecting the underlying binary foot structure in Japanese, we will reinvestigate those prior proposals for feet. It will be claimed that bimoraic effect is not directly reliant on prosody; and therefore, at least some of the bimoraic effects should not be used for direct evidence for feet as a component of Prosodic Hierarchy.

We can illustrate general problems for bimoraic effect on word transformation as given in (2) below, upon which we will be reliant when revising the relationship between binary feet and bimoraic effect:

(2) Bimoraic effect on word transformation
a. non-exhaustivity
   Bimoraic effect does not operate exhaustive footing.

b. complexity
   Bimoraic effect is complex: bimoraicity is not necessarily reliant upon prosody.
25

c. irregularity

Bimoraic effect is irregular: permitting no free occurrence of parsed (or footed) structure.

2 Word transformation

The issues about word transformation will be treated within several sections thereafter: this section’s goal is to reinvestigate previous argumentations for Japanese feet reportedly found in some word transformation processes such as reduplication (see subsection 2.1), a kind of female servants’ jargons in traditional Japanese (女房言葉 nyooobo-ko]toba: see subsection 2.2), hypocoristic formation (see subsection 2.3) and word inversion known as zuuzya-go (see subsection 2.5), which was massively used in show business in the twentieth century. While previous studies have commonly assumed the presence of bimoraicity (and bimoraic feet) in those processes, there are still some points of view which should not be ignored. These problems will be argued in the following sections.

2.1 Reduplication

As investigated in the earliest analyses, the reduplication of morphemes may be a good illustration of Prosodic Morphology in some languages, where required templates may be, however, typologically different from language to language: in McCarthy and Prince (1986), for example, a simple monosyllabic template is suggested in Philippine language Ilokano progressive verbs, as well as the foot-based template for Australian language Diyari (see (3a-b)). Then, our next question will be which prosodic domain is used for the reduplication process in Japanese.

Parallel to the languages given above, Japanese is also known for having some reduplication processes of morphemes for different purposes: at least one of them, the noun reduplication which will create plural forms, is obviously irrelevant to foot structure, where only simple reduplication of an entire prosodic word is allowed. As to this process, there is no deformation of the original words which may imply binary foot structure: such as short vowel lengthening (e.g. ki[ ‘tree’. ki]gi ‘trees’, *kiigii see (3c)).
Furthermore, this morphological process is no longer productive in the contemporary use: most of possible reduplicants are limited to native Japanese words with tolerating a handful of exceptions\(^4\). In certain cases, reduplicated words undergo the process of compound voicing known as 連濁 *rendaku*\(^5\).

In (3) below I give some data for reduplication in different languages including Japanese. Reduplicable parts of words are marked with bold fonts.

(3) Reduplication

a. syllable-based: Ilokano

<table>
<thead>
<tr>
<th>Reduplicant</th>
<th>Reduplication</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>basa</em></td>
<td>ag-<em>(bas)</em>-basa</td>
<td>‘be reading’</td>
</tr>
<tr>
<td>*dait</td>
<td>ag-<em>(da)</em>-dait</td>
<td>‘be studying’</td>
</tr>
<tr>
<td><em>trabaho</em></td>
<td>ag-<em>(trab)</em>-trabaho</td>
<td>‘be working’</td>
</tr>
</tbody>
</table>

b. foot-based: Diyari

<table>
<thead>
<tr>
<th>Reduplicant</th>
<th>Reduplication</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>wija</em></td>
<td>(wija)*-wija</td>
<td>‘woman’</td>
</tr>
<tr>
<td>*kanku</td>
<td>(kanku)*-kanku</td>
<td>‘boy’</td>
</tr>
<tr>
<td><em>ku[ku]ya</em></td>
<td>(ku[ku])*-ku[ku]ya</td>
<td>‘to jump’</td>
</tr>
</tbody>
</table>

c. full reduplication: Japanese (less productive)

<table>
<thead>
<tr>
<th>Reduplicant</th>
<th>Reduplication</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ki]</em></td>
<td>(ki)*-gi</td>
<td>‘tree, trees’</td>
</tr>
<tr>
<td>*hi]</td>
<td>(hi)*-bi</td>
<td>‘day, days’</td>
</tr>
<tr>
<td><em>ta</em></td>
<td><em>(ta)</em>-da</td>
<td>‘rice field, *rice fields’</td>
</tr>
<tr>
<td>*hana]</td>
<td>(hana)*-hana</td>
<td>‘flower, flowers’</td>
</tr>
<tr>
<td>*ka[mi]</td>
<td>(kami)*-gami</td>
<td>‘god, gods’</td>
</tr>
<tr>
<td>*kuni</td>
<td>(kuni)*-gumi</td>
<td>‘country, countries’</td>
</tr>
</tbody>
</table>

\(^4\) Against the principle of native word preference, for example, there are some reduplicated Sino-Japanese words (see *toti* > *toti-to*\(\text{lit.} \) ‘region, regions’ and *bubun* > *bubun-bubun* ‘part, parts’ in (3c)), while this type of reduplication is much more scarce in foreign stratum than in both traditional lexical strata. Although there is no clear criterium for the maximal size of reduplicants, they are mostly between monomoraic and trimoraic in length.

\(^5\) This process will typically occur if the reduplicant is from native word stratum. This effect becomes operative when the reduplicant begins with a voiceless consonant /h t k s/ (清音 *seion* ‘clear sound’), which will be converted into its voiced counterpart /b d g z/ (濁音 *daku*on ‘turbid sound’) in the second iteration. It should be noted that the realisation of *rendaku* is not entirely predictable despite some regularity.
In contrast to Japanese nominal reduplication where foot structure is not related, it is claimed that verbal reduplication in 连用形 ren’yookee (an inflected form: see (1) in chapter 2) is subject to bimoraic effect, which means collateral action along with the sentence-final main verb, and which constructs bimoraic foot structure according to previous studies. In this word transformation process, monomoraic reduplicants are actually lengthened into bimoraic; also prohibiting reduplication of longer ren’yookee forms composed of three morae or more (Poser 1990). Some data for ren’yookee reduplication are given in (4):

```
(4) Ren’yookee reduplication
Reduplicant  Reduplication  Gloss
si| (fin. suru)  (sii)ζ-sii   ‘do (verb), with doing’
mii (fin. mi|ru)  (mii)ζ-mii  ‘see (verb), with seeing’
naki (fin. naku)  (naki)ζ-naki ‘cry (verb), with crying’
```

Even if this may be a part of evidence of bimoraic feet, the entire (i.e. exhaustive) structure of the putative feet in an utterance remains invisible. Considering the fact that the nominal reduplication does not overall demand bimoraicity (see (3) in this chapter), moreover, the bimoraic effect on ren’yookee reduplication should be just a specific nature.

2.2  Nyooobo-kotoba
Amongst recent studies on Prosodic Morphology in Japanese, Labrune (2012) argues that Japanese prosody is strongly determined by feet and morae whereas syllables have no significant role\(^6\), stating that Japanese is “mora-counting mora language” (Labrune 2012:134) _contra_ the traditional views on Japanese as “mora-counting syllable language” (McCawley 1968). Her research is mainly concerned with some Japanese traditional or contemporary word transformation phenomena presumably related to the bimoraic foot structure: such as 女房言葉 nyooobo-kojita (female house servant language in traditional Japan), hypocoristic formation with suffix -tyan as well as formerly mentioned word inversion called zuuzya-go (see subsection 2.5 in this chapter).

According to Labrune (2012), a nyooobo-kojita (see (5) for some data) used in traditional Japanese is composed of the combination of honorific prefix o- and truncated form of the word base reduced to one foot, where she agrees with assuming feet in Japanese to be bimoraic, following the common belief about feet in Japanese.

(5) _Nyoobo-kojita_ (based on Labrune 2012)

<table>
<thead>
<tr>
<th>Base</th>
<th>Derived</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>satuma-imo</em></td>
<td>o-sa/tu</td>
<td>‘sweet potato (lit. Satsuma potato)’</td>
</tr>
<tr>
<td><em>zyuu-bako</em></td>
<td>o-zyu/uu</td>
<td>‘stackable box’</td>
</tr>
<tr>
<td><em>den_gaku</em></td>
<td>o-de/noon</td>
<td>‘oden (pot cuisine)’</td>
</tr>
<tr>
<td><em>ne-syoobe/noon</em></td>
<td>o-ne/syo</td>
<td>‘bed wetting’</td>
</tr>
</tbody>
</table>

\(^6\) She has presented a radical opinion to syllables in Japanese in the same paper (Labrune 2012), where she states that there would be no syllables in Japanese. She compares Japanese to some other languages which have supposedly no syllable structure (such as Gokana spoken in Nigeria, which has been previously discussed in Hyman 2003, 2010); however, it appears that her argument generally underestimates the role of syllables in Japanese including various regional variants. As known as syllabeme dialects (シラビーム方言 sirabiimu-hojopen) opposing moraic dialects (モーラ方言 moora-hojopen) (see Shibata 1962), the basic tonal unit in some dialects is syllable rather than mora (e.g. Kagoshima Japanese and others). In Japanese in terms of dialectology, in fact, there are certain phonological processes which should be explained with the notion of syllable instead of discarding it.

Even within Tokyo Japanese, there is phrase-initial LH tone deletion where the structure of phrase-initial syllable is involved: the initial rising of a phonological phrase will be reduced to almost high level tone when the initial syllable has a vocal or a nasal end: for example, we can compare the words such as murasaki-’iro LHHHH ‘purple colour’ and moosikomi HHHHH ‘application’ (Pierrehumbert & Beckman 1988). Moreover, the optional lowering kernel shift on heavy syllables may also be construed as a phenomenon where syllable is related: Hayata (1999) points out that the lowering kernel on the heavy syllable may shift within syllable. For example, the word o’ndo ‘temperature’ can be pronounced like on’do (see subsection 4.3 and 4.4 in chapter 4). While there is no great accumulation of researches on the lowering kernel shift in Tokyo Japanese, this phenomenon does not seem uncommon especially in lively conversations.

From the position in support of syllables in Japanese, the usefulness of this prosodic component will be defended in this thesis (as a side topic), while languages do not necessarily organise syllable structure and Japanese has indeed relatively opaque syllables in terms of prosody.
In this word process, however, there are seemingly exceptions to which the bimoraic effect is ineffective. See (6) below:

(6) Exceptions

<table>
<thead>
<tr>
<th>Base</th>
<th>Derived</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>nigiri</em>-mesi</td>
<td>o-<em>nigi</em></td>
<td>‘rice ball (lit. hand-pressed rice)’</td>
</tr>
<tr>
<td>?</td>
<td>o-<em>musu</em></td>
<td>‘rice ball’</td>
</tr>
</tbody>
</table>

The data in (6) show that *nyoobo-kojotoba* does not necessarily require the bimoraic template, even though the binary output is the statistic majority. The outputs in (6) commonly require entire phonological words instead of feet.

In addition to the process of regular *nyoobo-kojotoba* production which is not always governed by bimoraicity, we can consider another variant of *nyoobo-kojotoba*. In contrast to the first version, the *nyoobo-kojotoba* variant typically requires monomoraic truncation from the word base, some of which given in (7). The transformed output is basically composed of (o-)*X*-mozi where X is a monomoraic syllable taken from the initial position of the source word. This construction literally means ‘the letter X’; thus, the word o-ka*mozi* ‘hair’ (see (7)) refers to ‘(the word which begins with) the letter かな ka’.

(7) A variant template of *nyoobo-kotoba*

<table>
<thead>
<tr>
<th>Base</th>
<th>Derived</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>kami</em></td>
<td>(o-)<em>ka</em>-mozi</td>
<td>‘hair’</td>
</tr>
<tr>
<td><em>susi</em></td>
<td>(o-)<em>su</em>-mozi</td>
<td>‘sushi’</td>
</tr>
<tr>
<td><em>syakusi</em></td>
<td>(o-)<em>sy</em>-mozi</td>
<td>‘rice scooper’</td>
</tr>
<tr>
<td><em>hidaru</em></td>
<td>hi-mozi*-i</td>
<td>‘hungry’</td>
</tr>
<tr>
<td><em>horeru</em></td>
<td>ho*-no-zi</td>
<td>‘be in love with someone’</td>
</tr>
</tbody>
</table>

There is no word *musubi-mesi* ‘tied rice’ in Modern Japanese.
Interestingly, there is no presence of bimoraic effect for the process in (7), showing that bimoraic effect does not demonstrate absolute influence on *nyoboo-kotjoba in general. It should be noted that this kind of word production is not reliant upon orthography despite the etymological background which originally referred to the initial letter of the source word. According to the current writing system in Modern Japanese, for example, the CV syllable *syə is transcribed with two letters しゃ, where the lower case in the second position indicates an intermediate y between the onset consonant and the nuclear vowel.

2.3 Hypocoristic formation

Along with the preceding discussion on the interaction between morphology and phonology in Japanese, the issues on hypocoristic formation will be addressed here, which has attracted a great deal of researchers working on Modern Japanese word prosody and morphology. As briefly mentioned previously, the Japanese hypocoristic suffix for human proper names ちゃん -tyaN⁸ has been frequently discussed since the 1990s (e.g. Poser 1990, Itô 1990, Kubozono 1995, Labrune 2012 and others). This suffix is originally derived from the honorific suffix for proper names 様 -sama (originally means ‘appearance’), which remains highly productive in current speech of Japanese: in other words, the problem due to irregularity (see (2c)) is relatively small⁹; moreover, the influence of bimoraic effect is strong as non-bimoraic truncation has no productive power despite certain possible influence of non-bimoraicity.

The hypocoristic suffix -tyaN may be used with truncated or full forms of human proper names. Poser (1990) claims that truncated output of the host will have the structure composed of a binary foot; namely, of either two light syllables or one heavy syllable. Monomoraic truncation is almost overall prohibited (e.g. ha[nako > *ha-tyaN). The shortening process allows morpheme-crossing truncation as well as morphologically well-formed outputs (see (8a-c)). Since the truncated form may not exceed two morae, syllable-breaking truncation is also possible when the first syllable is light and the second syllable is heavy (e.g. ta[roo > ta[ro-tyaN: see (8d)).

⁸ This suffix can be used for family names as well as for given names.
⁹ Amongst the suffixes derived from -sama, -san (さん) and -tyaN are frequently used even recently. While the historically oldest form -sama is used in expressing formal relationship, derived suffixes are preferred in more informal situations. The suffix -tyaN stands for particularly intimate or pre-social relationship, including talking to close friends or young children.
Proper name clipping does not always leave the initial two morae of the source word intact, tolerating some deviation from the original form. For example, if the second mora of the truncated form underlyingly contains either /ti/ or /tu/, the second mora is regularly transformed into moraic geminate, while this transformation does not breach the basic two-mora structure of the truncated form (see (8e)). Due to the possibility of formal deviation, it is possible for a single proper name to have several different abbreviations.

(8) Hypocoristic form of Japanese proper names (based on Poser 1990)

a. morphologically well-formed

<table>
<thead>
<tr>
<th>Base</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>ayako&lt; (&lt; a/yawa ‘twill’)</td>
<td>ayatyann</td>
</tr>
<tr>
<td>hana&lt; (&lt; hana ‘flower’)</td>
<td>hanyatyann</td>
</tr>
<tr>
<td>hami&lt; (&lt; hu/mi ‘letter’)</td>
<td>hamityann</td>
</tr>
<tr>
<td>zyuNko&lt; (&lt; zyuN ‘order, obedience’)</td>
<td>zuyntyann</td>
</tr>
<tr>
<td>yuku&lt; (&lt; yu/ku ‘gentle, graceful’)</td>
<td>yuckyatyann</td>
</tr>
</tbody>
</table>

b. morpheme-crossing

<table>
<thead>
<tr>
<th>Base</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>makoto&lt; (&lt; ma ‘true’, koto ‘word’)</td>
<td>makotytan</td>
</tr>
<tr>
<td>misato&lt; (&lt; m/isi ‘beautiful’, sato ‘village’)</td>
<td>misatytan</td>
</tr>
</tbody>
</table>

c. morpheme-breaking

<table>
<thead>
<tr>
<th>Base</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>a/ki/ra&lt; (&lt; aki/ra ‘bright, clear’)</td>
<td>akityan</td>
</tr>
<tr>
<td>megumi&lt; (&lt; me/gumi ‘mercy’)</td>
<td>megumityan</td>
</tr>
<tr>
<td>yukari&lt; (&lt; yukari ‘relation, destiny’)</td>
<td>yukaryatan</td>
</tr>
</tbody>
</table>

d. syllable-breaking

<table>
<thead>
<tr>
<th>Base</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>t/u/ro&lt;</td>
<td>tu/rotyan</td>
</tr>
<tr>
<td>z/u/ro&lt;</td>
<td>zuaryan</td>
</tr>
</tbody>
</table>

10 -ko is a typical proper name suffix which produces relatively traditional girls’ names, which originally means ‘child’. Since some decades proper names with this suffix have been less popular for children, sometimes being regarded to be stereotypical or old-fashioned.
11 Accurate accentuation pattern for this word is unknown as it is hardly used in isolation. Betokened with superscript question mark hereafter in this thesis.
e. **geminate formation**

<table>
<thead>
<tr>
<th>Base</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>mi</td>
<td>tiko</td>
</tr>
<tr>
<td>se</td>
<td>tuko</td>
</tr>
<tr>
<td>ta</td>
<td>tya</td>
</tr>
</tbody>
</table>

f. **unpredictable (no straight left-to-right truncation)**

<table>
<thead>
<tr>
<th>Base</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>mi</td>
<td>tiko</td>
</tr>
<tr>
<td>mi</td>
<td>tiko</td>
</tr>
</tbody>
</table>

Some unpredictable but allowable forms are lexically fixed rather than productive, whereas most of the productive templates are left-anchored, taking the morae from left to right without skipping. When the source name is clipped into one mora, the remaining part will be lengthened into two morae. In some special cases, a moraic nasal is added to the truncated form instead of vowel lengthening. Some examples are given in (9):

(9) **Monomoraic truncation and vowel lengthening**

<table>
<thead>
<tr>
<th>Base</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>yako</td>
</tr>
<tr>
<td>hi</td>
<td>roko</td>
</tr>
<tr>
<td>izumi</td>
<td>i</td>
</tr>
<tr>
<td>ti</td>
<td>eko</td>
</tr>
<tr>
<td>mi</td>
<td>yuki</td>
</tr>
<tr>
<td>masao</td>
<td>ma</td>
</tr>
<tr>
<td>no</td>
<td>zomi</td>
</tr>
</tbody>
</table>

2.4 **Revising previous proposals**

Investigating thus far, the bimoraic (or one-foot according to previous studies) template for nicknames with the suffix -tyaN seems statistically dominant despite some exceptions. The bimoraic template has great productivity especially for typical proper names in Modern...
Japanese; in other words, however, the putatively foot-based template might not be applied to non-typical Japanese proper names including foreign ones, which previous researches have not thoroughly investigated (see (10)). In self-examination as a native speaker of Japanese, some non-typical Japanese proper names, which have become popular recently, or, in contrast, which have been regarded as anachronistic nowadays, are sometimes difficult to truncate into bimoraic. Similarly, for certain proper names of foreign origin there may be difficulties in truncation as well. When nickname truncation is impossible, full forms will be mostly used.

As some rather rare examples in (10b) demonstrate, the bimoraic compensation usually does not occur even if the transcribed original name is composed of one mora.

(10) Exceptional cases for hypocoristic formation

a. non-typical Japanese proper names

<table>
<thead>
<tr>
<th>Base</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>kikyoo</td>
<td>?kikyo-tyaN, kikyoo-tyaN</td>
</tr>
<tr>
<td>mi]ree</td>
<td>?mire-tyaN, mi]ree-tyaN</td>
</tr>
<tr>
<td>misuzu</td>
<td>?misu-tyaN, misuzu-tyaN</td>
</tr>
<tr>
<td>koharu</td>
<td>?koha-tyaN, koharu-tyaN</td>
</tr>
<tr>
<td>sa]zae</td>
<td>?saza-tyaN, sa]zae-tyaN</td>
</tr>
<tr>
<td>hu]hito</td>
<td>?huhi-tyaN, hu]hito-tyaN</td>
</tr>
<tr>
<td>ba]syoo</td>
<td>?basyo-tyaN, ba]syoo-tyaN</td>
</tr>
</tbody>
</table>

b. foreign proper names

<table>
<thead>
<tr>
<th>Base</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>zye]emuzu (= James)</td>
<td>?zyee-tyaN, zye]emuzu-tyaN</td>
</tr>
<tr>
<td>ma]kkusu (= Max)</td>
<td>?mat-tyaN, ma]kkusu-tyaN</td>
</tr>
<tr>
<td>yo]hanesu (= Johannes)</td>
<td>?yoha-tyaN, yo]hanesu-tyaN</td>
</tr>
<tr>
<td>da]bido (= David)</td>
<td>da]bi-tyaN, da]bido-tyaN</td>
</tr>
<tr>
<td>ri] (= 李 lǐ)</td>
<td>ri]i-tyaN, ri]i-tyaN</td>
</tr>
<tr>
<td>ra] (= 罗 luó)</td>
<td>?raa-tyaN, ra]i-tyaN, ru]o-tyaN</td>
</tr>
<tr>
<td>so] (= 苏 sū)</td>
<td>?soo-tyaN (&lt; so]o = 宋 sòng, so]i-tyaN, su]u-tyaN</td>
</tr>
</tbody>
</table>
To summarise, the truly productive template for hypocoristic truncation is left-anchored, although there are some exceptions where it appears difficult to create the well-formed nicknames using the productive template. As seen above, the productivity of *X-tyaN* structure for uncommon proper names is obviously lower than for common ones. There is some effect of irregularity despite high productivity of the bimoraic template in hypocoristic production.

Moreover, the data in (10) show an interesting fact that bimoraic truncation for foreign proper names is fully successful only when they are well known (hence especially for European names). Since the degree of familiarity is seemingly involved in this truncation process, there may be the effect of complexity (see (2b)). The bimoraicity seen in hypocoristic truncation is not exclusively reliant upon prosody. While there have been seemingly not a sufficient amount of studies on which conditions would prevent the original proper names from being truncated into bimoraic forms, the facts given above commonly demonstrates that bimoraic truncation is not purely driven by prosody.

While, as (10) shows, we should not deny the preference of bimoraic structure in hypocoristic formation, we can still think of following questions: taking the claims in previous studies into account, truncated forms are generated according to Prosodic Hierarchy (= foot). However, considering the traditional notion of Strict Layering (Selkirk 1984), the syllable-breaking truncation should have been ruled out (see (8d)). To avoid this problem, we could revise conventional foot-based analyse for hypocoristic formation in Japanese: Here I will suggest a model where every truncated proper name is made up of one or two morae obtained from the source name. In this proposal, the maximal number of obtainable morae ($\mu \leq 2$) is defined by bimoraic effect, which might be called as a foot according to previous studies.

Using their term of *foot*, we can hypothesise as follows: the foot is seen only in the output form, while expected foot structure of the source word is ignored. And the two morae for the truncated hypocoristic form may be taken relatively freely from the original form, permitting deformation such as syllable breaking (see (8d)) and mora skipping (see (8f)). While the bimoraic cluster created in outputs seems faithful to the traditional expectation for binary feet (two light syllables or one heavy syllable), its production process is not thoroughly dependent on prosody. The illustration in (11) shows the fact that the number of captured

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12 It should be noted that hypocoristic production from the source form is not absolutely prosody-independent: while the morae of the abbreviated form may be taken from the base word relatively freely, it seems impossible to pick up a single special mora from a heavy syllable (e.g. *taʃɽoo* \(\Rightarrow *oo-tyaN\)). This fact suggests that the
morae in hypocoristic formation may be selectable (one mora or two morae), while formal adjustment of the captured morae into a binary foot is obligatory.

Even if admitting that the effect of binarity on hypocoristic formation is operative to some extent, nonetheless, the putative foot structure does not tell anything about foot structure outside the truncated proper names themselves. In other words, the bimoraic structure seen in hypocoristic formation generally lacks the function of exhaustive persing even if they could be seen as bimoraic feet due to its affinity to bimoraicity.

(11) Mora capturing and foot production

<table>
<thead>
<tr>
<th>Captured morae</th>
<th>Formal adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 1</td>
<td>+ (empty slot filling: such as vowel lengthening)</td>
</tr>
<tr>
<td>b. 2</td>
<td>- (satisfies the minimal foot structure)</td>
</tr>
</tbody>
</table>

In the most productive cases of hypocoristic formation, the truncation process will take two morae from the source; however, when only a single mora is taken, the second slot is occupied with a special mora. The obligatory geminate formation (see (8e)) would be a result of phonetic assimilation to the suffix rather than of capturing only a single mora from the source.

The entire truncation process is, in fact, driven by different strategies despite certain presence of bimoraic effect which might be associated with the metrical feet: the whole process could be illustrated like in (12). In the table below, the process of creating bimoraic (putatively one-foot) template is omitted as this operation is common to every transformation process.

(12) Processes in hypocoristic formation

<table>
<thead>
<tr>
<th>Base</th>
<th>Process</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) yako</td>
<td>phonological: take two morae from the source</td>
<td>a) yya-taN</td>
</tr>
</tbody>
</table>

(left-anchored)

phonological: take one mora from the source  

a) ytaN

(left-anchored)

output forms are required to contain syllable nuclears whereas post-nuclear components can be dropped, providing some positive evidence for the validity of syllables in Japanese.
phonological: fill the empty slot with a special mora

phonological: take two morae from the source (non-left-anchored)  \[a\]ko-tya\[N\]

phonological: take one morae from the source (non-left-anchored)  \[*ko\]o-tya\[N\]

phonological: fill the empty slot with a special mora

morphological: avoid taking an affixive element (-ko ‘child’) in isolation

phonological: take two morae from the source (left-anchored)  \[zyu\[N\]ko\]

phonological: take two morae from the source (non-left-anchored)  \[*N\]ko-tya\[N\]

phonological: avoid taking a special mora without a governing independent mora

phonological: take two morae from the source (left-anchored)  \[mi\[it\]iko\]

phonetic: assimilate the second syllable to the suffix

phonological: assign a geminate on the second syllable as a result of assimilation

phonological: take one morae from the source (left-anchored)  \[mi\[i\]ji\]-tya\[N\]

phonological: fill the empty slot with a special mora
The transformation processes presented in (12) commonly shows supporting evidence for our claim that even non-prosodic elements are involved in those phenomena. Therefore, they will not perfectly visualise latent foot structure of Japanese. Considering the entire data of ours, the influence from other external conditions other than prosody should not be neglected.

While the influence on the outputs from prosodic structure is not altogether absent, prosodic structure of the original forms is not taken into account, as being able to break the syllable boundaries in some truncation processes (e.g. taro\(\tilde{o}\) \(\rightarrow\) ta\(\tilde{r}\)o-\(\tilde{y}\)a\(\tilde{N}\)). As the fact that the proper name \(\text{mi}t\)iko may generate the left-anchored \(\text{mi}f\)-\(\tilde{y}\)a\(\tilde{N}\) as well as the right-anchored \(ti\)ko-\(\tilde{y}\)a\(\tilde{N}\) (and even the middle-skipped \(\text{mi}j\)ko-\(\tilde{y}\)a\(\tilde{N}\)) shows, moreover, that the footing direction of the original words is inconsistent.
Our data consistently suggest that the process of hypocoristic truncation gives any information about neither foot structure of the input nor that of the entire utterance.

2.5 Zuuzya-go

In Modern Japanese, there was a temporal preference of word inversion for creating new words, which was particularly seen in colloquial speech in the field of entertainment business, termed therefore zuuzya-go, which originates from an inverted form of *zya'zu 'jazz'* (briefly mentioned in subsection 2.2 in this chapter). In the time when this type of word inversion was of popularity in this language, a great number of inverted words were created while most of them did not survive in Contemporary Japanese in the twenty-first century. In contrast to some word transformation processes which may be influenced by lexical stratum structure (such as native Japanese or Sino-Japanese), zuuzya-go word inversion has a unique nature where stratal preference is absent: as seen in (13) below, words from every stratum can be inverted into zuuzya-go.

According to the majority of past studies (Poser 1990, Itô, Kitagawa & Mester 1996 and others), the templates used for word inversion are determined with respect to bimoraic foot structure. They commonly claim that inverted words between bimoraic and quadrimoraic length are composed of the combination of two bimoraic clusters, or, in their term, of two feet. In case of quadrimoraic words, for example, the second half of the original word is placed on the first bimoraic slot of the transformed word, whereas the first half of the original word moves to the second position of the output. When the original words are trimoraic or less, the inverted part

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13 In clear contrast to the process of hypocoristic truncation which appears to be highly complex as well as *nyooobo-koitoba* formation, there are some further phenomena where a simpler explanation may be possible: for example, Japanese bar girls (including traditional 艺者 *geesya* girls) have traditionally called their frequent guests using truncated forms of their surnames. A truncated surname in this case is made of the stem with the honorific suffix *-san*, where the prefix of honorific function *o-* can be optionally added (Poser 1990). The stems are clipped and modified into a heavy syllable so that it can construct a putative bimoraic foot. The first mora of the output is taken from the leftmost position of the base surname (e.g. *tanaka* > *o-ta'ja-san*), with the second slot filled with lengthened vowel. The syllable structure of source words are ignored in this clipping process (e.g. *kon'doo* > *o-kon'san*, *o-ko'ny-san*). This phenomenon is parallely seen in hypocoristic formation, where syllable-breaking truncation is possible (see (8d)). According to the classification of mora capturing patterns in (11), the bargirls’ truncation uses basically only the second strategy (see (11b)).

Similarly, the traditional girls’ name truncation, which is no longer productively used in the contemporary speech, obeys a simple principle where bimoraic effect is present: in this nicknaming process, the initial two morae are taken from the base name and are connected with the prefix *o-* (e.g. *yu'kiko* > *o-yu'ki*, *yo'oko* > *o-yo'ko*). In contrast to the bargirls’ truncation, the output will demand the direct extraction of the initial two morae from the base words: in other words, only the first strategy of mora capturing is operative in this process (see (11a)).
may be shorter than two morae, in which moraic shortage will be compensated with some satisfaction strategies: such as vowel lengthening and geminate insertion. According to Poser (1990)’s claim, interestingly, some of possible outputs may even violate basic phonotactic rules in Modern Japanese where, for example, a moraic nasal should never stand in the word-initial position: such as \(pa/N\) ‘bread’ > \(NN-paad\)\(^{14}\).

Since word inversion has been frequently used especially in informal speech, phonological forms of inverted words may lack consistency, which might have caused confusion in transcription and pronunciation among researchers: for example, Ito & Mester (2003) uses \(siime\) for the inverted form of \(mesi\) ‘meal’, whereas Poser (1990) transcribes this word in a slightly different form with vowel lengthening in the second syllable: transcribed \(siimee\). While it seems reasonable to believe that both forms were co-existing, I basically will use older data (here those of Poser) in this thesis when there is formal inconsistency amongst researches.

In the data in (13), vertical bars | stand for boundaries of inversion units. The part in angle brackets < > are ignored in the inversion process.


a. simple symmetric inversion

<table>
<thead>
<tr>
<th>Base</th>
<th>Inverted</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>koo</td>
<td>hi</td>
<td>ji</td>
</tr>
<tr>
<td>kii</td>
<td>/i</td>
<td>gai</td>
</tr>
<tr>
<td>batu</td>
<td>guN</td>
<td>guN</td>
</tr>
</tbody>
</table>

b. symmetric inversion (with optional special mora addition)

<table>
<thead>
<tr>
<th>Base</th>
<th>Inverted</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>me</td>
<td>si</td>
<td></td>
</tr>
<tr>
<td>su</td>
<td>si</td>
<td></td>
</tr>
<tr>
<td>ki</td>
<td>i</td>
<td>i</td>
</tr>
<tr>
<td>tu</td>
<td>u</td>
<td>uul</td>
</tr>
</tbody>
</table>

---

\(^{14}\) Japanese conventional phonotactical rules usually do not tolerate moraic nasal /N/ to occur on the first position of a prosodic word and to be even lengthened. Exceptions can be found in some interjections (e.g. \(NN\) ‘hm’), while moraic nasals are not lengthened if natural independent morae co-occur (e.g. \(uN\) ‘yes’, \(uNN\) ‘hm’, \(uNN\) ‘hm’).

\(^{15}\) Lowering kernels for inverted words are omitted due to some reasons: first, there will be no commonly agreed position of their lowering kernels. Second, the author is no longer able to judge the correctness of their lowering kernel position since this word inversion process has mostly extinct in the current speech.
pa|N  Npaa  ‘bread’
hi|i  hii  ‘fire’
c. asymmetric inversion (with optional special mora addition)

Base    Inverted    Gloss
ni|ojii    oi|nii    ‘smell’
ha|wai    wai|ha\(^{16}\)  ‘Hawaii’
gi|taa    taa|gi    ‘guitar’
huku|ro    rop|puku    ‘bag’
ku|suri    suri|ku    ‘drug’
on|na    na|ON    ‘woman’
gi\(N\)za    zer|gin    ‘Ginza (place name)’
roppon|gi    gi|roppon    ‘Roppongi (place name)’
d. internal mora deletion

Base    Inverted    Gloss
mane|e|zyaa    zyaa|mane    ‘manager’
koma|a|syaru    syaru|koma    ‘commercial’
e. orthographic transformation

Base    Inverted    Gloss
bik|ku|ri    kuri|bitu    ‘surprised’
f. irregular

Base    Inverted    Gloss    Note
siro|oto    too|siro    ‘amateur’    second element inversion
toro|b|On    bon|toro    ‘trombone’    superheavy syllable clipping
ka|wai<soo>    wai|ka<soo>    ‘pitiful’    ignored final syllable

Generally speaking, the regular outputs of zuuzya-go word inversion is either trimoraic or quadrimoraic made up of two inversion units, with which previous studies are commonly agreed\(^{17}\).

\(^{16}\) To my personal knowledge, there is an alternative form waihaa with a lengthened final syllable, while this form is apparently not attested in previous studies.

\(^{17}\) Note that inversion patterns may be subcategorised with respect to two distinct transformation processes, which originally Itô, Kitagawa & Mester (1996) reported: they propose exhaustive reversals and non-exhaustive reversals in inverting trimoraic inputs in particular, where the former is defined as the word
2.6 Word inversion and bimoraic effect

Looking at the current data, one would notice that zuuzya-go word inversion is a complex transformation process where varied algorithms are involved as well as in other word transformation addressed before. Here we can consider two main problems: first, a zuuzya-go output can be influenced by the orthographic form of the source word (see (13e)), which seems to be less influential in other transformation processes such as hypocoristic formation. Second, the outputs may ignore prosodic structure of the source word especially when it is short ($\mu \leq 2$), which is the common problem with other word transformation processes discussed in previous topics. To confirm those problems, we will consider some empirical data in the following: the transformation process in $pa|N > NNpaa$ cannot be operated without breaching the source word’s syllable boundary and reconstructing syllables after that. If every inversion unit in the source word is a foot, the rearrangement of $pa|N$ into $NNpaa$ is impossible.

As commonly seen in other processes of word transformation, the putatively foot-based bimoraic effect on word inversion is not overall effective on prosodic structure of the source word, while the outputs have some affinity to bimoraicity (= feet), treating two light syllables and a heavy syllable as equivalent.

As to longer source words ($\mu = 3, 4$), on the other hand, their original prosodic structure may be better preserved (e.g. $ha|wai > wai|ha$ vs. $oN|na > naoN$) even after transformation. Taking the facts presented above into account, the transformation processes may be revised as follows in (14):

(14) Processes in word inversion

<table>
<thead>
<tr>
<th>Base / Gloss</th>
<th>Process</th>
<th>Inverted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exhaustive vs. nonexhaustive reversals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. exhaustive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$ni</td>
<td>oi &gt; o</td>
</tr>
<tr>
<td></td>
<td>b. non-exhaustive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$be</td>
<td>e&gt;</td>
</tr>
</tbody>
</table>

In this thesis, the second subcategory is excluded from our discussion for the sake of convenience.
koohi\ji \quad \text{phonological: take bimoraic clusters from the} \quad \text{hiikoo}

‘coffee’ \quad \text{source as inversion units}
\quad \text{phonological: invert unit order}

ki\ji \quad \text{phonological: take two morae from the source} \quad \text{iikii}

‘key’ \quad \text{as inversion units}
\quad \text{phonological: convert special morae independent}
\quad \text{phonological: give each inversion unit a bimoraic status}
\quad \text{phonological: fill empty slots in inversion units}
\quad \text{with special morae (long vowels)}
\quad \text{phonological: invert unit order}

hi\j\i \quad \text{phonological: give the source word a bimoraic} \quad \text{iihii}

‘fire’ \quad \text{status}
\quad \text{thereafter the same process as in ki\ji > iikii}

\textit{on}na\j \quad \text{phonological: take a heavy syllable from the} \quad \text{naoN}

‘woman’ \quad \text{source as an inversion unit}
\quad \text{phonological: take stray mora as the second inversion unit}
\quad \text{phonological: invert unit order}

\textit{ha}wai \quad \text{the same process as in \textit{on}na\j > naoN} \quad \text{waiha}

‘Hawaii’

\textit{hu}kuro\j \quad \text{phonological: take the initial bimoraic cluster} \quad \text{roppuku}

‘bag’ \quad \text{as an inversion unit}
\quad \text{phonological: take stray mora as the second inversion unit}
\quad \text{phonological: give each inversion unit a bimoraic}
status
phonological: fill empty slots in inversion units
with special morae (a geminate)
phonological: invert unit order
phonetic/phonotactic: optimise geminate
condition ($hhu \rightarrow \overset{\circ}{\ddot{u}} \rightarrow ppu \rightarrow \overset{\circ}{\ddot{u}}$)

kusuri phonological: create a foot from right to left and suriku
‘drug’ take it as an inversion unit
thereafter the same process as in hukuro $\rightarrow$
roppuku (with no foot adjustment of stray mora)

bikkurī orthographic: convert geminate unit ($\rightarrow$) into kuribito
‘surprised’ a regular CV syllable tu ($\rightarrow$), which is an
orthographic (but not phonological) counterpart
thereafter the same process as in koohiji $\rightarrow$ hiikoo

Since the process of zuuzya-go word creation was merely a temporary preference, most of them have become unused in current Japanese, with only a handful of survivors remaining. Among them, for example, the word ネタ neta which means ideas for entertainers or artists’ presentations in particular, is interestingly unfaithful to the binary (bimoraic) template of optimal word inversion. This word is apparently derived from 種 ta/ne ‘seed, source’ and the expected form *neetaa does not exist or has become extinct otherwise.

As we have seen heretofore, such non-canonical forms may survive while canonical forms have been almost eradicated in the current use: this fact suggests to me that bimoraic

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18 In Modern Japanese phonology, /p/ is considered as a counterpart of /h/ despite the absence of voicedness opposition: they are exchangeable in some consonant transformation processes (such as in Sino-Japanese compound formation: e.g. ni:jī ‘sun’ + ho:n ‘root’ $\rightarrow$ nip-po:n ‘Japan (lit. sun-root)’). Historically, the emergence of /h/ consonant in Japanese is a result of sound change from bilabial stop /p/ in Old Japanese.

In the earliest period, there was typical voicedness opposition in bilabial stops (/p b/) in Japanese, which changed into /h b/ opposition. Nowadays, labial consonants employ three-way discrimination (/p b h/) since voiceless bilabial stop did not completely disappear. There is a great demand for voiceless bilabial stop in Modern Japanese due to massive word borrowing.
(foot-based) structure of inverted words has in fact not been obligatorily satisfied despite a strong tendency which prefers bimoraicity, allowing unexpected forms to survive as a result.

In some Germanic languages where binary structure of feet is more salient, in contrast, the process of word transformation unit is strictly confined to minimal word structure, tolerating no template smaller than a binary (bimoraic) foot: such as pr[ə]fessional > pr[əʊ] (*pr[ə]) and br[ʌ]ther > br[əʊ] (*br[ʌ]) in regular word truncation, where the subminimal condition of morae is repaired by certain procedures such as vowel change (Itô, Kitagawa & Mester 1996).

Moreover, as some inverted words presented in (14) have shown (e.g. huku|ro > rop|uku and ku|suri > suri|ku), footing direction is not uniform while many scholars premise consistent left-to-right footing direction for Japanese. Previous analyses, however, have not successfully accounted for the inconsistency of footing direction in some word transformation processes.

3 Single word truncation

As one of the main discussions in this thesis, this section’s research theme will be the phenomena of single word truncation. When referring to word truncation in this thesis thereafter, this will usually mean foreign word truncation (see subsection 3.1 in this chapter). Previous studies do not presume that foot-based analysis is useful in both traditional word strata (native Japanese and Sino-Japanese), being therefore focused on foreign word truncation. The second section will introduce the basic idea of interaction between feet and truncation templates.

It should be noted that this thesis will propose to treat compound word truncation (see section 4) differently from single word truncation (see subsection 3.2) due to the templatic difference between both of these procedures. In subsection 3.3, subsequently, we will propose the possibility of regarding longer ($\mu \geq 4$) templates as equivalent to compound truncation, using the concept of pseudo-compound (Sato 2002, Giriko 2010 and others) because of the possible difference in template limitation between short and long outputs.

By considering the proposed pseudo-compound effect in longer templates of single word truncation, we can treat them as a part of compound truncation (see subsection 3.4). According to this presumption, only sub-quadririmoraic templates can be considered as the true single word truncation.
Taking the pseudo-compound structure into account, single word truncation will be differently analysed from prior proposals. From the fifth section in this chapter, the basic unit of single word truncation will be argued. Whereas some researchers have claimed that single word truncation is based on bimoraic stem structure (such as Itô 1990), we will propose a different option of minimal obligatory stem being disyllabic rather than bimoraic (see subsection 3.6). As the majority of Japanese foot studies are agreed with bimoraic structure, the minimal disyllabicity of single word truncation templates will be a negative fact for the theories of Japanese bimoraic feet.

In the final parts in this section, we will argue what causes minimal template of single word truncation minimally supermonomoraic instead of preserving the monomoronicity of natural content words (see subsection 3.7 and 3.8). As to what causes the change of minimal limitation, we will consider several non-prosodic conditions such as derivedness (Itô 1990) and dispreference of too short truncated forms which may risk clashing with existing words.

3.1 Foreign word truncation

Along with the issues on word transformation phenomena argued above, the strategy of foreign word (mainly from Western languages during modernisation) truncation has been frequently debated in Japanese foot studies. In the past hundreds of years, the Japanese language has imported a huge number of new words from foreign languages other than Han Chinese which traditionally has been the main source of non-Japonic vocabulary (Sino-Japanese words). In current Japanese, words in non-Chinese foreign category are frequently abbreviated due to some reasons.

From phonological aspect, foreign words are tendentially long because of formal adjustment to Japanese phonology such as vowel epenthesis. Other than that, word size compression through truncation is also useful in sparing effort in writing as well as in speaking, since foreign words are usually written in Japanese syllabic katakana and transcription with Chinese characters is impossible. As to both traditional lexical strata (native and Sino-Japanese), writing in Chinese characters has some compression effect on the text due to its ability to express multiple syllables with a single character.
With respect to the phenomena of word clipping, there have been some approaches to account for its phonological realities (such as Itô 1990, Labrune 2002, Itô & Mester 2003, Irvin 2011, Labrune 2012). According to their claims, templates used in word truncation processes are defined by certain phonological conditions. Previous studies commonly (and seemingly correctly) have posited that no foreign word truncation into a single light syllable or a single heavy syllable is productive\(^\text{19}\), in which many of them have assumed binary foot structure.

Previous studies since Poser (1990) have generally attempted to define feet in Japanese, assuming that the process of foreign word truncation play a role for mapping segments to foot structure like other word transformation phenomena discussed before do: Itô & Mester (2003) claim that truncated words are governed by minimal word requirement, which demands prosodic words to be minimally disyllabic, while there are a huge number of monosyllabic words in Modern Japanese (see section 2.2 in chapter 1).

3.2 Single word truncation

The foreign word clipping process may be classified into single word truncation and compound truncation. Among both of them we will discuss single word truncation first, giving some actual data in (16) and (17) below. Almost all of truncated forms are composed of four morae or less while some quinquemoraic outputs have been reported in past studies as rare cases: such as \textit{konseotorikkupuru} ‘plug, socket (lit. concentric plug)’ > \textit{konsento}. With respect to statistics (Irwin 2011), left-anchored truncation is overwhelming while some truncated forms are unfaithful to the left-anchoring principle: such as \textit{wanisu} (dut. \textit{vernis}) ‘varnish’ > \textit{nisu}. In previous discussions in this thesis we have continuously seen inconsistency in footing direction which may occur in hypocoristic formation as well as in word inversion.

Notwithstanding some complexity in determining final output forms, previous studies have agreed with that there are regular templates in single word truncation as well as there are irregular ones: the representation in (15) will illustrate putative regular and irregular patterns of single word truncation proposed in previous analyses (e.g. Itô 1990, Labrune 2012b).

---

\(^{19}\) Strictly speaking, single heavy syllable truncation can be allowed in some rare cases (see the data in (16) in the main text), whereas single light syllable truncation is generally avoided; nevertheless, there is a strong preference to the binary (here disyllabic) structure in single word truncation, which should not be underestimated.
Regular vs. irregular templates

a. regular: LL, HL, LLL, LLLL, HLL

Detailed data for regular and irregular truncated words are given in (16) and (17). I add some recent data there in addition to traditional ones since many of influential researches have been made in the end of the twentieth century and a great number of new abbreviated words have been created in the past decades: as this word creation process is preferred especially in colloquial use, outputs are strongly influenced by the temporary preference of native speakers.

In the data below, captured elements in the truncation process are indicated with bold fonts.

(16) Regular truncation

a. bimoraic and disyllabic (LL)

<table>
<thead>
<tr>
<th>Base</th>
<th>Truncation</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>sutora</em>jiki*</td>
<td><em>su</em>to / *su</td>
<td>‘labour strike’</td>
</tr>
<tr>
<td><em>geba</em>ru<em>to</em> (ger. <em>Gewalt</em>)</td>
<td><em>ge</em>ba / *ge</td>
<td>‘violence’</td>
</tr>
<tr>
<td><em>kyarakuta</em>a*</td>
<td><em>kya</em>ra / *kya</td>
<td>‘character’</td>
</tr>
<tr>
<td><em>roke</em>esy<em>o</em>N</td>
<td><em>roe</em> / <em>roek</em></td>
<td>‘location’</td>
</tr>
<tr>
<td><em>demo</em>Nsutosre<em>esy</em>o*N</td>
<td><em>demo</em> / <em>de</em> / <em>demo</em></td>
<td>‘demonstration’</td>
</tr>
<tr>
<td><em>kari</em>mu* (ger. <em>Kalium</em>)</td>
<td><em>kari</em> / <em>ka</em></td>
<td>‘potassium’</td>
</tr>
<tr>
<td><em>katuretu</em></td>
<td><em>katuretu</em> / <em>ka</em></td>
<td>‘cutlet’</td>
</tr>
<tr>
<td><em>do</em>ru<em>ru</em>ru*</td>
<td><em>do</em>ru / <em>do</em></td>
<td>‘dollar’</td>
</tr>
<tr>
<td><em>akau</em>N<em>o</em></td>
<td><em>aka</em> / <em>a</em></td>
<td>‘account’</td>
</tr>
<tr>
<td><em>ripu</em>rai*</td>
<td><em>ripu</em> / <em>ri</em></td>
<td>‘reply’</td>
</tr>
<tr>
<td><em>kome</em>N<em>o</em></td>
<td><em>kome</em> / <em>ko</em></td>
<td>‘comment’</td>
</tr>
<tr>
<td><em>su</em>reddo*</td>
<td><em>su</em>reddo / <em>su</em></td>
<td>‘thread’</td>
</tr>
</tbody>
</table>

b. trimoraic and disyllabic (HL)

<table>
<thead>
<tr>
<th>Base</th>
<th>Truncation</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>sandoi</em>tti*</td>
<td><em>san</em>do / <em>san</em></td>
<td>‘sandwich’</td>
</tr>
<tr>
<td><em>roote</em>esy<em>o</em>N</td>
<td><em>roote</em> / <em>roo</em></td>
<td>‘rotation’</td>
</tr>
</tbody>
</table>
maiku[hon] majiku / *mai ‘microphone’
eNta[enme]to eNta / *eN ‘entertainment’
c. trimoraic and trisyllabic (LLL)

<table>
<thead>
<tr>
<th>Base</th>
<th>Truncation</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>terebi[zyon]</td>
<td>te[rebi]</td>
<td>‘television’</td>
</tr>
<tr>
<td>sa</td>
<td>purime[nto]</td>
<td>sa</td>
</tr>
<tr>
<td>anime</td>
<td>esyon]</td>
<td>a</td>
</tr>
<tr>
<td>puraka]ado</td>
<td>puraka</td>
<td>‘placard’</td>
</tr>
</tbody>
</table>

d. quadrimoraic (LLLL, HLL)

<table>
<thead>
<tr>
<th>Base</th>
<th>Truncation</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>irasutore</td>
<td>esyon]</td>
<td>irasuto</td>
</tr>
<tr>
<td>in</td>
<td>teri</td>
<td>ge</td>
</tr>
<tr>
<td>(rus. иntеллигенция)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tenpure</td>
<td>eto</td>
<td>tenpure</td>
</tr>
<tr>
<td>yuukaripu</td>
<td>itasu</td>
<td>yuukari</td>
</tr>
</tbody>
</table>

(17) Irregular truncation

a. single heavy syllable (H)

<table>
<thead>
<tr>
<th>Base</th>
<th>Truncated form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>hi</td>
<td>ropoN</td>
<td>poN</td>
</tr>
</tbody>
</table>

b. light syllable + heavy syllable (LH)

<table>
<thead>
<tr>
<th>Base</th>
<th>Truncated form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>supaa</td>
<td>rinigu</td>
<td>supa l</td>
</tr>
<tr>
<td>to</td>
<td>ran</td>
<td>toroN</td>
</tr>
</tbody>
</table>

c. internal heavy syllable (LHL)

<table>
<thead>
<tr>
<th>Base</th>
<th>Truncated form</th>
<th>Gloss</th>
</tr>
</thead>
</table>

20 Methamphetamine used as stimulant drug.
21 The Romanisation / in the representations denotes voiceless bilabial fricative [ɸ] rather than voiceless labiodental fricative [f], which has relatively recently emerged in Modern Japanese presumably due to influence from foreign languages: English in particular. Since there is no true voiceless labiodental fricative in Modern Japanese, this sound from foreign languages is mostly replaced by voiceless bilabial fricative (e.g. /f/) ‘photo’). It should be noted, however, that this Romanisation is not officially accepted: there is any agreement neither in the official nor in the conventional Romanisation.
The data in (16)-(17) commonly show that, interestingly, truncation into irregular templates is not absolutely excluded despite low frequency in statistical terms. Nevertheless, it seems true that single word truncation has a certain tendency to avoid monosyllabic (L or H) and right-heavy (LH) patterns, whereas other irregular templates are tolerated to some extent.

From the viewpoint in favour of feet, many of previous studies have assumed binary

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22 This form is attested only in compound truncation: such as depa-ga < depatomeNto(-suto)a-ga]aru ‘young female staff in a department store (lit. department (store) girl)’, depa-tika < depatomeNto(-suto)a-ti[jka ‘basement shopping area in a department store’. Note that the final element of the second data (depa-tika) is a Sino-Japanese word, while everything else is a foreign word.

23 An alternative form (gurisererin) is preferred in current speech while the form presented in (17) might sound old-fashioned.

24 This output is impossible for the homonymous general noun: irasutore]etaa ‘illustrator’ > *irare.
foot structure in the minimal condition of foreign word truncation. The strict avoidance of monosyllabic and right-heavy structures may be supporting their claims. However, certain influence of non-phonological factors in some truncation processes should not be underestimated, as frequently emphasised throughout this thesis.

Looking at morphological structure of some data above (e.g. \textit{depa\textsuperscript{ato} < depa\textsuperscript{atome}Nto}, \textit{tora\textsuperscript{nsu} < tora\textsuperscript{nsu}fo\textsuperscript{omaa}}), one could question if there is a so-called morphological \textit{pseudo-compound} (Sato 2002, Giriko 2010) effect caused by affixes or affix-like components. Supposing that this analysis is correct, the data in (17c) should not be treated as optimal single truncation due to the presence of affix-like elements such as \textit{-men\textsuperscript{to} \textsuperscript{-ment}} or \textit{tora\textsuperscript{nsu} \textsuperscript{-trans}}. While previous studies have emphasised truncated word’s binary structure driven by prosody, they have relatively ignored morphological (and psychological as well) effects on foreign word truncation: such as the aforesaid pseudo-compound effect.

Taking morphological factors into account, previous assumptions can be revised in some points: first, long truncation templates ($\mu \geq 4$) should be separated from short ones ($\mu < 4$). In comparison with the truncation process in the second category, the first category is more sensitive to the (pseudo-)morphological nature of base words, where the presence of (pseudo-)compound effect is suspected. As previously seen, for example, middle-heavy and right-heavy structures are possible in long outputs in single word truncation as well as in compound truncation, whereas previous studies have in common maintained that these templates are forbidden in single word truncation (see (15)-(17)).

As to compound truncation in general, on the other hand, there is no constraint in template forms especially when the output is long ($\mu \geq 4$). According to Nishihara, van de Weijer & Nanjo (2001), the process of compound truncation can be classified into \textit{back truncation} (e.g. \textit{aisu-kuriimu} ‘ice cream’ > \textit{a\textsuperscript{isu}}), \textit{front truncation} (e.g. \textit{naito-\textsuperscript{ku}rabu} ‘night club’ > \textit{\textsuperscript{ku}rabu}) and \textit{double truncation} (e.g. \textit{zii\textsuperscript{N}zu-p\textsuperscript{an}tu} ‘jeans pants’ > \textit{zii-p\textsuperscript{an}N}), with middle-heavy and right-heavy structure tolerated everywhere (see (18) below). We can see a structural parallel in the outputs of single word truncation and true compound truncation, especially when the former output has sufficient length.

Among these three truncation strategies, double truncation is the statistical majority and is followed by back and front truncation. Their research presents the frequency of the three truncation processes in percentage: 47\%, 39\% and 14\% respectively (Nishihara, van de Weijer
& Nanjo 2001:308). The formal likeness between long outputs of single word truncation and some truncated compound words can be illustrated as in (18): Note that alveolar stop letter with underdot (t and d) seen in the data thereafter represents non-palatalised sound. In Japanese official Romanisation (訓令式 kunree-siki), an alveolar stop letter (t and d) will represent palatalised sound when followed by a palatal (semi-)vowel.

(18) Long outputs of single word truncation and compound truncation

a. long outputs of foreign word truncation

<table>
<thead>
<tr>
<th>Base</th>
<th>Truncation</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>dyusserudo]ruhu</td>
<td>dyu]sseru</td>
<td>‘Düsseldorf’</td>
</tr>
<tr>
<td>depa]atomeNto(-sutoa)</td>
<td>depa]ato</td>
<td>‘department store’</td>
</tr>
<tr>
<td>purezenTe]esyoN</td>
<td>purezen</td>
<td>‘presentation’</td>
</tr>
<tr>
<td>enTaate]inmeNto</td>
<td>enTa-me</td>
<td>‘entertainment’</td>
</tr>
</tbody>
</table>

b. compound truncation

<table>
<thead>
<tr>
<th>Base</th>
<th>Truncation</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>karee-rajisU</td>
<td>karee</td>
<td>‘curry rice’</td>
</tr>
<tr>
<td>bureen-tora]suto</td>
<td>bureen</td>
<td>‘brain trust’</td>
</tr>
<tr>
<td>uinnaa-soose]ezi</td>
<td>uinnaa</td>
<td>‘Vienna sausage’</td>
</tr>
</tbody>
</table>
| geemu-se]ntaa      | gee-seN    | ‘game center’  

(1)3 (amusement arcade)

3.3 Pseudo-compound effect

Through the discussion above I suggest that long abbreviations should be distinguished from short ones due to the difference in acceptability of middle-heavy and final-heavy constructions, and that some irregular templates (see (17c, d, f)) have certain similarities to those in compound truncation. We can assume the existence of pseudo-compound structure even in morphologically simplex words, which may divide a word into two (or more) parts in accordance with virtual separation.

Here, we should consider a series of prior studies on pseudo-compound in Japanese: it has been widely claimed that foreign words with five or more than five morae are treated as
compounds in Japanese phonology (Uwano 1999, Labrune 2002, Sato 2002, Kubozono & Ogawa 2005, Giriko 2010, Kubozono 2010). According to those researches, simplex words with five and more than five morae are statistically scarce in native Japanese and Sino-Japanese lexical strata, while such long simplex words are mainly found in foreign lexical category. Therefore, it is presumable that long simplex words are subject to pseudo-compound effect.

Uwano (1999), for example, posits that the position of lowering kernel is preserved in the final element of a compound word if the final element itself is morphologically complex, while a simplex final element may undergo lowering kernel shift: following the generally agreed compound accentuation rules in Japanese, there is an algorithm which changes non-kernelled words in the final element into initial-kernelled (e.g. *amerika* ‘America’ > *minami-amerika*25 ‘South America’: Uwano 1999:198, McCawley 1968, Poser 1990, Kubozono 2010) and the lowering kernels in non-final elements are deleted if there are (e.g. *gunzi* ‘military affairs’, *sangyoo* ‘industry’ > *gunzi-sangyoo* ‘military industry’).


On the other hand, the compound word *deksi-haamoni* ‘electric harmonica (lit. electron harmonica)’ stays non-kernelled, although the second element *haamoni* is non-kernelled in isolation and morphologically simplex. Uwano (1999) proposes that the accentuation rules for longer second elements (μ ≥ 5) should be analysed differently from those for shorter ones (μ < 4), assuming virtual compound structure in the former category. I give some representations for compound accentuation in (19), taking them exclusively from foreign word stratum for the sake of convenience, while the original research does not pay great attention to the vocabulary layers in Japanese:

---

25 Concerning the lowering kernel position of this word, there is a telling claim that the lowering kernel on the second mora of the second element is also possible: namely *minami-amerika* (Kindaichi 2011). In my personal observation, furthermore, there is ambiguity in determining the lowering kernel position of *minami-osetia* ‘South Osetia’ (*minami-o*setia ~ *minami-ose*tiia), which was frequently to hear when South Osetia War broke out in 2008. Following the principle of compound accentuation, it is expected that the lowering kernel be placed on the first mora of the second element (*minami-o*setia), as the second element is non-kernelled.
Compound accentuation (based on Uwano 1999)

a. complex N2

<table>
<thead>
<tr>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
<th>Lowering kernel</th>
</tr>
</thead>
<tbody>
<tr>
<td>riy[a]-kaa</td>
<td>suupaa-riya]-kaa</td>
<td>preserved</td>
</tr>
<tr>
<td>‘bicycle-drawn car’</td>
<td>‘super-bicycle-drawn car’</td>
<td></td>
</tr>
</tbody>
</table>

(lit. rear car)

| raisu-nu]udoru | iNsutaNo-raisu-nu]udoru | preserved |
| ‘rice noodle’ | ‘instant rice noodle’ | |

b. simplex N2 (µ < 5, non-kernelled)

<table>
<thead>
<tr>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
<th>Lowering kernel</th>
</tr>
</thead>
<tbody>
<tr>
<td>beesu</td>
<td>daburu-be]esu</td>
<td>changed</td>
</tr>
<tr>
<td>‘bass’</td>
<td>‘double bass’</td>
<td></td>
</tr>
<tr>
<td>ahurika</td>
<td>burakku-a]hirika</td>
<td>changed</td>
</tr>
<tr>
<td>‘Africa’</td>
<td>‘Black Africa’</td>
<td></td>
</tr>
<tr>
<td>bookaru</td>
<td>riido-bo]okaru</td>
<td>changed</td>
</tr>
<tr>
<td>‘vocal’</td>
<td>‘lead vocal’</td>
<td></td>
</tr>
</tbody>
</table>

c. simplex N2 (µ ≥ 5, non-kernelled)

<table>
<thead>
<tr>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
<th>Lowering kernel</th>
</tr>
</thead>
<tbody>
<tr>
<td>haamonika</td>
<td>gurasu-haamonika</td>
<td>preserved</td>
</tr>
<tr>
<td>‘harmonica’</td>
<td>‘glass harmonica’</td>
<td></td>
</tr>
<tr>
<td>surobakia</td>
<td>tyeko-surobakia</td>
<td>preserved</td>
</tr>
<tr>
<td>‘Slovakia’</td>
<td>‘Czechoslovakia’</td>
<td></td>
</tr>
</tbody>
</table>

The data in (19) provides positive evidence for pseudo-compound structure in longer N2 (see (19c)), where the falling pattern is preserved after compounding. Nevertheless, it will be worth to mention some exceptions which cannot be accounted for with the expected pseudo-compound effect: such as arukooru ‘alcohol’ > metiru-a]rukooru (*metiru-arukooru) ‘methyl alcohol’, puropireN ‘propylene’ > pori-puropi]reN (pori-puropireN) ‘polypropylene’.

Sato (2002)’s subsequent analysis on pseudo-compound effect in Japanese relies upon the virtual word partition in long foreign words, where he performed an experiment with the assistance of Japanese native speakers: there it was claimed that partition points of long foreign
simplex words may be construed as pseudo-compound boundaries. With respect to phonology, the position of lowering kernels for the target words is in support of his assumption, suggesting that lowering kernels are tendentially placed on the following mora of the place where the words are virtually divided. This could be a parallel to the fact that there is a standard form of compound words in which lowering kernels are put on the first mora of the second element (Sato 1989b, 2002 and others). I will give some examples of virtual word partition in (20) below, where the partition points are denoted with hyphens, as if the words in question were true compound words:

(20) Virtual word partition (Sato 2002)

a. quinremoraic
   *eto-ra*Nze ‘étranger (fre.)’, *yoo-gu)ruto ‘yoghurt’, *kuu-tyu)rrie ‘couturier (fre.)’, *son-bu)rero ‘sombrero’

b. sexamoraic
   *ebapo-re)eto ‘evaporate’, *anka-ta)ddo ‘UNCTAD’, *sarido-majido ‘thalidomide’

c. septimoraic
   *koresu-te)oru ‘cholesterol’, *iruri-ga)toru ‘irrigator (ger. Irrigator)’
   *kosolo)siamu ‘consortium’

The data above show highly frequent coincidence of morphological pseudo-boundaries with lowering kernels despite some exceptional cases (such as *kan-ta)ibire ~ kanTa)Ja-bire

26 Here, several problems in the word partition task should be pointed out: generally speaking, the virtual word partition does not guarantee 100% accuracy for falling pattern prediction. It should be noted that Sato (2002)’s study was an attempt to discover virtual compound structure on long foreign words particularly in terms of morphology.

The first problem is, as Sato (2002) himself admits, that there are some data where the participants fail to determine consistent partition points (e.g. *kan-ta)ibire ~ kanTa)Ja-bire ‘cantabile’, *wa)te)faroo ~ waate)fra-roo ‘Waterloo’). If the partitions may accurately predict the position of lowering kernels, there would be no inconsistency in determining where to divide. In contrast to such ambiguity, *kanTa)abire is not allowed, although Sato (2002:72-73)’s data show that most of the sexamoraic tokens are divided in the middle position. In his research, it was claimed that the 3+3 partition was seen almost 90% in his data. Some exceptional cases could be explained with the fact that the partitions uniformly avoid interrupting heavy syllable sequences.

Secondly, as is well known, Japanese lexical inventory has a great amount of initial-kernelled long simplex words, most of which are from foreign stratum (e.g. *a)kusesari ‘accessories’, *pu)jusikin ‘Pushkin’, *we)tetore-su ‘waitress’, *sa)kaririga ‘cycling’). In those cases as well, the pseudo-compound partitions will not coincide with the lowering kernel position.

27 This word may produce a right-anchored truncated form such as *ga)toru (see (22)).
According to Sato (2002)’s report, there are a number of (2+3) type partitions in quinquemoraic words (see (20a)), where the majority of the data can be divided into either (2+3) or (3+2) templates. From the positive viewpoint to pseudo-compound structure, the (2+3) outputs may be understood as formally symmetrical to quinquemoraic compound words such as beru-bo’oi ‘bellboy’. In the (3+2) partition, on the other hand, the third mora is typically special and the lowering kernel is placed on the fourth mora from the right edge (e.g. kate’eru ‘Katheter (ger.)’, puno’N-’pen ‘Phnom Penh’). While the partition points may fail to coincide with the lowering kernels, we can analyse these words as pseudo-compounds due to formal parallelism to true compound words.

Sato (2002) posits that the final (pseudo-)compound element should be distinguished with respect to mora count. A Lowering kernel may be placed on the final mora of the pre-final element if the final element is shorter than three morae. Here, the syllable structure of the pre-final element plays a certain role: since lowering kernel generally avoids being placed on special morae, it is pushed into the adjacent mora to the left if the pre-final compound unit ends with a special mora (Hayata 1999, Kubozono 2008 and others). See (21) for actual data:

(21) Compound unit and mora length

a. $\mu_{N2} \leq 2$: N1 lowering kernel possible

<table>
<thead>
<tr>
<th>N1 / Gloss</th>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>supiido</td>
<td>ga’N</td>
<td>supiido’-ga’N</td>
</tr>
<tr>
<td>‘speed’</td>
<td>‘gun’</td>
<td>‘speed gun’</td>
</tr>
<tr>
<td>su’upa’a</td>
<td>ka’ba’</td>
<td>suupa’a-kaa</td>
</tr>
<tr>
<td>‘super’</td>
<td>‘car’</td>
<td>‘supercar’</td>
</tr>
</tbody>
</table>

b. $\mu_{N2} > 2$: N1 lowering kernel impossible

<table>
<thead>
<tr>
<th>N1 / Gloss</th>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ti’ja’N</td>
<td>garasu</td>
<td>tiji-garasu</td>
</tr>
<tr>
<td>‘titanium’</td>
<td>‘glass’</td>
<td>‘titanium glass’</td>
</tr>
<tr>
<td>koohii’ji</td>
<td>ka’ppu</td>
<td>koohii-ka’ppu</td>
</tr>
<tr>
<td>‘coffee’</td>
<td>‘cup’</td>
<td>‘coffee cup’</td>
</tr>
</tbody>
</table>
As the data above shows, the phonological behaviour of (3+2) partition is equivalent to that of compound words with (21a)-type N2 units. Furthermore, the (2+3) pattern may also be explained with pseudo-compound effect. As empirically known, many of long words are kernelled and the lowering kernel is frequently on the third or on the fourth mora from the right edge, and these patterns can be explained as pseudo-compound structure made up with (X+3) or (X+4) partition. The former pattern is widely known as antepenultimate rule suggested in earlier researches (McCawley 1968 and others), which has been understood as giving the traditional templates of default accentuation of foreign words. See subsection 2.8 in chapter 4 for the precise investigation on default patterns in Japanese pitch accent.

Now, we are interested in the concept of how the pseudo-compounding effect may be used for foreign word truncation, especially where outputs are quadrimoraic or longer. Supposing that virtual morphological influence is present, we can analyse long truncated forms as follows in (22) below. The word truncation process is basically operated in accordance with virtual morphological partition.

However, applying the claim of Sato (2002) to phonology, we assume the lowering kernels in those data directly visualising the virtual partition points of prosodic words. Even in some cases where there is pseudo-morphological ambiguity like kaN-ta\[a]bire ~ kaNt\[a]a-bire 'cantabile', the phonological pseudo-boundary (namely, the lowering kernel), which does not necessarily coincide with the morphological one, is uniformly defined. While Sato (2002)'s experiment has discovered some interesting facts about virtual partition in terms of morphology, where the participants were requested to draw virtual boundaries on written stimuli, this idea is also applicable to phonology, even though the partition in both terms does not necessarily coincide.

(22) Pseudo-compound effect and foreign word truncation

a. Back truncation

<table>
<thead>
<tr>
<th>Base</th>
<th>Trunaction</th>
<th>Virtual partition</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>apa[atome]Nto</td>
<td>apa[ato]</td>
<td>apa[ato-me]Nto</td>
<td>'apartment'</td>
</tr>
<tr>
<td>i[ntaa]ty[N]zi</td>
<td>i[ntaa]</td>
<td>i[ntaa-tye][N]zi</td>
<td>'interchange'</td>
</tr>
<tr>
<td>ba[ate][Nd]aa</td>
<td>ba[ate]N</td>
<td>ba[ate]N-[d]aa</td>
<td>'bartender'</td>
</tr>
<tr>
<td>pure[ze]N[te][esy][o]N</td>
<td>pure[ze]N</td>
<td>pure[ze]N-[te][esy][o]N</td>
<td>'presentation'</td>
</tr>
</tbody>
</table>
In (22a), I treated *konkuri* (< *konku-rito*) as a back-truncated word, but whose rear element deletion is incomplete. Such a pattern in true compound truncation can be seen in some words such as *wan-pi*isu ‘one-piece dress’ > *waN-pi* and *tuiN-te*ru ‘twin tail (a hairstyle)’ > *tuiN-te*. For further information, we can give some outputs with sub-quadrimoraic length where a couple of morae are skipped (such as *irasuto-re*etaa > *irare* ‘Adobe Illustrator®’: see (17)), which may also be explained with the effect of virtual morphological structure. In the case of *irasuto-re*etaa > *irare*, for example, the virtual compound structure can be expected to be *irasuto-re*etaa. Interpreting pseudo-compound effect is active, the output must have undergone double truncation. However, we will not consider such data further in this thesis since sub-quadrimoraic truncation of long foreign words cannot be consistently treated as equivalent to compound truncation due to the presence of template constraint (such as *L, *H, *LH: see subsection 2.8 in this chapter).

So far, we have seen some evidence for pseudo-compound effect on the long outputs from single word truncation, which has been also supported by a certain number of researches. Consequently, the existence of pseudo-compound structure supports my assumption that long outputs in single word truncation can be interpreted as a result of compound truncation in a broad sense.

Since there seems to be no forbidden template in long truncated words, the shortening process for those words may be interpreted as equivalent to compound truncation where there is no syllabic or moraic constraint of output forms. On the other hand, short truncated outputs are not strongly subject to pseudo-compound effect, staying faithful to phonologically
determined templates. The overlap between single word truncation and compound truncation may be summarised like in (23):

(23) Single word truncation and compound truncation

a. Short single word truncation
   Mora count of outputs < 4 \(\mu\)
   Template constraint + (*monosyllabic, *right-heavy)

b. Long single word truncation
   Mora count of outputs \(\geq 4 \mu\)
   Template constraint -

c. Back/front truncation
   Mora count of outputs depends on the remaining element
   Template constraint -

d. Double truncation
   Mora count of outputs mostly \(\mu = 3, 4\)
   Template constraint -

3.4 Revision for the template inventory

For the sake of convenience, long truncated words should be separated from the discussion about single word truncation, regarding them as a variant of compound truncation: focusing on short forms of abbreviation, we can immediately find the consistent tendency avoiding monosyllabic and right-heavy templates (see also (15)-(17)). Many cases of intermediate element skipping in simplex words can be accounted for with the virtual compound effect, which provides a good explanation for truncation effect on the words such as *irasuto-rejetaa* ‘Adobe Illustrator’ (> *irare*), and possibly even on shorter words like *moru-hine* ‘morphine’ (> *mojhi*) as well.

As the transformation of *moruhine* into *mojhi* above shows, clipping truncata into monomoraic is possible in compound truncation despite low productivity, which will be discussed in the following. Moreover, this data also suggests the possibility of *not all* sub-
quadrimoraic outputs being irrelevant to pseudo-compound effect; however, we will not talk about these topics further. The revised version of single truncation templates is given in (24)\(^{28}\):

(24) Revised template list for single word truncation

<table>
<thead>
<tr>
<th>Template</th>
<th>Example</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>*L</td>
<td>-</td>
<td>*monosyllabic</td>
</tr>
<tr>
<td>(LL)(_E)</td>
<td>*su]to(-raiki)</td>
<td>‘labour strike’</td>
</tr>
<tr>
<td>*(H)(_E)</td>
<td>-</td>
<td>*monosyllabic</td>
</tr>
<tr>
<td>(LL)(_E)L</td>
<td>*te]rebi(-zyoN)</td>
<td>‘television’</td>
</tr>
<tr>
<td>*L(H)(_E)</td>
<td>-</td>
<td>*right-heavy</td>
</tr>
<tr>
<td>(H)(_E)L</td>
<td>*daiya(-moNdo)</td>
<td>‘diamond’</td>
</tr>
</tbody>
</table>

In the revised template list, outputs with four morae or more are not considered since these templates are construed as (pseudo-)compound truncation in a broad sense.

3.5 Structure of single word truncation

Through our previous discussions we confirmed that prior analyses on single word truncation have paid little attention to possible pseudo-compound structure, and that virtual morphological effect plays certain roles especially in long truncated words (\(\mu \geq 4\)). It was also examined that templates for long outputs should be treated separately from single word truncation due to the influence of pseudo-compound effect, which induces the absence of limitation on templates. The structure of long abbreviations has in fact a certain parallelism to compound truncation.

My proposal to regard the templates for long outputs parallel to compound truncation is a good explanation for the problem why there is certain asymmetry in regular templates for short and long truncated foreign words. Due to the absence of forbidden templates in quadrimoraic (and some rare more than quadrimoraic) outputs in single word truncation, we can

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\(^{28}\) It seems there are some ill-behaving data where it is difficult to tell how pseudo-compound effect is working. For example, the transformation process of *tor\(\text{amu}(-\text{pearej})/\text{ssii}\)* into *torape\(\text{n})* (see (17f) in this chapter) cannot be explained purely by pseudo-compound deletion as the imaginary morphological effect would predict the output, say, to be *torapea.*
treat them as identical to regular compound truncation and as having undergone the process of pseudo-compound truncation (back truncation, front truncation or double truncation: see (23)).

Following my claim, the revised templates of single word truncation are limited to a maximum of three morae, which is illustrated in (25). Taking my own analysis into account, we will continue our argument on the structure of truncated simplex words, questioning if we may find any effect of bimoraicity therein.

3.6 Basic unit of regular templates

Supposing the minimal structure of single word truncation is directly reflecting bimoraic feet, the minimal template in this truncation process should be permitting bimoraic monosyllable construction. However, following discussion will reveal the fact that the formal restriction in single word truncation is in fact firmly tied up with syllables rather than with morae, which previous studies have admitted as well (such as Itô 1990). Consequently, it would be simpler to assume that the minimal form of single word truncation is mapped to minimally disyllabic template, ignoring its moraic weight. In other word, the binary effect on single word truncation is present; however, it requires disyllabic structure instead of bimoraicity. Since it has been commonly claimed that Japanese putative foot structure is bimoraic but not disyllabic, the dysyllabic structure will not directly demonstrate foot structure in this language.

In contrast to this analysis, the prior suggestion of Itô (1990), on the other hand, presupposes the presence of bimoraic stem (StemF) for outputs in single word truncation, which establishes the main structure of outputs. A truncation stem may be combined with an optional suffixal element, as illustrated in (25):

(25) Stem-suffix structure in single word truncation (Itô 1990)

a. non-suffixed

\[\text{he}ri < \text{heriko}putaa\quad \text{roke} < \text{rokeesyoN}\]

‘helicopter’

‘location’
b. suffixed

\textit{te}rebi < \textit{terebi}zyon \hspace{1cm} ko\textit{nb}i < ko\textit{nbine}esyon

‘television’ \hspace{1cm} ‘combination’

\textit{ro}ote < \textit{roote}esyon

‘rotation’

The advantage of the stem-suffix model is that it can systematically rule out irregular L and LH templates as L stems in both constructions do not satisfy minimal size requirement (\text{Stem}_F = \mu \mu). In addition, her proposal is convenient as it being applicable to compound truncation as well as to single word truncation, where the combination of stem and suffix is also present: such as \textit{(te}re\textit{)}_\text{Stem}_F-(\textit{ka})_\text{Suffix} < \textit{tere}hon-\textit{kalado} ‘telephone card’.

Using Itô (1990)’s foot-based principle, the inner structure of a trimoraic truncated compound could be explained as reduction of the second element into a suffix, which is no
longer subject to minimal size constraint. On the other hand, abbreviated compounds with (2+2) structure can be understood as double-stemmed (see (26b)), which previous studies have claimed to be the statistical majority for compound truncation. Indeed, Itô (1990) mainly presents truncated words with the (2+2) pattern, assuming other possible templates as scarce according to her own data (Itô 1990:220). Nonetheless, recent studies have reported the increase in trimoraic abbreviations (e.g. Taniguchi 2013) while (1+1) outputs stay irregular as before.

(26) Stem-suffix structure in compound truncation

a. suffixed

\[\text{ako-gi} \prec \text{akoosutikku-gi}ttaa\]  
\[\text{‘acoustic guitar’}\]

b. double-stemmed

\[\text{rimo-koN} \prec \text{rimooto-kon}toro]oru\]  
\[\text{‘remote control’}\]

The proposal of Itô (1990) has given a good formulation to the phonological reality of Japanese foreign word truncation in general, but there seems to be some need for reconsideration: the primary problem would be that her foot-based (= bimoraic) stem theory does not account for why H template in single word truncation is strongly disfavoured despite satisfying bimoraic minimal foot condition. Moreover, her binary stem theory does not give any persuasive reason why the suffixal third mora is \textit{obligatory} when the stem node is occupied with a heavy syllable, and why it is \textit{optional} when the stem is made of two light syllables.

Her proposal can potentially annihilate the structural difference between single and compound truncation as the structure of both patterns can commonly be classified into either \textit{isolated Stem}_F, \textit{suffixed Stem}_F or \textit{doubled Stem}_F. However, I will treat the both truncation processes as different since their basic stem units are different from each other. I will propose a simple improvement for the template constraint of single word truncation instead of accepting the conventional foot-based stem-suffix model directly.
As suggested above, suffixal appendices are obligatory when stems are monosyllabic and they are optional when stems are disyllabic. This fact will imply that regular templates in this process are determined by syllable count rather than mora count. According to this model, for example, the structure of \((dai)\alpha(ya)\alpha\) is equivalent to that of \((de)\alpha(mo)\alpha\), both of which are purely composed of obligatory units. Here I will introduce the disyllabic stems \((\text{Stem}_{ss})\) instead of foot-based \textit{bimoraic} ones for the basic unit of single word truncation.

(27) Disyllabic stem structure

a. non-suffixed
\[
de\text{mo} < \text{demo}\text{sutore} \equiv \text{daiya} < \text{daiyamo} \text{ndo}
\]
‘demonstration’ \hspace{1cm} ‘diamond’

\[
\begin{array}{c}
\omega \\
\mid \\
\text{Stem}_{ss} \\
\mid \\
\mid \\
\sigma & \sigma \\
| & | \\
\mu & \mu \\
| & | \\
\text{de} & \text{mo}
\end{array}
\hspace{1cm}
\begin{array}{c}
\omega \\
\mid \\
\text{Stem}_{ss} \\
\mid \\
\mid \\
\sigma & \sigma \\
| & | \\
\mu & \mu & \mu \\
| & | \\
\text{da} & \text{i} & \text{ya}
\end{array}
\]

b. suffixed (optional)
\[
te\text{rebi} < \text{terebi} \equiv \text{zon}
\]
‘television’

\[
\begin{array}{c}
\omega \\
\mid \\
\mid \\
\mid \\
\mid \\
\mid \\
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\mid 
\end{array}
\]

63
Now, we could conclude that the regular templates of single word truncation are not reflecting bimoraic foot structure. This fact demonstrates that binary effect in Japanese in general is not necessarily moraic, permitting disyllabic template to be realised (see above). The irregular LH pattern can also be ruled out in my proposal because L (monosyllabic) stems are prohibited.

While the basic stem structure of simple word truncation has been proposed, that of foreign compound truncation will be treated in next section (see section 4 in this chapter).

3.7 Derivedness and minimal size requirement

A further question about single word truncation which have been rarely discussed since Itô (1990) is why there is the inconsistency in minimal size requirement between natural content words and abbreviated words: as we have seen, Japanese word-level phonology employs no binarity-based minimal word constraint and contains a great number of monomoraic content words particularly from native Japanese and Sino-Japanese lexical strata, while truncated foreign words generally do not prefer monosyllabic forms.

Being conscious of this problem, Itô (1990) suggests that the asymmetry in minimal size condition is ascribed to the term of derivedness (from Lexical Phonology: Kiparsky 1985). In the framework of Lexical Phonology, some phonological rules are operative only in derived environment (Kiparsky 1985, Hualde 1989, Itô 1990, Łubowicz 2002): such as English suffixation and Trisyllabic Shortening (Chomsky 1968, Lahiri & Fikkert 1999). Using the notion of the traditional level-based classification of word formation, the level 1 process is understood as the combination of derived form of words and affixal derivation units, whereas

29 Though, it is suspicious that LH pattern is universally avoided in word transformation in Japanese. Here we should consider the argument on zuzya-go word inversion addressed in subsection 2.5 in this chapter, where LH pattern is permitted. It should be noted that some inverted LH words such as oina] ‘woman’ > noin and giwza ‘Ginza (place name)’ > zagiin are possible. The difference in the tolerance to LH pattern can be illustrated as in (29-1) below:

(29-1) LH template prohibition

\[
\begin{array}{ccc}
\text{zuzya-go (word inversion)} & \rightarrow & \text{no LH ban} \\
\text{Single foreign word truncation} & \rightarrow & \text{LH ban}
\end{array}
\]

Moreover, this fact can be an objection to possible left-headedness of feet in Japanese (Kager 1994), which should prevent LH pattern from occurring. As to headedness in single word truncation, however, the entire data suggest that the obligatory disyllabic cluster be left-headed since the LH pattern is irregular.
the level 2 word derivation is operated with connecting derivation units with non-derived words.

Some data for word derivation are presented in (28) and (29):

(28) English suffixation (based on Kiparsky 1985)

a. level 1
   \[\text{damn} \rightarrow \text{da}[mn]\text{-ation, da}[mn]\text{-able, da}[mn]\text{-atory}\]
   \[\text{hymn} \rightarrow \text{hy}[mn]\text{-al, hy}[mn]\text{-ody, hy}[mn]\text{-ology}\]

b. level 2
   \[\text{damn} \rightarrow \text{da}[m]\text{-ing, da}[m]\text{-s}\]
   \[\text{hymn} \rightarrow \text{hy}[m]\text{-ing, hy}[m]\text{-s}\]

(29) Trisyllabic Shortening (based on Lahiri & Fikkert 1999)

a. Old English
   
<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>cīcen</td>
<td>cīcenu</td>
<td>‘chicken’</td>
</tr>
<tr>
<td>hēafod</td>
<td>hēafodu</td>
<td>‘head’</td>
</tr>
<tr>
<td>ānig</td>
<td>ānige</td>
<td>‘any’</td>
</tr>
</tbody>
</table>

b. Modern English
   
<table>
<thead>
<tr>
<th>Non-suffixed</th>
<th>suffixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>divīne</td>
<td>divīnity</td>
</tr>
<tr>
<td>grāve</td>
<td>grāvity</td>
</tr>
<tr>
<td>serēne</td>
<td>serēnity</td>
</tr>
<tr>
<td>verbōse</td>
<td>verbōsity</td>
</tr>
</tbody>
</table>

According to the suggestion of Itô (1990) on foreign word truncation in Japanese, derived forms (truncated words) are subject to the minimal condition, whereas this constraint is not applied to non-derived forms (natural content words).

However, it should be noted that there are numerous monomoraic constructions even in the process of lexical derivation, without avoiding the subcanonical status of binary feet: for example, \textit{si} ‘to do’ (連用形 \textit{ren’yookee}: an inflected form (lit. verb-modifying form)) derived from \textit{suru} (終止形 \textit{syuusikee}: the dictionary form (lit. terminal form)): this inflected verb can
even stand as an independent prosodic unit in utterance (see (30)). It seems, therefore, that derivedness is not the only reason for outputs avoiding monomoraicity. There should be another reason for the inconsistency of minimal structure between abbreviated foreign words and natural content words.

(30) *Ren’yookee* verb
Example
\[\text{yo}ku \ b\text{en}kyoo=o \ s\text{i} \ m\text{ata} \ yo\text{ku} \ a\text{sobu}\]
well learning=ACC do.REN’YOOKEE and well play ‘learning well and playing well’

As a simple alternative for the ban on monomoraic construction for foreign word truncation, we could consider possible collision of abbreviated words with existing vocabulary, which will be discussed in next subsection.

### 3.8 Why the monosyllabic construction is avoided

Now, we should restart our argument on minimal size asymmetry without using the notion of derivedness because it will be a side factor. It seems the motivation for avoiding monosyllabic construction should also be discussed from viewpoints outside prosody. First of all, we should take the fact into account that monosyllabic outputs for single word truncation may clash with existing vocabulary. There are a huge number of monosyllabic words in both of traditional lexical strata (native Japanese and Sino-Japanese): light monosyllabic words are frequently seen in native Japanese vocabulary and Sino-Japanese lexical category has numerous heavy monosyllabic words. With respect to clash avoidance, a relatively recent research of Ota (2014) focuses on “if there are candidates (Ota 2014:76, author’s translation)” in truncation rather than setting regular and irregular templates.

In accordance with his claim, the irregular templates (*L, *H, *LH) are ruled out due to a great amount of homonymic candidates but not due to mismatch to the regular templates: for example, the imaginable minimum of demago\text{g}ii ‘Demagogie (ger.)’’s abbreviation would
be \(^*de^30\), which obviously violates the conventional template constraint. This abbreviation is nevertheless impossible, as having large number of candidates such as \textit{dekore\[esyo\]} ‘decollation’, \textit{dezainaa} ‘designer’, \textit{demoku\[rasii} ‘democracy’ and others (Ota 2014). Furthermore, this monomoraic output would compete with numerous foreign words with the English prefix \textit{de-} (e.g. \textit{deba\[ggu} ‘debug’, \textit{deri\[iito} ‘delete’, \textit{deforuto} ‘default’, \textit{dehure\[esyo\]} ‘deflation’, \textit{depures\[syo} ‘depression’). Following Ota (2014)’s claim, the abbreviation process is completed when there are no longer (powerful) candidates, as given in (31):

(31) Abbreviation process (Ota 2014)

\begin{tabular}{lll}
Output & *te & *tere & te\[rebi \\
Candidates\(^31\) & approx. 10 words & tereta\[ipu} ‘teletype’ & - \\
 & & tere\[kkusu} ‘telex’ & \\
 & & tere\[pasii\(^32\) ‘telepathy’ & \\
\end{tabular}

As Ota (2014) himself admits, however, his statement seems incorrect in some circumstances: for example, the only possible abbreviated form of \textit{demo\[surutore\[esyo\]} ‘demonstration’ is \textit{de\[mo}, though there are a certain number of rivals for this output (such as \textit{demoku\[rasii} ‘democracy’, \textit{demogu\[rafii} ‘demography’). The occurrence of LL (or slightly larger) abbreviation is in fact no rare event despite greater possibility of competition, while monosyllabic and LH patterns are, interestingly, generally dispreferred.

Taking this fact into account, the effect of a priori templates in the process of single word truncation should not be altogether neglected. Ota (2014)’s assumption does not account for why LH truncation is impossible whilst LLL forms are frequently seen, as well as the asymmetry of acceptability between LL and LH templates. Both of those trimoraic templates are equal in phonological length and they are long enough to avoid the clash with other words.

Against the suggestion of Ota (2014), therefore, we can take the position in favour of a priori templates in single word truncation, while partially agreeing with his suggestion. Some

\(^30\) Its well-formed output is \textit{de\[ma}. This could also be an abbreviated form of \textit{demago\[jogu} from English \textit{demagogue}.


\(^32\) This falling pattern is based on Kindaichi (2011), while antepenultimate-kernelled \textit{terepa\[sii} sounds acceptable as well.
data is presented in (32) as too short outputs, which are not scarce in frequency while they should be ruled out due to rivalry with other candidates.

(32) Too short outputs

<table>
<thead>
<tr>
<th>Base / Gloss</th>
<th>Truncation</th>
<th>Candidate / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>herikoputaa ‘helicopter’</td>
<td>hejri</td>
<td>herijum ‘helium’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hejriteezi ‘heritage’</td>
</tr>
<tr>
<td>sutorajiki ‘labour strike’</td>
<td>sutto</td>
<td>sutorejeto ‘straight’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sutorejiti ‘stretch’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sutookaa ‘stalker’</td>
</tr>
<tr>
<td>rokeesyonN ‘location’</td>
<td>rojke</td>
<td>rokejeto ‘rocket’</td>
</tr>
<tr>
<td>hijsuterii ‘Hysterie (ger.)’</td>
<td>hijsu</td>
<td>hijsutorii ‘history’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hisutamin ‘histamine’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hisupanijku ‘Hispanic’</td>
</tr>
<tr>
<td>rejkutya ‘lecture’</td>
<td>reku</td>
<td>rekuriejesyon ‘recreation’</td>
</tr>
<tr>
<td>korajazyu ‘collage’</td>
<td>korra</td>
<td>koraborejesyon ‘collaboration’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>koramunisuto ‘columnist’</td>
</tr>
<tr>
<td>polrisu ‘police’</td>
<td>polri</td>
<td>porinejsia ‘Polynesia’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>poriejtiren ‘polyethylene’</td>
</tr>
</tbody>
</table>

The data above demonstrate several interesting facts. In usual cases, their rivals are less competitive; however, the LL outputs are not overall impossible even when the candidates are powerful enough. As the data shows, for example, there are plenty of frequent foreign words with the same initial segments as sutorajiki (e.g. sutorijito ‘street’, sutorejeto ‘straight’, sutorijori ‘story’), while the clipped form (sutojito) is only allowed for this word.

33 Here, we do not consider any template larger than LL because the possibility of competition is reduced in larger templates, although we can find a handful of data, as given in (33-1):

(33-1) Too short outputs (µ > 2)

<table>
<thead>
<tr>
<th>Base / Gloss</th>
<th>Truncation</th>
<th>Candidate / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>akukasesarii ‘accessories’</td>
<td>akuse</td>
<td>akukusesu ‘access’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>akukusento ‘accent’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>akuserurejita ‘accelerator’</td>
</tr>
</tbody>
</table>

34 As a further topic, there are too long outputs despite the absence of powerful candidates, which Ota (2014) has already pointed out. His candidate-based strategy of foreign word truncation does not explain, for example,
In summary, Ota (2014)’s argument against the conventional template-based analyses is not entirely successful, while I am not absolutely against the assumption that the clash avoidance may play a role in word truncation processes. Along with the risk of clashing, moreover, it appears difficult for too short truncated outputs (see (32)) to reconstruct their original forms. A certain degree of base word reconstructability seems to be expected for clipped words.

More generally, the avoidance of extremely short outputs may be summarised as avoidance of excessive formal deviation from the base words, which will be investigated in the following arguments where we deal with the issues on compound truncation. The effect of excessive deviation will be influential to the structural difference in the shortening processes of single and compound foreign words, which will prevent the truncated outputs from clashing with other lexical items and from losing reconstructability.

The most primitive way for avoiding excessive deviation in clipped word is keeping enough phonological length by means of obtaining sufficient elements from the base word. In single word truncation, components of outputs can be obtained only from a single base word, while it is allowed for compound truncation to take components from all the members of the compound word in question.

Here, we should consider that the monomoraic truncation of a compound element is (only in some rare cases) allowed in compound truncation, while monomoraic outputs are almost overall impossible in single word truncation: such as modan-boi ‘modern boy’ > mojang-bo, posuto-mo|daN ‘post-modern’ > pojang-mo. Consequently, we could construe that the paired monomoraic construction prevents the entire output being excessively deviated from the base word, which as a result increases the acceptability of monomoraic truncation (avoiding excessive deviation and summing effect: see subsection 4.2 and 4.3 in this chapter).

3.9 Summary for the bimoraic effect on single word truncation

To summarise the entire argument on the structure of truncated simplex words from foreign word stratum, first of all, we should agree with the presence of binary effect while this effect

why the abbreviation of baate|nda ‘bartender’ is baaten instead of *baate since there is seemingly no competitive truncated foreign word for *baate.
does not directly coincide with bimoraic foot structure. Against the common agreement about the coincidence between preference to bimoraic construction and feet, for example, the obligatory stem structure in single word truncation is based on syllables rather than morae (see subsection 3.6 in this chapter).

Moreover, the anchoring direction has inconsistency in single word truncation despite the great tendency to left-anchored transformation: as a typical example for the right-anchored truncation, we can address some frequent words such as arubalito ‘part-time job’ (ger. Arbeit) which may be reduced into baito (see (17e)). The inconsistency of directionality is a common problem of linking the preference toward binary structure in some word transformation processes with feet.

We have questioned the validity of classical foot-based approach to single word truncation in Japanese, which led us to the proposal to revise the formerly suggested truncation templates thus far (see subsection 3.5 in this chapter). There we claimed that long templates ($\mu \geq 4$) should be separated from short ones ($\mu \leq 3$) in analysis according to difference in formal restriction. As previously shown, the template circumscription, which rules out monosyllabic and right-heavy patterns, has no influence on long outputs. Due to the formal parallelism between long outputs for single word truncation and compound truncation, I proposed to construe long outputs of truncated simplex words as variants of compound truncation, where the invisible virtual compound structure is involved (pseudo-compound effect: see subsection 3.3 in this chapter).

The argument on pseudo-compound structure in Japanese has a research history of several decades, which provide us some positive evidence for the effect of pseudo-compound on its morphology and prosody (e.g. Sato 1988, 1989a, 2002, Uwano 1999, Giriko 2010). The pseudo-compound effect may help some simplex words to be truncated according to their virtual partition points which do not necessarily coincide with true morphological boundaries.

By regarding long simplex truncata as variants of compound truncation, we can obtain a simpler template inventory for single truncation (see (25)). Excluding long templates from the argument on single word truncation, we can find some common natures in the regular templates given in (25): firstly, they are disyllable-based instead of being based on bimoraic feet. Secondly, the regular templates are possibly left-headed since they avoid right-heavy (LH) structure (e.g. demosutoresenyoN ‘demonstration’ > demoN, *.demoN).
Based on the discussions in this section, constraints for regular templates of single word truncation may be formulated like in (33):

\[(33) \quad \text{Regular templates constraint: single truncation}\]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimal size</td>
<td>disyllabic</td>
</tr>
<tr>
<td>headedness</td>
<td>possibly left-headed (due to LH ban)</td>
</tr>
</tbody>
</table>

4 Compound truncation

The fourth section in this chapter will treat compound truncation: as this thesis construe long \((\mu \geq 4)\) templates for single word truncation as equivalent to compound word truncation, this section will discuss those templates along with the true compound truncation.

As we will assert in subsection 4.1, compound truncation has a different structure from single compound truncation. This section will show an interesting fact that compound truncation will tolerate monosyllabicity such as in *araundo-salitii* ‘(the people) around thirty years old (lit. around thirty)’ > *ara-saa*.

Nevertheless, monomoraic truncata will not occur in compound truncation except for some rare cases (consider *araundo-salitii* > *a-sa* and *modan-bojoi* ‘modern boy’ > *moj-bo*): as argued in subsection 3.8, this may be relevant to general dispreference of too short outputs.

In addition to the preceding discussions in the third section in this chapter, we consider two conditions because of which too short templates are disfavoured (*clash avoidance* with other candidates and *reconstructability* of base words). In next subsections, we will investigate the effect of summing multiple stems which may weaken template constraint (see subsection 4.3 and 4.4). As a result of constraint weakening, compound truncata may minimally be *bimoraic* instead of disyllabic.

4.1 Difference in basic stem structure

In prior section we tackled some issues on single word truncation and concluded that the base structure of regular truncation templates are dominated by syllabic condition rather than moraic,
questioning the direct link between obligatory minimum of truncation and bimoraic foot structure.

Taking over the discussions above, we will investigate compound truncation in the following, which is apparently ruled by different transformation strategies from single word truncation. The most striking difference between both shortening processes is that truncated elements composed of single L or H syllables are possible in compound truncation, which has already been pointed out before (see some data in (18b): such as geemu-sejNtaa > gee-seN). Further data of compound truncation are given in (34) below, which suggests structural difference between single word truncation and compound truncation.

(34) Single word truncation vs. compound truncation

a. L templates

<table>
<thead>
<tr>
<th>Example</th>
<th>Truncation</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>pe\epaa</td>
<td>*pe</td>
<td>'paper'</td>
</tr>
<tr>
<td>ka\Ningu-pe\epaa</td>
<td>kaN-pe</td>
<td>'cheating paper'</td>
</tr>
<tr>
<td>ge\emu</td>
<td>*ge</td>
<td>'game'</td>
</tr>
<tr>
<td>i\Ntaanetto-ge\emu</td>
<td>neto-ge</td>
<td>'Internet game'</td>
</tr>
<tr>
<td>meeru</td>
<td>*me</td>
<td>'(e-)mail'</td>
</tr>
<tr>
<td>meeru-a\doresu</td>
<td>me-ado / meru-ado</td>
<td>'e-mail address'</td>
</tr>
<tr>
<td>ka\itto</td>
<td>*ka</td>
<td>'cut'</td>
</tr>
<tr>
<td>risuto-ka\itto</td>
<td>ri\su-ka</td>
<td>'wrist cutting'</td>
</tr>
<tr>
<td>ho\N</td>
<td>*ho</td>
<td>'phone'</td>
</tr>
<tr>
<td>sumaato-ho\N</td>
<td>suma-ho</td>
<td>'smartphone'</td>
</tr>
<tr>
<td>se\Ntoraru</td>
<td>*se</td>
<td>'central'</td>
</tr>
<tr>
<td>se\Ntoraru-ri\jigu</td>
<td>se-ri\jigu</td>
<td>'Central League'</td>
</tr>
<tr>
<td>modaN</td>
<td>*mo</td>
<td>'modern'</td>
</tr>
<tr>
<td>modaN-bo\oi</td>
<td>mo-bo</td>
<td>'modern boy'</td>
</tr>
</tbody>
</table>

b. H templates

---

35 One of Japanese professional baseball leagues opposed to the other one, Pacific League (pasifikku-ri\jigu or pa-ri\jigu).
Parallel to the single word truncation, there is asymmetry in allowed templates: while there is no regular LL construction, HL pattern may produce regular outputs (e.g. *kaN-pe < kanningu-gelepaa, boi-pa < boisu-paaka:ssyoN ‘voice percussion’). What this fact suggests is that the former structure has no obligatory unit whereas the latter does. Thus, it is assumable that heavy monosyllabic unit can establish the obligatory stem in compound truncation, though monosyllables are not regular templates in single word truncation regardless of length.

(35)  Stem size in compound truncation

a.  *LL  b.  HL

The primary question here will be how we can describe the structural difference between single word truncation and compound truncation and if there are factors which cause the different construction of minimal unit. Supposing that the basic structure of compound
truncation is different from single word truncation, we will discuss whether its structural base is reliant upon foot structure, which earlier literature generally has regarded correct.

At the very least we can theorise that obligatory stems in compound truncation should be based on a different prosodic component from syllables, while obligatory stems in single word truncation rely on the disyllabic construction (\text{Stem}_{\overline{\sigma \sigma}}: see subsection 3.6 in this chapter). My proposal for the basic structure of compound truncation is that their stem structure is based on \textit{bimoraic} skeleton rather than syllables (\text{Stem}_{\mu \mu}: see (36) below).

Supposing that the bimoraic effect is present, the bimoraic obligatory stems may be composed of the bimoraic feet. As far as the process of compound truncation is concerned, the proposal of Itô (1990) seems to be correct and there would be no great need for sophistication. The possible regular patterns of the both word truncation systems can be illustrated like in (36), where meanwhile the difference in minimal stem structure is proposed:

\begin{enumerate}
\item Regular truncation
\begin{enumerate}
\item single word truncation ($\mu < 4$ in outputs)
\begin{itemize}
\item non-suffixed
\item suffixed
\end{itemize}
\end{enumerate}
\end{enumerate}

\begin{enumerate}
\item compound word truncation
\begin{enumerate}
\item suffixed
\item two-stemmed
\end{enumerate}
\end{enumerate}
4.2 Excessive deviation

In the following we will focus on the main issues in this section: what will be investigated in the discussions below is firstly whether my proposal for multiple (either disyllabic or bimoraic) stem structures is correct; and secondly, why they are different. Against previous studies which tendentially have emphasised phonological effect on the processes of word transformation, I would suggest influence from some external, especially non-prosodic factors. As briefly mentioned in the preceding argument above (see subsection 3.8 in this chapter), the inconsistency of regular truncation templates between single word truncation and compound truncation may be accounted for with the principle of avoiding excessive deviation from base words.

The notion of excessive deviation is defined with two basic conditions, basically reliant upon the idea of Ota (2014) who claimed that the length of abbreviated form is defined in accordance with the presence of other homonymic candidates. The basic conditions which define excessive deviation is if outputs are able to avoid clashing with other candidates, and if speakers may have difficulties in reconstructing base words.

Whereas the original idea of Ota (2014) cannot exclude some too short outputs such as purezen (< purezente]esyōn ‘presentation’: see (32) in this chapter), which will have to compete with an apparently more frequent candidate pure]zento ‘present’, there will be no great difficulty in reconstruction since there are sufficient fragments of original words. On the other hand, it is generally difficult for monosyllabic templates (L or H) to be reconstructed into the original forms due to great number of possible candidates.

Considering both conditions (clash avoidance and base word reconstructability), the form of excessively deviated templates should be monosyllabic (L or H), which are systematically excluded from regular word clipping processes. The interaction between foreign word truncation and excessive deviation in Japanese can be illustrated as in (37):

(37) Foreign word truncation and excessive deviation

<table>
<thead>
<tr>
<th>Truncation template</th>
<th>Excessive deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(μ)</em></td>
<td>+</td>
</tr>
<tr>
<td><em>(μμ)</em></td>
<td>+</td>
</tr>
</tbody>
</table>
(μ)_σ(μ)_σ - (irregular in compound truncation)
(μμ)_σ(μ)_σ -
*(μ)_σ(μμ)_σ - (irregular in both truncation processes)
(μ)_σ(μ)_σ -

To visualise the degree of excessive deviation, we can establish a binary parameter, which is depicted with a plus or a minus sign. Too short (excessively deviated) outputs depicted with plus signs in (37) are regularly ruled out from the process of foreign word truncation, whereas sufficiently long outputs depicted with minus signs in (37) are generally allowed despite certain exceptional cases. As an exception we can consider the fact that the right-heavy structure is irregular in both truncation processes (see (37)), which implies left-headedness of regular template (see subsection 3.9 in this chapter). It should be noted, therefore, that excessive deviation from the base word is not the only factor which defines the templatal restriction.

The excessive deviation in the process of word truncation suggests that monosyllabic abbreviation is forbidden in Japanese partially because the output is too short to avoid clashing with existing words and to reconstruct the original form. This proposal may account for the true nature of binary effect in Japanese, which is not necessarily related to prosodic conditions or to bimoraicity; and therefore, it should be carefully investigated if a certain preference toward binary construction may be directly associated with foot structure.

4.3 Summing effect in compound truncation

In this subsection, we will make some discussions about the factor which triggers the structural difference in allowable minimal forms in single word truncation and in compound truncation. In comparison with single word truncation, there are some well-formed outputs only in compound truncation (see (34)) which may be accounted for by assuming the effect of summing on deviatedness of outputs. Detailed natures of summing will be explained in the following.

Summing of word elements in a compound word weakens the strength of deviation; therefore, the weakening effect changes some irregular templates in single word truncation to be regular in compound truncation. Generally speaking, there are some conditions where some monosyllabic elements may occur in compound truncation despite the monosyllable ban in
single word truncation. If both truncated elements of a two-membered compound word are monosyllabic but the first element consists of a heavy syllable, or if either of them is more than monosyllabic, the truncation process will produce a regular output. Such interaction between truncated units in a compound word can be illustrated like in (38):

(38) Element interaction in compound truncation

a. $[+\text{deviation}] + [+\text{deviation}]$

<table>
<thead>
<tr>
<th>Truncation$_{N1}$</th>
<th>Truncation$_{N2}$</th>
<th>Output</th>
<th>Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>$(\mu)_{\sigma}$</td>
<td>$(\mu)_{\sigma}$</td>
<td>$(\mu)<em>{\sigma}(\mu)</em>{\sigma}$</td>
<td>-</td>
</tr>
<tr>
<td>$(\mu\mu)_{\sigma}$</td>
<td>$(\mu)_{\sigma}$</td>
<td>$(\mu\mu)<em>{\sigma}(\mu)</em>{\sigma}$</td>
<td>+</td>
</tr>
<tr>
<td>$(\mu)_{\sigma}$</td>
<td>$(\mu\mu)_{\sigma}$</td>
<td>$(\mu)<em>{\sigma}(\mu\mu)</em>{\sigma}$</td>
<td>-</td>
</tr>
<tr>
<td>$(\mu\mu)_{\sigma}$</td>
<td>$(\mu\mu)_{\sigma}$</td>
<td>$(\mu\mu)<em>{\sigma}(\mu\mu)</em>{\sigma}$</td>
<td>+</td>
</tr>
</tbody>
</table>

b. $[+\text{deviation}] + [-\text{deviation}]$

<table>
<thead>
<tr>
<th>Truncation$_{N1}$</th>
<th>Truncation$_{N2}$</th>
<th>Output</th>
<th>Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>$(\mu)_{\sigma}$</td>
<td>$(\mu)(\mu)_{\sigma}$</td>
<td>$(\mu)<em>{\sigma}(\mu)(\mu)</em>{\sigma}$</td>
<td>+</td>
</tr>
<tr>
<td>$(\mu\mu)_{\sigma}$</td>
<td>$(\mu)(\mu)_{\sigma}$</td>
<td>$(\mu\mu)<em>{\sigma}(\mu)(\mu)</em>{\sigma}$</td>
<td>+</td>
</tr>
</tbody>
</table>

The data in (38) brings us an interesting logical consequence: the strength of deviation in heavy monosyllabic templates is less than in light monosyllabic ones since only the heavy monosyllabic element is able to generate a regular output when followed by a light monosyllabic element. Therefore, the $[+\text{deviation}]$ templates, which are composed of either light monosyllabic (L) or heavy monosyllabic (H) structure, can be ranked as $L > H$ with respect to the strength of deviation. In other words, light monosyllabic templates are the weakest in summing power, while heavy monosyllabic ones have more powerful summing effect. For disyllabic templates, on the other hand, the power of deviation is so small that the output is even able to stand in isolation (single word truncation) without the help of summing.

Under the influence of summing effect, truncation units in compound truncation are no longer strongly dependent on syllable count. Using the stem-suffix model of foreign word truncation (Itô 1990), compound truncation’s stem structure has only to be faithful to minimal bimoraicity (Stem$_{\mu\mu}$) instead of being required to be disyllabic (Stem$_{\sigma\sigma}$): see the data in (39) for the difference in basic structure between both truncation processes.
(39) Summing effect and minimal stem size

a. single word truncation (without summing effect)
   non-suffixed         suffixed

   ![Diagram]

   {ge}ba < {gebra}ruto   {te}re-bi < {terebi}zyoN
   ‘violence (ger. Gewalt)’   ‘television’

   {a}nna < {anau}Nsaas   {ani-me} < {anime}esyoN
   ‘announcer’         ‘animation’

   {daiya} < {daiyamo}Ndo
   ‘diamond’

*b*stem-free

   ![Diagram]

b. compound word truncation (with summing effect)
   suffixed              two-stemmed
In both truncation processes, stem-free construction is not allowed to be regular templates. This fact suggests obligatory stem structure for foreign word truncation in general, which will be either disyllabic (single truncation) or bimoraic (compound truncation) according to the presence of summing effect. The natures of summing effect can be represented as follows in (40), where I denote the different degrees of deviation with some different symbols: the strongest degree of deviation is depicted with \([-\cdot\cdot]\), which corresponds to light monosyllabic construction, and the weaker level of deviation symbolised with \([-\cdot\cdot\cdot\cdot]\) refers to heavy monosyllabic construction which is able to produce regular templates even if the second element

---

36 With respect to headedness, the stem-suffix model is a preferable proposal, which assumes stems to be the head of truncated compound words. Whilst some researchers such as Crowhurst (1991) advocates non-headedness of morphological feet opposed to metrical feet, it is difficult to accept her entire generalisation as there are some phonological facts in support of the existence of head structure (see subsection 3.9 in this chapter).
is defined as deviated (\([-\) or \(\)-]). The plus sign means that truncated output is long enough to stand in isolation in single word truncation. Lastly, the symbol \([X]\) is any truncated element, which may have minimally zero morae\(^{37}\).

(40) Summing effect table

\[
\begin{array}{ccc}
[-] & + & [-] > \text{irregular} \\
[-] & + & [-] > \text{regular} \\
[-] & + & [-] > \text{regular} \\
[+] & + & [X] > \text{regular} \\
[X] & + & [+] > \text{regular}
\end{array}
\]

5 Conclusion

First of all, since bimoraic effect in word transformation processes shown above is commonly limited to lexical level, it seems difficult to analogise exhaustive foot structure which can parse an entire utterance into feet. Whereas previous studies have successfully revealed the presence of bimoraic effect in word transformation processes, which supposedly will visualise the latent structure of feet, it remains unknown through which process an utterance is separated into the putative bimoraic feet. This question will be challenged in next chapter where we will argue the influence of bimoraic effect on Japanese pitch accent.

Looking at the entire discussions about word transformation in Japanese, where a considerable number of previous analyses have assumed binary foot structure due to certain affinity to bimoraicity, it would be difficult to conclude that bimoraic structure does not have any effect on word transformation.

While agreeing with the formal preference to bimoraicity in some word transformation processes, however, we have seen that this tendency is not always present. For example, noun reduplication will require an entire prosodic word to be reduplicated, while \(reN'yookee\) verb stem reduplication requires bimoraic structure. This process allows verbal stem to be lengthened into bimoraic if the stem is monomoraic.

\(^{37}\) The output is back- or front-truncated if the undefined compound unit \([X]\) is occupied with zero morae.
Another interesting phenomenon of word transformation where non-bimoraicity is preferred is a certain type of female servants’ language in traditional Japan (nyooboo-ko)toba), where there is template which prefers the source form to be truncated into monomoraic.

In addition to lack of optimal moraic status which may be easily linked with foot structure, it is a common nature of word transformation that the outputs are strongly influenced by some external conditions instead of being governed by purely prosody-based effect. In word transformation processes in general, where preference to bimoraicity may be present, the output is lexically restricted to some extent: such as perfectly free occurrence of transformation being impossible. This fact obviously contradicts to traditional understanding of exhaustive feet which are found basically everywhere in utterance.

It seems some non-prosodic factors are involved in many cases. In noun reduplication in Japanese (see subsection 2.1 in this chapter), replicable words are basically limited to native Japanese lexical stratum. As to hypocoristic formation, the truncation process cannot be used for every proper name, where familiarity could also play a role. In some further cases, even orthography may have certain influence: as shown in jazzmen’s word inversion (zuuzya-go: see subsection 2.4 in this chapter).

Generally speaking, Japanese word transformation has the nature of deforming original forms greatly for the sake of adjusting extracted elements (= morae) into templates. The process of tentatively foot-based hypocoristic formation (see subsection 2.3 in this chapter) has a great variation of element extraction patterns. While outputs are faithfully reflecting the typical structure of bimoraic feet, the element deletion process of truncation is not necessarily reliant upon foot structure of base words.

Non-prosodic deformation of base words may be seen in word truncation in certain frequency: such as (intaa-)netto-ge]emu ‘Internet game’ > neto-ge, meeu-a]doresu ‘e-mail address’ > meru-ado, where special morae are skipped. As well as deformation, moreover, syllable breaking is widely seen in the process of word transformation. This fact suggests the prosodic structure of base words is generally ignored, while the phonological shape of outputs will show certain affinity to bimarity.

As a further problem, inconsistency of footing direction should be addressed here: the suggested footing direction may be different even within a single word transformation process, as we can see in a minimal pair such as ku[suri ‘drug’] > suri[ku] and hu[kuro ‘bag’] > rop[puku...
(see subsection 2.6 in this chapter) in word inversion. In word truncation, the most preferred pattern will take morae from the left of the original word, which may be implying the left-to-right direction of footing in Japanese. However, this transformation process may tolerate the right edge of the original word to be preserved instead of being deleted (e.g. \textit{wanisu} ‘varnish’ > \textit{niisu}, \textit{gurabia-ajidoru} ‘gravure idol’ > \textit{gura-doru}). Considering these facts, we can conclude that bimoraic effect in word transformation, which has been said to visualise latent foot structure in Japanese, does not manifest consistent directionality of feet.

From the view of contrastive linguistics, bimoraic structure can be breached easily in Japanese, in contrast to the majority of Germanic languages where minimal bimoraicity is preserved after undergoing transformation processes. The relatively weak stability and visibility of putative feet in Japanese may be suggesting that binary sequence is not a powerful element of prosody in this language, while the binarity of feet in Germanic languages seems much more stable and closely tied up with their metrical structure relied on stress pattern.

As the second question in this chapter, we should reconsider the issues on word truncation: through the entire discussions we concluded that basic structure of the obligatory stem in foreign single word truncation should be treated as disyllabic rather than bimoraic. From the traditional point of view in favour of feet in Japanese, disyllabic structure cannot be directly linked with bimoraic feet.

Obligatory minimal structure in single word truncation is loosened by some non-prosodic factors, such as summing effect triggered by the elements from different components of a compound word. From this fact we can theorise that underlying minimal stem structure of foreign word truncation is disyllabic, whereas bimoraic stems are allowed as a result of derivation from the disyllabic stems.

As we have seen thus far, the effect of bimoraicity in Japanese cannot be defined only in the influence of prosody, where the aforementioned non-prosodic factors should not be ignored.
Chapter 4

Bimoraicity and pitch accent
The third question addressed in this thesis is the relationship between feet and Japanese pitch accent. Whereas phonology of Japanese is historically known as widely employing pitch accent system in which strength effect is less effective in terms of lexical discrimination, a certain part of previous literature has claimed foot structure in this language.

From a critical position to the usefulness of binary foot structure in Japanese, however, this chapter will emphasise the following fact firstly: foot structure has been elsewhere better defined where lexical stress or minimal binarity of a prosodic word is available.

Despite the fact that both of those are absent in Japanese, there have been a certain number of attempts which have tried to find the link between pitch accent and feet. As one of main research questions on these issues, some researchers have claimed that the regular patterns of pitch accent may be a trace of underlying foot structure (see section 1). These assumptions will however be rather negatively concluded. This conclusion will mean that traditional attempts of linking accentuation defaults with feet in Japanese have not been greatly successful.

In the second section, the concept of Strict Layering for Prosodic Hierarchy will be introduced, as this have been used as a new solution for the questions on footing in Japanese. The theory of Strict Layering may be useful since loosening of the Strict Layeredness could solve some typical problems of foot parsing such as strict exhaustivity of prosodic components and odd-numberedness of a prosodic word.

Based on the concept of Weak Layering, Inaba (2005) makes a unique proposal for the issues about default accentuation, claiming that foreign words which are faithful to default accentuation pattern may be parsed into feet. The most unique point of his research would be that he is implying some effect of parsing into exhaustive feet, in striking contrast to previous studies whose main question has generally been limited to morphophonology.

His proposal and its theory will be the primary topic in section 3; however, as his theory premises that lowering kernel is *metrically strong* (the head of a trochaic metrical foot) like a stressed syllable in English, we should confirm if this presumption is justifiable. In some discussions in section 4 we will find several problems of interpreting lowering kernel as metrically strong: such as the presence of non-kerneled words and the possibility of lowering delay in a kernelled heavy syllable.

Next question to Inaba (2005)’s argumentation will be whether the claimed default patterns are the only true defaults. As previously argued in the first section, there is still
possibility of further default patterns of foreign word accentuation: such as words with ending 
\(-i\text{ngu}\) (\(-i\text{ngu}\) words: see subsection 1.7 in this chapter), based on English words which have suffix \(-\text{ing}\).

In section 5, we will start our argument if there could be further default patterns in terms of pitch accent. The findings in this section and the following discussion in section 6 will commonly demonstrate the existence of further default pitch accent patterns. If there are further default patterns, we should then consider why the (partially) exhaustive parsing into feet (Inaba 2005) is impossible for those words.

As the last topic of the investigation of pitch accent, we will address some variations (dialects) of Japonic languages (see section 7), focused on some dialects belonging to so-called accentless areas (e.g. Kumamoto Japanese, Sendai Japanese). Looking at the accentual natures in these dialects, it seems difficult to combine their pitch accent with exhaustive foot structure. For example, the lowering is preferred in the end of a heavy syllable in Kumamoto Japanese, in contrast to Tokyo Japanese where reportedly the lowering mainly occur in the middle of a heavy syllable. This fact will also imply that the accentuation-based foot structure in Japonic languages in general has not played a great role in their language history.

1 Feet and regular accentuation

As outlined in the statement above, this section will reconsider the tentative relationship between feet and regular accentuation. In accordance with what classic studies on Japanese phonology such as McCawley (1968) have claimed (see subsection 1.1), we could presuppose there are indeed some default pattern in terms of lexical pitch accent in Japanese.

It was Poser (1990) who first claimed the interaction between compound accentuation and bimoraic foot structure. Due to some shortcomings in his proposals, however, we will consider an alternative in subsection 1.2.

As suggested in the subsections thereafter (see subsection 1.3-1.7), there seem to be some complexities in compound accentuation: such as the length of compound elements, familiarity and the aforementioned pseudo-compound effect (see also subsection 3.3 in chapter 3). Premising the existence of pseudo-compound effect in foreign words composed of five morae or more, these foreign words may be treated in the scope of compound accentuation.
While earlier studies on foot-kernel interaction in Japanese have vaguely been limited to investigating the nature of foreign word compounding, it should be noted that foreign words themselves are strongly subject to the conditions which causes irregularity of accentuation patterns: such as nativisation. As argued in subsection 1.6, nativised foreign words may behave differently from non-nativised ones in terms of pitch accent.

Through our discussions in this section, we will confirm the fact that traditional attempts to combine accentuation rules and feet in Japanese have generally not achieved extensive agreement amongst researchers.

1.1 Accentuation rules and exceptions: focused on compound accentuation

From this section, I will conduct our discussion about interacting relationship of feet and pitch accent, while having made rather negative conclusion to interaction between word transformation and foot structure in chapter 3. Firstly in this chapter, we will look over traditional default accentuation rules proposed in earlier studies (see below). Based on those rules, recent studies have made various proposals on default accentuation and putative interaction between feet and pitch accent.

Generally speaking, though, the traditional accentuation rules have many exceptions; therefore, recent studies have tried to improve the accuracy and to reduce exceptional cases. As well as traditional rules, we will see some revised proposals for interaction between feet and accentuation rules (e.g. Poser 1990). Nevertheless, we will point out shortcomings in those proposals (see subsection 1.2 in this chapter).

Although the notion of feet in Japanese has attracted a great number of phonologists in recent years, the very first emergence of foot study was relatively late. It was the classical research of McCawley (1968), who certainly did not have any foot-like concept. In his paper, McCawley (1968) suggested regular compound accentuation rules which widely influenced subsequent studies on feet in Japanese such as Poser (1990) who assumed that regular accentuation rules have a certain link to foot structure.
McCawley (1968)’s regular accentuation rules are activated in compound word which are composed of two (or more) nouns\textsuperscript{38}, and whose second member is long\textsuperscript{39}. According to McCawley (1968), regular compound accentuation rules may be summarised as in (1):

(1) Regular compound accentuation rules: for those with long second member (McCawley 1968:162)

a. A compound word will have a lowering kernel on its first mora of the second element if it is non-kernelled or kernelled on the final syllable in isolation.

b. A compound word will have a lowering kernel on the original position of the second element otherwise.

After the emergence of his kernel placement rules, some researchers in future generation have attempted to sophisticate his statement: Poser (1990), for example, adds a further condition where the second element is penult-kernelled. In this condition, lowering kernel will be placed on the first mora of the second element (see (2c)), which is identical to (1a). Based on Poser (1990)’s idea for sophistication, the statement of McCawley (1968) may be rewritten as follows: lowering kernel will be on the initial mora of the second element if the second element is non-kernelled, final-kernelled or penult-kernelled. Some data for regular compound accentuation rules are given in (2) and (3):

(2) Regular compound accentuation rule 1

If the second element of compound word (N2) is non-kernelled or final-kernelled, compound word has a lowering kernel on the first mora of the second element. (McCawley 1968)

If the second element of compound word (N2) is penult-kernelled, compound word has a lowering kernel on the first mora of the second element. (Poser 1990)

\textsuperscript{38} Despite the fact that multi-membered compound words are possible, they will not be specifically focused in this thesis, as the prosodic nature of compound words are essentially the same regardless of the number of elements: basically, changing all non-final elements into non-kernelled and placing lowering kernel somewhere on the final element if necessary, in accordance with kernel placement rules.

\textsuperscript{39} In McCawley (1968)’s definition, the second member is long if it consists of three or more morae. It should be noted, however, that recent studies have discovered that the traditional compound accentuation rules are invalid when the second element is very long (µ ≥ 5: see Uwano 1999 and others), as we have also seen in subsection 3.3 in chapter 3. Basically, therefore, the traditional rules are operative when the second element is either trimoraic or quadrimoraic (see subsection 2.2 in this chapter for further discussion).
a. non-kernelled N2 (Poser 1990)

N1 / Gloss N2 / Gloss Compound / Gloss

*tya* hasira *tya-ba|sira*

‘tea’ ‘column’ ‘tea stalk’

*me|* kusuri *me-gu|suri*

‘eye’ ‘medicine’ ‘eyewash’

*kakudai* sa Nguyoo *kakudai-sa|Ngwoo*

‘expansion’ ‘industry’ ‘expanded industry’

b. final-kernelled N2 (Poser 1990)

N1 / Gloss N2 / Gloss Compound / Gloss

tel| kagami| te-ka|gami*

‘hand’ ‘mirror’ ‘hand mirror’

*hanauri|* musume| hanauri-mu|sume*

‘flower selling’ ‘girl’ ‘flower girl’

*i|NsutaNto* kohi|ji insutaNto-ko|ho|hii*

‘instant’ ‘coffee’ ‘instant coffee’

c. penult-kernelled N2 (Poser 1990)

N1 / Gloss N2 / Gloss Compound / Gloss

*sato* koko|ro sato-go|koro*

‘village’ ‘mind’ ‘homesickness’

*de|Nki* kamiso|ri deNki-ka|misori*

‘electricity’ ‘razor’ ‘electric razor’

(3) Regular compound accentuation rule 2

If the second element of compound word (N2) is initial-kernelled or medial-kernelled (but not penult-kernelled), compound word preserves the original position of lowering kernel of N2 (McCawley 1968).

a. initial-kernelled N2

N1 / Gloss N2 / Gloss Compound / Gloss

do|oro koi|ozi dooro-ko|ozi*
‘road’  ‘construction’  ‘road construction’

hi
situ  ka
Nri  hi
situ-ka
Nri

‘quality’  ‘control’  ‘quality control’

b.  non-penult medial-kernelled N2 (Poser 1990)

<table>
<thead>
<tr>
<th>N1 / Gloss</th>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>yume</td>
<td></td>
<td>monoga</td>
</tr>
<tr>
<td>‘dream’</td>
<td>‘tale’</td>
<td>‘dream story’</td>
</tr>
<tr>
<td>yama</td>
<td></td>
<td>hototo</td>
</tr>
<tr>
<td>‘mountain’</td>
<td>‘quail’</td>
<td>‘mountain quail’</td>
</tr>
</tbody>
</table>

Notwithstanding the sophistication which enhanced accuracy of predicting the position of lowering kernel in compound word, even the revised accentuation rules are not thoroughly free from exceptions. Tanaka (1998), for example, points out that the combination of monomorphemic foreign words se
Ntta ‘center’ and fowaado ‘forward’ will compose a compound word sentaa-fowa
ado ‘centerforward’, where the lowering kernel is placed on the second mora of the second element of the compound (fowa
ado). I will give some further exceptional cases for the traditional rules in (4) below, which violate previous proposals, and which are no rare cases in terms of frequency:

(4)  Traditional compound accentuation: exceptions

<table>
<thead>
<tr>
<th>N1 / Gloss</th>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
</table>
| si
boo | tokoro|40 |
| ‘patience’ | ‘place’ | ‘hard situation’ |
| wi
ndo | bureekaa42 |
| ‘wind’ | ‘breaker’ | ‘windbreaker’ |

40 There is some inconsistency of lowering kernel position especially for native final-kernelled words: several final-kernelled words such as tokoro/ and koko/ may be medial-kernelled (toko/ro or koko/ro). In contrast to this, though, final-kernelled words such as oto/ko/ or o
n/na/ ‘woman’ do not have medial-kernelled variation (*oto/ko or *o
n/na).

41 Along with this word, there are some further compound words with the second element tokoro (-dokoro after compound voicing known as 連濁 rendaku) whose accentuation pattern may be predicted with traditional accentuation rules: such as kome-do|koro ‘rice-producing area’ < kome/ ‘rice’+ tokoro/ ‘place’.

42 Note that bureekaa is alternatively possible (traditional form: Kindaichi 2011). Supposing that this isolation form is used in the compound formation, the position of lowering kernel of windo-bureekaa is predictable with the use of traditional accentuation rules.
pu\ro kyureetaa puro-kyure\etaaa / *puro-kyu\reetaa
‘professional’ ‘curator’ ‘professional curator’
si’iN kurasutaa si’iN-kurasutaa / *si’iN-ku\rasutaa
‘consonant’ ‘cluster’ ‘consonant cluster’
ekita\ a\nomia ekita\-a\nomia / *ekita\-a\nomia
‘liquid’ ‘ammonia’ ‘liquid ammonia’
po\ri puropiren po\ri-puropiren / *po\ri-puropiren
‘poly-’ ‘propylene’ ‘polypropylene’
de\leta kurasutaringu deeta-kurasutaringu / *deeta-ku\rasutaringu
‘data’ ‘clustering’ ‘data clustering’

It should be noted that some of those outputs are predictable due to superquadrimoraic (\(\mu \geq 5\)) length of the second elements (see Uwano 1999 and others). As discussed in subsection 3.3 in chapter 3, accentuation pattern of the second element are basically preserved when they are quinquemoraic or more (e.g. ekita\ ‘liquid’ + a\nomia ‘ammonia’ > ekita\-a\nomia ‘liquid ammonia’: see (4)). However, the data above also shows the fact that there are certain cases where even the quinquemoraic rule is invalid. For further discussion on this issue please see subsection 2.2 in this chapter.

1.2 Revising compound accentuation rules

As mentioned above briefly, it is the research field of regular accentuation in which many scholars have tried to discover the interaction between bimoraic clusters and regular lowering kernel position; in particular attempting to find any evidence for bimoraic feet in Japanese.

Here, I want to make a special remark to the study of Poser (1990) again, who attempted to account for the concept of feet in Japanese with reference to McCawley (1968)’s regular compound accentuation rules. He reinterprets the compound accentuation rules in terms of foot structure instead of using morae and syllables. He claims that accentuation rules may be generalised with feet when we ignore the final two morae, which construct a bimoraic foot according to his assumption. Ignoring the final two morae (namely, the final foot) of a compound word as extrametrical, traditional regular accentuation rules will be reformulated like
in (5): see (6) for further data where every extrametrical part is bracketed with angle parentheses < >.

(5) Revised compound accentuation rules (Poser 1990)\(^{43}\)

It is premised that the final two morae on the right edge of the second element are ignored in placing lowering kernel of the entire compound word (if any). In this condition:

a. if the visible part of the second element does not contain lowering kernel, it will be assigned to the initial mora of the second element.

b. otherwise, the location of lowering kernel will be left in place.

(6) Examples

a. Absent lowering kernel in the visible part

<table>
<thead>
<tr>
<th>Formula / Gloss</th>
<th>Result / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>tya ‘tea’ + ha&lt;sira&gt; ‘column’</td>
<td>tya-ba&lt;sira&gt; ‘tea stalk’</td>
</tr>
<tr>
<td>satō ‘village’ + ko&lt;ko&gt;ro&gt; ‘mind’</td>
<td>satō-go&lt;ko&gt;ro ‘homesickness’</td>
</tr>
<tr>
<td>den&lt;ki&gt; ‘electricity’ + kami&lt;so&gt;ri&gt; ‘razor’</td>
<td>den&lt;ki&gt;-ka&lt;so&gt;ri&gt; ‘electric razor’</td>
</tr>
</tbody>
</table>

b. Present lowering kernel in the visible part

<table>
<thead>
<tr>
<th>Formula / Gloss</th>
<th>Result / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>do&lt;oro&gt; ‘road’+ ko&lt;so&gt;zi&gt; ‘construction’</td>
<td>dooro-ko&lt;so&gt;zi ‘road construction’</td>
</tr>
<tr>
<td>bi&lt;jiti&gt; ‘beach’ + pa&lt;ra&lt;so&gt;ru&gt; ‘parasol’</td>
<td>bi&lt;jiti&gt;-pa&lt;so&gt;ru ‘beach parasol’</td>
</tr>
</tbody>
</table>

\(^{43}\)Note that Poser (1990)’s accentuation rule obviously assumes that the Japanese feet will be parsed from right to left rather than left to right because it is not \(\sigma\sigma\sigma\sigma\) but \(\sigma(\sigma\sigma\sigma\sigma)\) structure that he presupposes in his foot parsing theory. Although there is still some controversy on footing direction in Japanese, the right-to-left parsing model is widely supported by the phonologists advocating the existence of foot (e.g. Kubozono & Ota 1998).
At the first glance, it seems that the revised foot-based compound accentuation rules in Poser (1990) is providing a simpler explanation for lowering kernel assignment; however, his accentuation rules fail to explain why there are cases where the prediction is ineffective. For example, we have seen above the Japanese compound word *windo-burejekaa* ‘windbreaker’ (see (4) in this chapter), which violates foot-based accentuation rules as well as traditional assumption. In this case, Poser (1990)’s accentuation rules would predict that lowering kernel be located on the first mora of the second element (*windo-burejekaa*), which in fact does not occur.

In this thesis we have already questioned whether the original accentuation pattern is preserved if the second element is quinquemoraic or more: see the discussion on pseudo-compound effect in subsection 3.3 in chapter 3 again, where we confirmed that even morphologically simplex words may behave like compound words due to virtual word partition (Sato 2002). The data about interaction between lowering kernel and N2 length will be given in (7):

(7) Compound words and phonological length of the second element (Kubozono 1995)

<table>
<thead>
<tr>
<th>N1 / Gloss</th>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>kuro</em> ‘black’</td>
<td><em>ageha</em> ‘swallowtail’</td>
<td>*kuro-*ageha ‘black swallowtail’</td>
</tr>
<tr>
<td><em>yama</em> ‘mountain’</td>
<td><em>otoko</em> ‘man’</td>
<td>*yama-*otoko ‘mountain man’</td>
</tr>
<tr>
<td><em>gisee</em> ‘sacrifice’</td>
<td><em>hu</em> ‘fly’</td>
<td>*gisee-*hu ‘sacrifice fly’</td>
</tr>
<tr>
<td><em>bakku</em> ‘back’</td>
<td><em>supi</em> ‘spin’</td>
<td>*bakku-*supi ‘backspin’</td>
</tr>
<tr>
<td><em>minami</em> ‘south’</td>
<td><em>amerika</em> ‘America’</td>
<td>*minami-*amerika ‘South America’</td>
</tr>
<tr>
<td><em>nyu</em> ‘new’</td>
<td><em>mekisiko</em> ‘Mexico’</td>
<td>*nyu-*mekisiko ‘New Mexico’</td>
</tr>
<tr>
<td><em>bitti</em> ‘beach’</td>
<td><em>pa</em> ‘parasol’</td>
<td>*bitti-*pa ‘beach parasol’</td>
</tr>
<tr>
<td><em>o</em> ‘large’</td>
<td><em>kanemo</em> ‘rich’</td>
<td>*o-*kanemo ‘millionaire’</td>
</tr>
</tbody>
</table>
b. long (μ ≥ 5): N2 accentuation pattern is preserved

<table>
<thead>
<tr>
<th>N1 / Gloss</th>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>de</em>NSi 'electron’</td>
<td><em>haamonika</em> ‘harmonica’</td>
<td><em>densi-haamonika</em> ‘electric harmonica’</td>
</tr>
<tr>
<td><em>nyu</em>JU ‘new’</td>
<td><em>karedonia</em> ‘Caledonia’</td>
<td><em>nyuu-karedonia</em> ‘New Caledonia’</td>
</tr>
<tr>
<td><em>minami</em> ‘south’</td>
<td><em>kariforunia</em> ‘California’</td>
<td><em>minami-kariforunia</em> ‘southern California’</td>
</tr>
<tr>
<td><em>kita</em> ‘north’</td>
<td><em>airura]ndo</em> ‘Ireland’</td>
<td><em>kita-airura]ndo</em> ‘Northern Ireland’</td>
</tr>
</tbody>
</table>

Treating long (μ ≥ 5) second elements as phonologically complex, where the words in question are supposed to be influenced by pseudo-compound structure, some problems in irregular cases may be solved. There is a strong tendency that the second element will preserve their original accentuation patterns if they are long (μ ≥ 5), supporting the traditional assumption that words more than four morae in length are phonologically complex. Taking certain exceptions (see (4) in this chapter) into account, however, it would be reasonable to assume that there may be further conditions which trigger the irregularity. Indeed, there are a great number of words which are faithful neither to conventional default compound accentuation rules nor to foot-based generalisation of Poser (1990).

### 1.3 Long and short second element

As some previous researches (such as McCawley 1968, Poser 1990 Kubozono, Ito & Mester 1997, Tanaka 2004) have shown, accentuation of compound word is a complex phonological phenomenon, where it is difficult to find out consistent rules which are able to accurately predict the place of lowering kernels. However, it seems generally true that compound accentuation is determined mainly by the second member. From the viewpoint in favour of feet in Japanese,
mora number of the second element is claimed to be relevant to regular accentuation pattern of compound words (Poser 1990).

As McCawley (1968) claimed that the second element of compound word is long if it has three morae or more (see (1) in this chapter), there is classificational discrepancy between bimoraic and superbimoraic second elements in regular compound accentuation, which may be implying underlying foot structure in Japanese. While traditional regular compound accentuation rules have mainly dealt with compound word whose second element is long ($\mu \geq 3$: see (1) and (5) in this chapter), there are different principles for regular accentuation where the second element is short ($\mu < 3$).

(8) The length principle of compounds’ second member (Poser 1990)
If the second member of a compound is longer than two morae (a foot), then the second member is long. Regular accentuation patterns for compound words, whose second members are long, are differently classified from those, whose second members are short.

If the second member is short, there are three different classes of accentuation (Poser 1990:97), as given in (9) below:

(9) Short N2
a. compound is non-kernelled

<table>
<thead>
<tr>
<th>N1 / Gloss</th>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>garasu ‘glass’</td>
<td>tama] ‘sphere’</td>
<td>garasu-dama ‘glass bead’</td>
</tr>
<tr>
<td>mura]saki ‘purple’</td>
<td>iro] ‘colour’</td>
<td>murmaki-iro ‘purple colour’</td>
</tr>
<tr>
<td>usagi ‘rabbit’</td>
<td>kari] ‘hunting’</td>
<td>usagi-gari ‘rabbit hunting’</td>
</tr>
<tr>
<td>hasita ‘fraction’</td>
<td>kane ‘money’</td>
<td>hasita-gane ‘small money’</td>
</tr>
<tr>
<td>syoodoo ‘impulse’</td>
<td>kai ‘buying’</td>
<td>syoodoo-gai ‘impulsive buying’</td>
</tr>
</tbody>
</table>

b. compound has a lowering kernel on the final syllable of N1

<table>
<thead>
<tr>
<th>N1 / Gloss</th>
<th>N2 / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>kajbuto ‘helmet’</td>
<td>musi ‘insect’</td>
<td>kabuto]-mushi ‘rhinoceros beetle’</td>
</tr>
<tr>
<td>watari ‘crossing over’</td>
<td>tori ‘bird’</td>
<td>watari]-dori ‘migrating bird’</td>
</tr>
</tbody>
</table>
mamori ‘guarding’  hito ‘human’  mamori]-bito ‘guardian’
nemuri ‘sleeping’  hi]me ‘princess’  nemuri]-hime ‘Sleeping Beauty’
minato ‘port’  mati] ‘city’  minato]-mati ‘port city’

If the second member is long, the classification will be the same as (5) in subsection 1.2 in this chapter.

1.4 Length of the second element

Although we have seen some presence of bimoraic effect on regular accentuation of compounds, where especially phonological length of the second element is involved, there are some further factors which may influence the result of compounds’ accentuation patterns. Looking at the data given in (10) and (11) below, we can see a certain tendency that accentuation pattern has more regular shape either of the compound members is long. Supposing that this assumption is true, we can claim that the first member may also be influential to the accentuation pattern of compound word, even though the influence of the second member is much more salient.

(10) Pitch accent irregularity (compound words with short N2)

a.  X + ha] > X-ba ‘X-teeth’

<table>
<thead>
<tr>
<th>Compound</th>
<th>Gloss N1</th>
<th>Gloss</th>
<th>Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>sasi-ba</td>
<td>‘insertion’</td>
<td>‘false tooth’</td>
<td>-</td>
</tr>
<tr>
<td>o]ku-ba</td>
<td>‘back’</td>
<td>‘back tooth’</td>
<td>-</td>
</tr>
<tr>
<td>noko]-ba</td>
<td>‘saw’</td>
<td>‘saw tooth’</td>
<td>+</td>
</tr>
</tbody>
</table>

44 According to Kindaichi (2011), niwaka]-ame is possible as well.
*itokiri]-ba*\(^{45}\) ‘thread-cutting’ ‘canine tooth’ +

*urutora]-ba* ‘ultra’ ‘ultra tooth’ +

(b) \(X + musi > X-musi\) ‘X-insect’

<table>
<thead>
<tr>
<th>Compound</th>
<th>Gloss N1</th>
<th>Gloss</th>
<th>Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>ko-musi</td>
<td>‘small’</td>
<td>‘small insect’</td>
<td>-</td>
</tr>
<tr>
<td>kabuto]-musi</td>
<td>‘helmet’</td>
<td>‘rhinoceros beetle’</td>
<td>+</td>
</tr>
<tr>
<td>kuwagata]-musi</td>
<td>‘helmet horn’</td>
<td>‘stag beetle’</td>
<td>+</td>
</tr>
<tr>
<td>urutora]-musi</td>
<td>‘ultra’</td>
<td>‘ultra insect’</td>
<td>+</td>
</tr>
</tbody>
</table>

c. \(X + ne\]|ko > X-ne\]|ko\) ‘X-cat’

<table>
<thead>
<tr>
<th>Compound</th>
<th>Gloss N1</th>
<th>Gloss</th>
<th>Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>ko-ne]</td>
<td>ko</td>
<td>‘child’</td>
<td>‘kitten’</td>
</tr>
<tr>
<td>oya-ne]</td>
<td>ko</td>
<td>‘parents’</td>
<td>‘cat parents’</td>
</tr>
<tr>
<td>maneki-ne]</td>
<td>ko</td>
<td>‘bringing’</td>
<td>‘wealth-bringing cat’</td>
</tr>
<tr>
<td>urutora-ne]</td>
<td>ko</td>
<td>‘ultra’</td>
<td>‘ultra cat’</td>
</tr>
</tbody>
</table>

(11) Pitch accent irregularity (compound words with long N2)

(a) \(X + kanemo\]|ti > X-ganemoti / X-kanemoti\) ‘X-rich’

<table>
<thead>
<tr>
<th>Compound</th>
<th>Gloss N1</th>
<th>Gloss</th>
<th>Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>ko-gane]</td>
<td>moti</td>
<td>‘small’</td>
<td>‘small rich’</td>
</tr>
<tr>
<td>oo-ga]</td>
<td>nemoti</td>
<td>‘big’</td>
<td>‘big rich’</td>
</tr>
<tr>
<td>nise-ka]</td>
<td>nemoti</td>
<td>‘false’</td>
<td>‘false rich’</td>
</tr>
<tr>
<td>niwaka-ka]</td>
<td>nemoti</td>
<td>‘sudden’</td>
<td>‘sudden rich’</td>
</tr>
<tr>
<td>urutora-ka]</td>
<td>nemoti</td>
<td>‘ultra’</td>
<td>‘ultra rich’</td>
</tr>
</tbody>
</table>

(b) \(X + mura\]|saki > X-murasaki\) ‘X-purple’

<table>
<thead>
<tr>
<th>Compound</th>
<th>Gloss N1</th>
<th>Gloss</th>
<th>Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>ko-mura]</td>
<td>saki</td>
<td>‘small’</td>
<td>‘small purple’</td>
</tr>
<tr>
<td>oo-ru]</td>
<td>rasaki</td>
<td>‘big’</td>
<td>‘sasakia charonda(^{46})’</td>
</tr>
<tr>
<td>usu-ru]</td>
<td>rasaki</td>
<td>‘light’</td>
<td>‘light purple’</td>
</tr>
<tr>
<td>urutora-ru]</td>
<td>rasaki</td>
<td>‘ultra’</td>
<td>‘ultra purple’</td>
</tr>
</tbody>
</table>

\(^{45}\) *Itokiri*]-ba is an alternative pattern according to Kindaichi (2011).

\(^{46}\) A kind of Asian butterfly known for male adults’ large purple wings.
The data indicate that accentuation pattern of compound word cannot be predicted by looking at only the second element. Furthermore, the strength of inconsistency may differ among second members despite certain tendency: the longer the first element is, the more likely the output’s accentuation pattern is to be regular. In contrast to N2 length where bimoraicity is seemingly involved, moreover, the data in (10) and (11) do not show any borderline between bimoraic and trimoraic N1s in terms of accentuation pattern. This fact may be supporting my assumption that bimoraicity of compound word element is not the only factor for defining the accentuation pattern of compound word.

Concerning inconsistency of accentuation pattern, a group of compound words whose second element is -go ‘language’ may provide us some interesting data. In general, these words have a strong tendency to keeping their predictability of accentuation almost everywhere. As the data in (12) show, this group of words are non-kernelled for almost every language name. While language names whose first element is monomoraic are extremely scarce, there are some rare cases such as i-go’ ‘Yi language’ mainly spoken in southwest China (Pu 2004). It is unclear, however, whether pitch accent preservation is operative for such language names, since their true accentuation patterns are unknown due to low frequency.

<table>
<thead>
<tr>
<th>Compound</th>
<th>Gloss N1</th>
<th>Gloss</th>
<th>Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>tai-go</td>
<td>‘Thai’</td>
<td>‘Thai language’</td>
<td>+</td>
</tr>
<tr>
<td>suu-go</td>
<td>‘Sioux’</td>
<td>‘Sioux language’</td>
<td>+</td>
</tr>
<tr>
<td>fiN(raNdo)-go</td>
<td>‘Fin(land)’</td>
<td>‘Finnish language’</td>
<td>+</td>
</tr>
<tr>
<td>tyeko-go</td>
<td>‘Czech’</td>
<td>‘Czech language’</td>
<td>+</td>
</tr>
<tr>
<td>basuku-go</td>
<td>‘Basque’</td>
<td>‘Basque language’</td>
<td>+</td>
</tr>
<tr>
<td>zyoozia -go</td>
<td>‘Georgia (country)’</td>
<td>‘Georgian language’</td>
<td>+</td>
</tr>
<tr>
<td>suweedeN-go</td>
<td>‘Sweden’</td>
<td>‘Swedish language’</td>
<td>+</td>
</tr>
<tr>
<td>urutora -go</td>
<td>‘ultra’</td>
<td>‘ultra language’</td>
<td>+</td>
</tr>
</tbody>
</table>

Such word groups, where accentuation pattern is highly regular, are not altogether rare: giving some further examples, the compound word group X-si ‘X city’ has mostly lowering
kernels on the penultimate position, where even monomoraic Xs are possible: such as tuʃi- ‘Tsu City’, parʃi- ‘Paris City’, tukubəʃi- ‘Tsukuba City’, yamagataʃi- ‘Yamagata City’, urutoraʃi- ‘ultra city’. It seems, interestingly, the influence from N1 cannot be defined uniformly, in contrast to the influence of N2 length (µ < 3 or µ ≥ 3).

1.5 Length and compound element

Throughout this section, our discussion was primarily focused on regular compound accentuation and foot structure in Japanese. Having discussed so far, we should construe that there is some effect of bimoraic structure in regular compound accentuation in Japanese. However, traditional principles for regular compound accentuation cannot be accounted only for by foot structure of the second element, as confirmed in the discussion above.

Due to rarity (or absence) of N1-kernelled compound words where the second element is long (µ > 3), we can find a certain discrepancy between bimoraicity and superbimoraicity of N2 in terms of accentuation patterns. On the other hand, we questioned if N1 elements may be influential to compound accentuation patterns, as positively confirmed in (10)-(12). These data suggest the absence of consistent bimoraicity effect from N2. Of course, it cannot be expected that the bimoraic effect working here would be used as evidence of exhaustive feet.

In sum, while many researchers since Poser (1990) have attempted to discover uniform default patterns of compound accentuation in Japanese, lack of accuracy and existence of certain exceptions (including further possible default patterns: see section 5 and 6 in this chapter) have never been overcome by previous analyses.

1.6 Irregularity factors

While we have seen some traditional discussions on how powerfully the tentative foot structure (= bimoraicity) influences the patterns of regular compound accentuation, which in fact cannot be consistently explained only with N2 feet, we will here focus on what makes outputs irregular. As to foreign word accentuation, for example, it is said that the period of borrowing may affect accentuation pattern. Generally speaking, the earlier the words are imported to Japanese, the
less imported words are faithful to the regular pattern. This tendency may have been caused by the process of nativisation.

Inaba (2005) posits that relatively old foreign words have tendency to prefer unpredicatable accentuation patterns, whereas relatively new ones are essentially faithful to default accentuation. In addition to his claim, some more researchers have commonly assumed that old foreign words are strongly subject to the effect of nativisation (McCawley 1968, Suzuki 1995, Katayama 1998, Inaba 2005 and others), where foreign words gradually acquire native Japanese-like pitch accent. Both of those accentual patterns (= default and nativised) are given in (13) and (14).

(13) Default foreign word accentuation (based on Inaba 2005)
   a. lowering kernel is placed on antepenultimate mora
      (antepenultimate rule: McCawley 1968, NHK 1998)
   b. if penultimate mora is a special mora, lowering kernel is shifted to pre-
      antepenultimate mora

(14) Nativised foreign word accentuation (based on Inaba 2005): no lowering kernel

47 Of course, default accentuation rules for foreign vocabulary previously proposed do not guarantee 100 % accuracy: Minusa (2009), for example, gives some empirical data that even relatively early borrowed foreign words are not necessarily undergo the process of nativisation. He considers a foreign word mi]ritarii ‘military’ as a typical example, which is apparently not phonologically nativised despite its relatively early borrowing (according to his claim, in the middle of nineteenth century). On the other hand, relatively new foreign word such as kureemu ‘claim’ is non-kernelled, being unfaithful to general expectation.

Akinaga (1998) assumes that relatively newly borrowed foreign words tend to preserve their accent pattern in source language rather than taking the default (such as mo]oniNGu ‘morning’); however, the word mi]ritarii will contradict this analysis since this word seems to be imitating the original stress pattern despite relatively old borrowing according to Minusa (2009). In sum, it is difficult to conclude if there is a clear-cut interaction between pitch accent and the period of borrowing, while the age of borrowing may be a partial factor for irregular accentuation pattern. It appears foreign word accentuation in Japanese is a complex process where a number of factors are involved.

48 As a native speaker of Japanese, a non-kernelled alternative form hareesyon would sound acceptable to me.
*aNtena* ‘antenna’, *omuretu* ‘omelette’, *katuretu* ‘cutlet’, *kyarameru* ‘caramel’

*kasutera*[^49] ‘Japanese traditional sponge cake’, *arukari* ‘alkali’, *arukooru* ‘alcohol’

Frequency may play a role for irregular accentuation along with other factors such as age of borrowing (Akinaga 1998). Considering a foreign word *pori- furopireN* ‘polypropylene’ (see (4) in this chapter) again, we can assume that its unpredictable accentuation pattern could have been caused by its relatively high frequency in everyday life. Interestingly, there is a certain difference between the accentuation pattern of *pori- furopireN* and that of other compound words with the same second element (*-furopiren*). The position of lowering kernel in *pori- furopireN* is highly stable and there seems to be no great ideolectal difference, whereas other compound words with the same second element, only whose first slots are occupied with different lexical items (formulated as *X-furopireN*), are more faithful to generalised pattern where the second element may be treated as phonologically complex due to its superquadrimoraic length (pseudo-compound: see 3.3 in chapter 3).

These words are much less frequent than *pori- furopireN*, which could have caused them to accept regular patterns; however, there is great ambiguity in the lowering kernel position for those words[^50] even in the level of ideolect. The different tendency of N2 kernel preservation in some compound words with *X-furopireN* structure is shown in (15).

### (15) *X-furopireN* words

<table>
<thead>
<tr>
<th>a. irregular and stable</th>
<th>Compound</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1 / Gloss</td>
<td><em>pori- furopireN</em></td>
<td>‘polypropylene’</td>
</tr>
<tr>
<td><em>po</em>ri ‘poly-’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b. regular and unstable</th>
<th>Compound</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1 / Gloss</td>
<td><em>iso-furopireN?</em></td>
<td>‘isopropylene’</td>
</tr>
<tr>
<td><em>iso</em> ‘iso-’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[^49]: According to *Daijirin Third Edition* (大辞林第三版 daizi\iri\ dai\ji sanban; 2006), the name of カステラ *kasutera* is derived from the name of the Kingdom of Castile in Spain, which was brought to Japan by Portuguese in the sixteenth century.

[^50]: Such accentual ambiguity is no rare event especially for infrequent words, which would be one of the interesting natures of Japanese pitch accent system. Speakers sometimes do not have to know accurate accentuation pattern in real communication.
Considering the data above, we could confirm that accentuation pattern of chemical substances shown in (15) is commonly faithful to the assumption of Poser (1990) and Kubozono (1995), where the position of second element’s lowering kernel stays fixed in compounding if the second element is composed of more than four morae. In contrast to this, poripurojireN is almost the only exceptional case among the compound word group with the same structure.

This phenomenon is presumably caused by some external factors including unusually high frequency for chemical substance (due to frequent usage of this substance for some plastic products). It would be an interesting fact that poripurojireN appears to be obeying the conventional default compound word accentuation rule (see (1) in this chapter), as though this word were a compound made up of *poripuro and *pireN, ignoring the original compound junction. As discussed in subsection 3.3 in chapter 3, there is certain effect of virtual compounding (pseudo-compound) which enables a word to be divided in accordance with virtual partitions (Sato 2002).

Summarising our discussions on the word group with the aforesaid common structure (X-puropiren), we can reach the following assumption: when frequency is lower, the outputs are more predictable in terms of lowering kernel placement. As far as I see, the accentuation pattern of poripurojireN is the only exceptional case among X-puropireN words. In contrast to this, the accentuation pattern of other X-puropireN words is less stable and could also be regular (non-kernelled).

(16) Summary: X-puropireN words

a. +frequency

regular accentuation rules are invalid, stable kernel position
b. -frequency

regular accentuation rules are valid, instable kernel position

Looking over the reality of regular accentuation and its exceptions, its regularity in Japanese does not seem uniformly defineable. Whereas previous studies have relatively neglected exceptional cases as statistically unimportant, it appears useful to investigate irregular cases to confirm the putative interaction between pitch accent and foot structure.

1.7 Foreign words end with -ingu

In this subsection we will consider some additional cases for irregularity of pitch accent, while the preceding subsections have mainly focused on traditionally known regular accentuation patterns and their shortcomings. Concerning long foreign words with ending -ingu (hereafter -ingu words), which is originally derived from English suffix -ing, there is an interesting study which concludes that they are frequently non-kernelled especially when they are derived from verbs and have five or six morae (Giriko 2010). On the other hand, foreign words with the same ending, which do not satisfy these conditions, mostly have lowering kernels somewhere. The result of his informant surveys is illustrated below with some empirical data.

(17) -ingu words (based on Giriko 2010)

a. verbal derivation, non-kernelled
   
   aidoringu ‘idling’, surooingu ‘throwing’, torimingu ‘trimming’, battingu
   peiniingu ‘painting’, keetariingu ‘catering’, sukuuriingu ‘schooling’,
   baruuniingu ‘ballooning’

b. verbal derivation, kernelled
   
   kuiikkingu ‘cooking’, sajikuriingu ‘cycling’, orientejeriingu ‘orienteering’,
   sutorejiitingu ‘stretching’, torejeniingu ‘training’, fisissingu ‘fishing’,
   pajakingu ‘parking’, bibrudiingu ‘building’

c. no verbal derivation

(18) Result of informant surveys (Giriko 2010)
   a. Verbal vs. non-verbal -ingu words

<table>
<thead>
<tr>
<th></th>
<th>Kernelled</th>
<th>Non-kernelled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal</td>
<td>41.7 %</td>
<td>58.3 %</td>
</tr>
<tr>
<td>Non-verbal</td>
<td>100 %</td>
<td>0 %</td>
</tr>
</tbody>
</table>

   b. Verbal derivation: accentuation pattern and morae

<table>
<thead>
<tr>
<th></th>
<th>Kernelled</th>
<th>Non-kernelled</th>
</tr>
</thead>
<tbody>
<tr>
<td>μ = 4</td>
<td>83.3 %</td>
<td>16.7 %</td>
</tr>
<tr>
<td>μ = 5</td>
<td>38.4 %</td>
<td>61.6 %</td>
</tr>
<tr>
<td>μ = 6</td>
<td>32.3 %</td>
<td>67.7 %</td>
</tr>
<tr>
<td>μ ≥ 7</td>
<td>84.6 %</td>
<td>15.4 %</td>
</tr>
</tbody>
</table>

Focusing on quinquemoraic and sexamoraic tokens in (18), it may be construed that non-kernelled pattern shows more default-like behavior than kernelled one, while kernelled pattern seems statistically overwhelming otherwise. Considering the first cases, it should be noted that their accentuation pattern may change in compounding, obtaining lowering kernel in the second element of the compounded form. This fact would be a further obstacle for the traditional generalisation of compound accentuation (see Kubozono 1995 and others), which presupposes that superquadrimoraic (µ ≥ 5) second elements should preserve their original accentuation patterns under the influence of virtual complexity in prosodic structure (pseudo-compound).

Here, we may question if compound word with non-kernelled -ingu word in N2 slot could have a different default pattern in terms of accentuation, which cannot be predicted by traditional understanding of default accentuation. On the other hand, accentuation pattern is preserved even after compounding if the -ingu word in N2 slot is kernelled. See (19) and (20) for some data:

(19) Non-kernelled N2 (-ingu word): kernelled compounds

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
<th>Compound word</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>bo</td>
<td>dii</td>
<td>peintingu</td>
<td>bo</td>
</tr>
<tr>
<td>de</td>
<td>leta</td>
<td>kurasutariingu</td>
<td>deeta-kurasutariingu</td>
</tr>
</tbody>
</table>

103
(20) Kernelled N2 (-ingu word): lowering kernel position preserved

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
<th>Compound</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ho</td>
<td>omu</td>
<td>sukuri</td>
<td>ngu</td>
</tr>
<tr>
<td>da</td>
<td>buru</td>
<td>bukki</td>
<td>ngu</td>
</tr>
<tr>
<td>fi</td>
<td>gyua</td>
<td>suke</td>
<td>eti</td>
</tr>
<tr>
<td>‘ko</td>
<td>opereeti</td>
<td>ngu</td>
<td>ko-opere</td>
</tr>
<tr>
<td>guro</td>
<td>obaru</td>
<td>maake</td>
<td>ti</td>
</tr>
</tbody>
</table>

(21) Default of -ingu noun accentuation in compound word

a. If the second slot of a compound word is occupied with a non-kernelled -ingu noun, the entire compound word obtains a lowering kernel, regardless of its phonological length and of lowering kernel preservation rule for a long N2 unit.

b. However, the actual position of lowering kernel is less predictable as it appears there are some complex factors which can influence the kernel placement: such as kernel avoidance on special morae.

So far, we have made it clear that there are at least two default accentuation patterns for -ingu words (see (17) and (18)), whose strategy of compound accentuation may also be different.

The idea of multiple default pattern (see section 5 and 6 in this thesis) in compound accentuation will be helpful to account for some exceptional cases which traditional proposals have failed to explain: such as why a certain part of -ingu words have apparently non-kernelled default. Now, it would be reasonable to assume that there may be further default accentuation patterns for foreign vocabulary in Japanese.

In accordance with the suggestion for multiple defaults, we can claim as follows: it is only a part of the entire default patterns that the previously proposed compound accentuation rules are able to predict. This contradicts traditional proposals along with the generalisation of
Poser (1990), who attempted to define foot structure in Japanese with the help of default accentuation rules.

2 Footing and Layer structure

Taking over earlier studies on Prosodic Hierarchy, researchers have questioned the validity of traditional Layer structure: including Weak Layering (such as Itô 1990 and Itô & Mester 1992) which may tolerate a loosened structure of Strict Layering. Before beginning our discussion on Strict Layering, we will take a brief look at a theory attempting to link accentuation rules and feet in Japanese (Poser 1990: see subsection 2.1), where an alternative structure of traditional Layering will be proposed.

In subsection 2.1, we will consider a compound footing theory of Poser (1990): since his propose may break up syllable continuation (see below in subsection 2.1), a syllable-free analysis (such as Labrune 2012) of Japanese prosody should be a good alternative. In the syllableless model of the prosodic structure in Japanese, a heavy syllable may be regarded as structurally equivalent to two light syllables; therefore, the above-mentioned syllable breach does not occur. Moreover, discarding syllables from the prosody in Japanese may be convincing to a certain extent, as mora structure is of saliency in this language, compared to its relatively latent syllable structure.

Despite its latency, however, this thesis will confirm that syllables in Japanese actually have some unignorable roles in prosody, as will be discussed in the same subsection (see subsection 2.1). Since syllables should not be discarded in certain convincing reasons, another strategy will be used to improve early proposals. As the second alternative, we can consider Weak Layering (see subsection 2.2 and 2.3) mentioned above.

In later section, we will mainly treat the study of Inaba (2005) who made a new proposal for the interaction between default accentuation and feet in Japanese (see subsection 2.4), using the theories of Weak Layering and degenerate feet (Hayes 1995: see also 1.4 in chapter 1). The most unique point of his research would be his trial to introduce the concept of degenerate feet into Japanese (see (29)-(33) and others in this chapter), although degenerate feet are supposed to be defineable when the footed subminimal element is metrically strong. It will be, therefore, questioned if his argument is vailld despite the absence of stress effect on Japanese word prosody.
2.1 Violation to Strict Layer structure: a solution and problems

As the first alternative for the traditional Layering structure (Selkirk 1984), we will here treat the possibility of discarding syllables in Japanese in order to solve some problems caused by the traditional Layering. Along with Japanese, of course, traditional Hierarchy structure has been revised in individual languages such as Gokana (Hyman 2003, 2010) spoken in Nigeria, where discarding syllables has been proposed.

The greatest problem of the footing theory proposed by Poser (1990) would be, as suggested above, that it may break penultimate syllable boundary (see (21)). For example, a Japanese word *koori* ‘ice’ may be parsed into *ko(ori)_ό* according to his claim, ignoring syllable structure of the original form.

Considering the traditional principle of Strict Layering (Selkirk 1984), it is suspicious that Japanese feet will permit such a parsing which may break up syllable boundaries. Further data for foot parsing according to Poser (1990) is given in (21) (see also (5) and (6) in this chapter). Dots in the data will betoken theoretical syllable boundaries. Prosodic structures of both models are illustrated in (22).

(21) Foot parsing (Poser 1990): parsed from right to left edge

<table>
<thead>
<tr>
<th>Example</th>
<th>Gloss</th>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ha.(si.ra)_ό</em></td>
<td>‘pillar’</td>
<td><em>zi.do](o.sya)_ό</em></td>
<td>‘automobile’</td>
</tr>
<tr>
<td><em>ku.(su.ri)_ό</em></td>
<td>‘medicine’</td>
<td><em>ku.ri](i.mu)_ό</em></td>
<td>‘cream’</td>
</tr>
<tr>
<td><em>koo.(hi]i)_ό</em></td>
<td>‘coffee’</td>
<td><em>su.to.ra](i.ki)_ό</em></td>
<td>‘labour strike’</td>
</tr>
<tr>
<td><em>kai.(hiN)_ό</em></td>
<td>‘seaside’</td>
<td><em>kon.ku](u.ru)_ό</em></td>
<td>‘contest’</td>
</tr>
</tbody>
</table>

(22) Tree models

<table>
<thead>
<tr>
<th>Example</th>
<th>Gloss</th>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Among recent studies on Japanese foot structure, Labrune (2012) conducts a unique research from the viewpoint that there may be no salient role in syllables in Japanese. If the absence of syllables in this language would be demonstrated with phonological evidence, we could conclude that interrupted σ-boundaries (see (21b) and (22b)) do not exist. Therefore, the processes in (21b) and (22b) can be operated without any violation to the constraints of Prosodic Hierarchy. Labrune (2012)’s syllable-free prosodic model will be presented in (23) and (24) below. In Prosodic Hierarchy without syllables, morae are directly dominated by feet.

(23) Syllable-free Prosodic Hierarchy (Labrune 2012)\(^{51}\)

\[
\begin{array}{l}
\text{prosodic word (ω)} \\
\text{foot (Σ)} \\
\text{mora (μ)}
\end{array}
\]

(24) Syllable-free analysis (Labrune 2012)

a. intact σ-boundary  
   b. interrupted σ-boundary

\(^{51}\) Higher components of Prosodic Hierarchy than prosodic word are omitted from the figure.
However, the innovative proposal of Labrune (2012), who apparently is not in favour of syllables in Japanese, has not yet obtained great support from researchers, since it has been traditionally assumed that there are syllables in Japanese. Most researchers of Japanese phonology believe that syllables do have certain roles in Japanese phonology, as McCawley (1968) considered that Japanese is a mora-counting syllable language. As long as syllables are useful in certain phonological purposes in this language, we should not appreciate Poser (1990)’s footing theory.

One of the most obvious evidence for the melodical effect of syllables may be the phrase-initial tone (Kawakami 1954), where the first two morae should have low-high (LH) pattern unless the word has initial-high lexical pitch accent (or 頭高 atama-daka ‘head-high’). Traditionally, pitch accent in Tokyo Japanese have been regarded as “daji ippaku=to daji niha|ku=to ta|kasa=wa kanarazu kotonaru|ru [pitch height of the first mora is always different from the second] (Arisaka 1941, Kindaichi 1966; author’s translation)”, as is commonly mentioned in the pitch accent dictionary in NHK (日本放送協会 nippo|N hoosoo-kyo|okai ‘Japan Broadcasting Corporation’).

However, phrase-initial LH tone will not be realised if the second mora is a special mora. Namely, LH tone is no longer favoured when the phrase-initial syllable is heavy. According to Sugihara (2011)’s generalisation, initial tone will be high-high (HH) sequence if the second mora is vocal (long vowel, semivocal glide) or nasal, whereas high tone will emerge first in the third mora if the second mora is consonantal and non-nasal (Kawakami 2000). Hattori (1954) interprets this phenomenon as “iti-oNsetu-naj=ni nobori-tyo|osi=ga araware|ru=mo=0

\[
\begin{align*}
\text{ame\}|(r|ka)} & \equiv \text{‘America’} \\
\text{kuri\}|(i\mu) & \equiv \text{‘cream’}
\end{align*}
\]
kiratte kono bu]buN=ga taira-o]Ntyoo= to]ru [since a rising tone within a syllable is dispreferred, this part takes a level tone] (author’s translation)”. See (25) below for some data of LH tone deletion, where the geminate morae are specifically denoted with Ø due to their soundlessness, while geminate morae are usually treated as phonologically toned. This thesis also basically treats the geminate morae as bearing tones, but their soundlessness is exceptionally emphasised here\(^{52}\). Its purpose is to avoid unclear explanation about the tone underlyingly borne by soundless geminates.

(25) LH phrasal tone deletion
a. vocal second mora
\textit{teesya} HHH ‘stopping of a vehicle’, \textit{baiten} HHHH ‘kiosk’
b. nasal second mora
\textit{sinzyuku} HHHH ‘Shinjuku (place name)’, \textit{kankyoo} ‘environment’
c. geminate second mora
\textit{nippo|N LØH]L ‘Japan’, gappee} LØHH ‘merger’

As we have seen in (13) in this chapter, moreover, traditional default foreign word accentuation rule (antepenultimate rule) is known to be influenced by prosodic word’s syllable structure; therefore, lowering kernel shift to the left is possible if the predicted position of lowering kernel (basically, the third mora from the end of the prosodic word) is occupied with a special mora. As there are reasons to agree with the presence of syllables in Japanese as shown above, syllable-free analysis of Japanese prosody does not seem altogether persuasive.

Therefore, syllable boundary breaking in Poser (1990)’s footing theory (see (24)) should not be justified without discarding syllables, while his assumption for foot structure and some subsequent studies in favour of feet in Japanese have given plenty of information about the affinity to bimoraicity in this language. As repeatedly claimed in this thesis, a certain tendency toward binary structure is present in Japanese, which, however, is not necessarily closely related to prosody or to the foot structure. At the very least, the attempt of Poser (1990) to define the

\(^{52}\) We could assume that usually soundless moraic geminate is underlyingly bearing low tone taken over from the first mora (such as \textit{nippo|N LLH]L ‘Japan’) without having an empty tone slot. This assumption can be justified with the fact that a word-initial heavy syllable which ends with a voiced geminate may have a level low tone: such as \textit{hezzi-fa|ndo} LLHH]LL ‘hedge fund’ and \textit{berri|ini} LLH]LL ‘Bellini’.
foot structure in Japanese with the notion of compound accentuation does not appear entirely successful as long as the syllable is present despite some objections.

In the following investigations I will address the development of foot theory in Japanese after Poser (1990) with the concept of Weak Layering in Prosodic Phonology (see section 2 in this thesis), which could be contrasted with traditional Strict Layer hypothesis (Selkirk 1984), and which has supposedly some advantages in foot parsing (Itô & Mester 1992). As to recent footing theories, I will mainly treat the study of Inaba (2005) along with a number of influential studies in the past such as Itô (1990) and Itô & Mester (1992).

2.2 Strict vs. Weak Layering

Particularly due to violation to strictly layered structure of Prosodic Hierarchy, the default compound accentuation rules of Poser (1990) should be updated. His idea has also been criticised by even a number of phonologists, who are advocating feet in Japanese. For example, some past studies such as Itô (1990) and Itô & Mester (1992) proposed Weak Layering which may replace Strict Layering (Selkirk 1984), and which enables some cases of ill-formed parsing in Strict Layering to be possible. The most essential difference of Weak Layering from preceding structural model would be that the new layering model does not require its prosodic components to be obligatorily dominated by their immediate superordinates.

In the weakened layer structure, therefore, a prosodic word could dominate a syllable directly without being dominated by a foot, which is the immediate subcategory of prosodic word according to the traditional hierarchy model. The strictness of layering structure has been discussed among researchers since the first emergence of Prosodic Hierarchy. Among them, there have been some suggestions to decompose Strict Layering into looser constraint, as Itô & Mester (1992) proposed.

(26) Layering theories

a. Strict Layering
2.3 **Weak Layering and morphophonological processes**

After its emergence, Weak Layering had gained popularity in Japanese phonological studies as this idea may provide a good method to avoid contradiction between feet and syllable parsing which occurs in Poser (1990). Along with this, Weak Layering may also account for some morphophonological processes which previous studies have failed to successfully generalise.

Prior to Poser (1990)’s study, Itô (1990) hypothesises that the minimal output of truncated foreign words be as large as a binary foot (see section 3 and 4 in chapter 3), which establishes obligatory *stem* in her own term. While obligatory stem in single word truncation should be construed as reliant upon disyllabic structure (Stem$_{do}$) rather than upon bimoraicity (see subsection 3.6 in chapter 3), bimoraicity has some affinity to the obligatory structure in compound truncation (Stem$_z$).

Using the notion of bimoraic obligatory stem, trimoraic outputs which have undergone double truncation may be analysed as being composed of a bimoraic stem and a monomoraic suffix: such as *terehon-kajado* ‘telephone card’ > *te|re-ka*, which will be parsed into *(te|re)Stem$_z$(-ka)Suffix* (see subsection 4.1 in chapter 3).
Itô & Mester (1992) analyse this template of abbreviation using Weak Layering, where undominated units are allowed. The prosodic tree for trimoraic structure is given in (27), where the parsing process will create an ill-formed monomoraic foot in (27a), whereas the monomoraic part remains unfooted and being governed directly by the prosodic word in (27b). To prevent a subminimal (= monomoraic) foot from being created, Weak Layering can be a better option.

(27) Trimoraic template

a. Strict Layering

```
  \omega
 / \______
Σji \______ Σi
  /   \     
\sigma  \______ \sigma
```

b. Weak Layering

```
  \omega
 / \______
Σ \______
  /   \     
\sigma  \______ \sigma
```

In this subsection, we have seen so far that Weak Layering may be a convenient tool for footing in Japanese since odd-numberedness of a prosodic component is a common problem in parsing the prosodic structure into binary feet.

Now that we are agreed with the possible usefulness of loosened layering structure, we should carry on our investigation in the following. Thereafter we will discuss if we can define a consistent form and natures of feet in Japanese, which will serve to fulfil some accentual purposes, and which will have exhaustive function in utterance. There have been several studies in the past which have attempted to connect conventional foot theories with default accentuation, most of which have been in favour of the presence of default accentuation patterns.

So far in the following section, we will start with making a brief introduction of the aforementioned study of Inaba (2005) (see section 2 in this chapter), who uses the ideas of Weak Layering in his default accentuation theory. The validity of his proposal will be reinvestigated in the later discussions.

2.4 Weak Layering and default accentuation
Default accentuation in Japanese, in which the position of lowering kernel is determined by regular accentuation rules, has attracted great attention of researchers since last century (e.g. McCawley 1968, Poser 1990). McCawley (1968)’s classical accentuation rules, including the antepenultimate rule occasionally mentioned in this thesis, were originally proposed as an improvement for some previous suggestions on Japanese pitch accent. The basic idea of his default accentuation has been inherited through generations.

It was Inaba (1997, 1998, 2005), who is in favour of feet and Weak Layering in Japanese, that have tried to combine the notion of default accentuation patterns and the theory of Weak Layering. He argues that bimoraic foot structure may be observed in some phonological phenomena such as foreign word accentuation, and generalises patterns of foot parsing in long foreign words, which contain five or more than five morae.

(28) Short vs. long foreign words

a. short \( (\mu < 5) \)

b. long \( (\mu > 4) \)

This number five interestingly coincides with the minimal mora quantity in which a foreign word should be treated as compound word, according to some past studies such as Kubozono (1995), Uwano (1999), Kubozono & Ogawa (2005), Giriko (2010) (see also subsection 3.3 in chapter 3). It is however unknown if Inaba (2005)’s proposal is related to the effect of pseudo-compound structure. Due to being beyond the scope of this thesis, we will not treat this topic further.

Inaba (2005)’s default accentuation rules for foreign words, which may be a theoretical improvement for previous proposals claimed in the past, are presented in (29)-(31) below. As the parsing in (30)-(31) may contain stray (unfooted) morae, this model is only then possible, when Weak Layering is applied. It should be noted again, that Inaba (2005)’s default accentuation theory has some possibility of exhaustive footing, which previous studies have generally ignored (see the data below).

(29) Default foreign word accentuation process (Inaba 1998, 2005)

a. The final syllable of prosodic word is ignored as extrametrical.
b. Heavy (bimoraic) syllables construct bimoraic feet from the final syllable to the left.

c. Light (monomoraic) syllables construct bimoraic feet from the final syllable to the left.

d. Lowering kernel is placed on the head$^{53}$ of the rightmost (trochaic) foot.

(30) Lowering kernel calculation: tyokoreeto ‘chocolate’

a. Calculation process

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>tyokoreeto</td>
<td>&gt; tyokoree&lt;to&gt;</td>
<td>apply (29a)</td>
</tr>
<tr>
<td>tyokoree&lt;to&gt;</td>
<td>&gt; tyoko(ree)Σ&lt;to&gt;</td>
<td>apply (29b)</td>
</tr>
<tr>
<td>tyoko(ree)Σ&lt;to&gt;</td>
<td>&gt; (tyoko)Σ(ree)Σ&lt;to&gt;</td>
<td>apply (29c)</td>
</tr>
<tr>
<td>(tyoko)Σ(ree)Σ&lt;to&gt;</td>
<td>&gt; (tyoko)Σ(re)Σ&lt;to&gt;</td>
<td>apply (29d)</td>
</tr>
</tbody>
</table>

b. Branching model

![Branching model diagram](image)

(31) Further examples

a. Data

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>karenNdaa</td>
<td>&gt; kat(re)NΣ&lt;daa&gt;</td>
</tr>
</tbody>
</table>

$^{53}$ Many researchers in favour of feet in Japanese have presumed in common that Japanese feet are trochaic, where lowering kernel will be therefore put on the first mora of a bimoraic foot. According to their foot theories, a regular kernelled foot should be ($σ|σ)Σ$ instead of *($σ|σ)Σ$.
b. Branching model

\[
\begin{align*}
derakkusu & \quad \rightarrow \quad \text{der(raj)\text{ku}<su>)} \\
komaasyaru & \quad \rightarrow \quad \text{komaas(yaru)} \\
hyuumanizumu & \quad \rightarrow \quad \text{hyuumanizumu} \\
inhrueNza & \quad \rightarrow \quad (in)rueNza <za>
\end{align*}
\]

\[
\begin{align*}
derakkusu & \quad \rightarrow \quad \text{der(raj)\text{ku}<su>)} \\
hyuumanizumu & \quad \rightarrow \quad (hyu)\text{ma(ni)zu}<\mu>
\end{align*}
\]
As far as the following data show, the proposal of Inaba (2005) may be a good improvement of traditional default accentuation rules for long foreign words since his accentuation rules give a systematic explanation why the default lowering kernel is obliged to be placed on the syllable which contains antepenultimate mora. It should be also taken into consideration that his foot theory is able to predict the position of lowering kernels of some words which previous accentuation rules could not. The detail for improved prediction is presented in (32). Bracketed question mark in the data indicates that the output may not be canonical (according to Kindaichi 2011), although it does not seem completely inacceptable.

(32) Comparison: accuracy of kernel prediction

<table>
<thead>
<tr>
<th>Example / Gloss</th>
<th>Previous</th>
<th>New (Inaba 2005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. heriko]putaa ‘helicopter’</td>
<td>(?)herikopu]taa</td>
<td>(heri)Σ(ko]pu)Σ&lt;taa&gt;</td>
</tr>
<tr>
<td>c. are]rugii ‘allergy’</td>
<td>are ru]gii55</td>
<td>a(ri]ru)Σ&lt;gii&gt;</td>
</tr>
<tr>
<td>d. ba]asudee ‘birthday’</td>
<td>*baasu]dee</td>
<td>(ba]a)Σsu&lt;dee&gt;</td>
</tr>
</tbody>
</table>

As the examples in (32) generally suggest, the new proposal of default accentuation combined with Weak Layering theory will improve the accuracy of previous accentuation rules.

54 The position of the lowering kernel is based on Kindaichi (2011).
55 An alternatively possible form according to Kindaichi (2011).
in Japanese to some extent\textsuperscript{56}. For example, while foreign words with heavy-light-heavy (HLH) syllable structure tendentially have the lowering kernel on the initial position, this accentuation pattern may be predicted by the revised generalisation of foreign word accentuation. Some further data will be given below in (33), whose parsing process into feet is identical to that of \textit{ba\j asudee} ‘birthday’ (see (32d)).

(33) Default accentuation for HLH-words: initial-kernelled

<table>
<thead>
<tr>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>sa\j azudee</td>
<td>‘Thursday’</td>
</tr>
<tr>
<td>ba\j abarii</td>
<td>‘Barbary’</td>
</tr>
<tr>
<td>fo\j okunaa</td>
<td>‘Faulkner’</td>
</tr>
<tr>
<td>to\j oruki\N</td>
<td>‘Tolkien’</td>
</tr>
</tbody>
</table>

Since Weak Layering has enabled researchers to deal with some parsing problems of exhaustive footing in Japanese more easily, there have been some attempts to establish a theory which may account for exhaustive effect of Japanese feet. This seems to be a relatively new trend in foot studies in Japanese, while most of early researchers have focused on morphophonological or musical phenomena typically seen in word transformation or traditional verse (e.g. Poser 1990, Hayes 2008[1995], Labrune 2012).

Using the notion of Weak Layering, we will continue our discussion about further issues on relationship between feet and regular accentuation in next section.

3 \hspace{1em} Bidirectional foot parsing

This section firstly will introduce the word parsing theory of Inaba (2005) which will enable foreign words to be chunked into bimoraic feet with greater accuracy than previous proposals.

\textsuperscript{56} Of course, Inaba (2005)’s improved foreign word accentuation rules do not guarantee a perfect accuracy. Some data, where his accentuation rules are invalid (e.g. \textit{herikopu\j taa}, \textit{areru\j gii}), show that there are some exceptional cases. In my observation, the position of lowering kernel for final-heavy words may be ambiguous between ]\textit{H} or \textit{\textsigma H}: such as \textit{dosutoehu\j sukii} ~ \textit{dosutoe\j husu\j kii} ‘Dostoyevski’, \textit{\textalpha\j d\j eruse\j N}~ \textit{\textalpha\j d\j eru\j se\j N} ‘Andersen’. It should be noted that Japanese pitch accent in fact has no great role in comprehension, which may easily be mistook, especially when the word in question is unknown or unfamiliar to speaker.
The most striking characteristic of his bireational theory is that parsing may be performed in both directions (see subsection 3.1 and (34) in this chapter). While employing left-to-right parsing in short (µ ≤ 4) foreign word, feet will be produced from the rightmost edge when the word is long (µ > 5). Combined with Weak Layering’s greater flexibility, his theory has improved the accuracy of lowering kernel prediction. This foot parsing theory can, furthermore, is applicable to compound accentuation (see subsection 3.2).

His theory, however, has some shortcomings, as examined in following sections. The greatest problem would be that his theory presupposes that lowering kernel is metrically strong, despite the absence of strength effect on Japanese word prosody. Moreover, it should be reinvestigated if there are different patterns of default accentuation (see section 5 and 6 in this chapter). The possibility of multiple default accentuation would suggest that the proposed footing by Inaba (2005) is not overall valid in foreign word accentuation in general.

3.1 Inaba (2005)’s default accentuation theory

As we have seen in preceding sections, McCawley (1968)’s word accentuation theory including default accentuation rules have greatly affected subsequent studies on Japanese feet. Amongst them, Inaba (1998, 2005) claims that McCawley (1968)’s so-called antepenultimate default foreign word accentuation rule can be applied to foot parsing in Japanese, making use of the concept of Weak Layering (Itô & Mester 1992: see section 2 in this chapter) which permits some morae to be unfooted. While Inaba (2005)’s insight contains some telling suggestion of foot domain in Japanese, it will be investigated precisely in this section.

He states that the location of lowering kernel in short foreign words may be predicted with the notion of feet as well as long ones, simultaneously defining their heads and non-heads. This kind of discrimination have traditionally been regarded as obligatory for foot structure (such as in Crowhurst 1991).

Uniquely for his research, moreover, it is presupposed that the direction of foot parsing is different depending on the length of prosodic word. Therein he posits that short foreign words which are composed of four or less than four morae are parsed into feet from left to right, whereas long foreign words with five or more than five morae will employ right-to-left foot parsing strategy. He focuses on the fact that short foreign words are tendentially initial-
kernelled while long ones tend to be faithful to the conventional antepenultimate rule. In his regular accentuation theory, extrametricity of the final syllable apparently does not occur in short foreign words, with the reason not explicitly given.

At the beginning of our discussion, I will give the most essential claims of Inaba (2005) in (34) below. In (35), some empirical data will be found which apparently in support of left-to-right parsing direction for short foreign words, which conventional default accentuation rules do not premise (McCawley 1968 and others).

(34) Mora length and foot parsing direction (Inaba 2005)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Foot parsing</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. short (µ &lt; 5)</td>
<td>left to right</td>
</tr>
<tr>
<td>b. long (µ ≥ 5)</td>
<td>right to left</td>
</tr>
</tbody>
</table>

Some facts in accentuation patterns of short foreign words may be in favour of the left-to-right hypothesis: supposing that lowering kernel is placed on the rightmost trochaic foot head, the conventional right-to-left footing direction may be ill-formed:

(35) Short foreign words and footing direction

a. Trimoraic

<table>
<thead>
<tr>
<th>Example / Gloss</th>
<th>Foot LR</th>
<th>Foot RL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ku\rasu ‘class’</td>
<td>(ku\ra)Σsu</td>
<td>*ku(ra)su)Σ</td>
</tr>
<tr>
<td>te\rebi ‘television’</td>
<td>(te\re)Σbi</td>
<td>*te(re</td>
</tr>
<tr>
<td>ha\wai ‘Hawaii’</td>
<td>(ha)Σ(wai)Σ</td>
<td>*ha(wai)Σ</td>
</tr>
<tr>
<td>gi\taa ‘guitar’</td>
<td>(gi)Σ(taa)Σ</td>
<td>*gi(ta)a)Σ</td>
</tr>
</tbody>
</table>

b. Quadrimoraic

<table>
<thead>
<tr>
<th>Example / Gloss</th>
<th>Foot LR</th>
<th>Foot RL</th>
</tr>
</thead>
<tbody>
<tr>
<td>e\NZin ‘engine’</td>
<td>(e\N)Σ(zin)Σ</td>
<td>(e\N)Σ&lt;zin&gt;</td>
</tr>
<tr>
<td>to\susto\57 ‘toast’</td>
<td>(to\Jo)Σ(suto)Σ</td>
<td>(to\Jo)su&lt;to&gt;</td>
</tr>
<tr>
<td>do\kutaa ‘doctor’</td>
<td>(do\ku)Σ(taa)Σ</td>
<td>(do\ku)Σ&lt;taa&gt;</td>
</tr>
</tbody>
</table>

\57 A non-kernelled variant toosuto is also possible (Kindaichi 2011).
Among the trimoraic foreign words, initial-high (or initial-kernelled) pattern is the statistic majority according to Katayama (1998). For this type of foreign words, we should confirm whether the word-initial lowering kernel is generated by right-to-left parsing or left-to-right one. Inaba (2005) interprets right-to-left parsing in (35a) as ill-formed, since the predicted position of lowering kernel do not coincident with the well-formed locus (e.g. *ku(ras)su vs. (ku)rasu). On the other hand, left-to-right parsing is seemingly a better option as lowering kernel will fall on the expected position.

Despite some supporting facts, we should note that his prediction rule will face a typical problem of foot parsing in general: here, we will reconsider the issue if there are monomoraic feet in Japanese (degenerate feet: see subsection 1.4 in chapter 1 and others), which neither satisfy the universal binarity of foot structure nor the traditional expectation of bimoraicity for Japanese feet.

Inaba (2005) states that left-to-right parsing such as (ha)wai or (gi)taa in (36a), which obviously violates the universal foot binarity (Prince & Smolensky 1993), could also be construed as well-formed by using the notion of degenerate feet which may be smaller than regular foot size. Since Weak Prohibition condition will permit feet to be monomoraic if the mora in question is metrically strong, Inaba (2005) allows foot parsing such as (ha)wai by interpreting the kernelled (accented in his word) mora as metrically strong.

In quadrimoraic foreign words, some predicted forms generated by right-to-left parsing are ill-formed; therefore, left-to-right parsing seems to be better for this category (see (35b)). Concerning this issue, Katayama (1998) reports that initial-kerneled pattern would be the default type for quadrimoraic foreign words, which will also in harmony with Inaba (2005)’s theorisation.

However, there are seemingly several different opinions among scholars and institutes: for example, NHK (1998)’s NHK 日本語発音アクセント辞典 (NHK nihongo-hatuon-akusento-zijiten [Japanese Pronunciation and Accent Dictionary]: author’s translation)
generalises that foreign words with four or more than four morae are pronounced high until the third mora from the end. On the other hand, a comment in Kindaichi (2011)’s 新明解日本語アクセント辞典 (Shinmeikai Japanese Accent Dictionary; author’s translation) maintains that almost half of quadrimoraic foreign words in Japanese have initial-kernelled pattern, which is followed by second-kernelled and non-kernelled one. His opinion seems closer to Katayama (1998)’s position than that of NHK.

In my observation, Kindaichi and Katayama’s assumption would be a better account for the prosodic reality of Contemporary Japanese. It appears Inaba (2005)’s generalisation is supported by some further facts suggested by different scholars.

Here, we do not have to address the case of long foreign words (µ ≥ 5) again as we have discussed this issue previously (antepenultimate rule: see McCawley 1968). As we have seen above, Inaba (2005)’s default lowering kernel prediction rules have relatively high accuracy also for long foreign words. His bidirectional footing theory can be summarised as in (36):

(36) Bidirectional foot parsing

a. If a foreign word is short (quadrimoraic or less), it is parsed from left to right. The position of default lowering kernel is on the head of the first trochaic foot from the left. Extrametricity does not occur.

b. If a foreign word is long (quinquemoraic or more), it is parsed from right to left, obeying traditional default accentuation rules (McCawley 1968). The position of default lowering kernel is on the head of the first trochaic foot from the right. The final syllable is ignored as extrametrical.

3.2 Extension to compound words

In the preceding subsection we have seen that Inaba (2005)’s footing rules, which can apparently predict the default lowering kernel with greater accuracy than older proposals, are mainly applied to monomorphemic foreign words. Moreover, his idea may be applied to predict default accentuation pattern of compound words in general. He claims that foot parsing for compound words is almost the same as for monomorphemic ones. The most striking characteristic of his
compound footing theory is that feet will be divided by word boundary between each compound element.

Giving a further explanation, for example, if the second element is short (quadrimoraic or less), feet in the first element are generated from the right to the left, whereas the second element is divided into feet from the left to the right. The starting point of parsing is word boundary.

Similarly, if the second element is long (quinquemoraic or more), feet are generated from the rightmost edge of the entire compound word structure, while the parsing is blocked at word boundary. Footing for the first element in this case is then restarted apparently from its rightmost mora. The application of bidirectional footing to compound word accentuation will be illustrated as follows in (37):

(37) Bidirectional footing for compound word

<table>
<thead>
<tr>
<th></th>
<th>Short N2 (μ &gt; 5)</th>
<th>Long N2 (μ ≤ 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1 parsing</td>
<td>right to left</td>
<td>right to left</td>
</tr>
<tr>
<td>N2 parsing</td>
<td>left to right</td>
<td>right to left</td>
</tr>
<tr>
<td>Starting point</td>
<td>compound element boundary</td>
<td>rightmost edge of compound word</td>
</tr>
</tbody>
</table>

It should be noted that length of the first element is not taken into consideration in his foot theory, as most of previous studies have commonly not. I will present some data for his footing theory in (38), which is mainly taken from Inaba (2005) with some additional words.

(38) Footing for compound words

<table>
<thead>
<tr>
<th></th>
<th>Short N2</th>
</tr>
</thead>
</table>

---

58 Whereas there is the statement that bidirectional footing is simultaneously applied to compound word when N2 is short (Inaba 2005:86), the author does not explain which direction of foot parsing for N1 should be used when the N2 is long.

"... N2 (enu-tu)wa=no hukugoo-mesi=no huitto (foot)=wa, (N1 ・ N2 (enu-wa=enu-tu)=ka=no kyookai=kara saiyuu ni mukatte kootiku sare, go=haku-izyo=no hukugoo-mesi=no N2 (enu-tu)wa=no huitto (foot)=wa, ... N2 (enu-tu)wa=no go]bi=kara hidari=ni mukatte kootiku sareru ... [... feet of compound word whose N2 is quinquemoraic[sic] or less are constructed from the border of (N1 ・ N2) to both direction, while feet of compound word whose N2 is quinquemoraic or more are constructed from the end of N2 to the left ... ]"

(Inaba 2005:86, author’s translation)
N2 = 1μ

Example

(gas)ξ(syo)ξ-bu

Gloss

‘chorus club’

N2 = 2μ

Example

(nyuu)ξ(zi)ξ-ki

Gloss

‘infancy (lit. infant period)’

ge(ka)ξ-i

‘surgeon (lit. surgery doctor)’

ka(gosi)ξ(ma)ξ-si

‘Kagoshima City’

N2 = 3μ

Example

(neba)ξ(da)ξ-(syuu)ξ

Gloss

‘Nevada State’

(siN)ξ(ri)ξ-(gaku)ξ

‘psychology (lit. mental science)’

(hoo)ξ(te)ξ-(siki)ξ

‘equation’

(ON)ξ(ga(keji))ξ-(kai)ξ

alternative form for ongaku-kai

(kyoo)ξ(keji)ξ-(eki)ξ

‘Kyoto station’

(koga)ξ(ne)ξ-(gumo)ξ

‘argiope amoena (lit. gold spider)’

su(pee)ξ(sufu)ξ-(kii)ξ

‘space bar (lit. space key)’

N2 = 4μ

Example

(gowa)ξ-(a)ξ(bu)ξ-ra

Gloss

‘sesame oil’

(kiiroku)ξ-(e)ξ(keji)ξ-ga

‘documentary film’

(koo)ξ(tuu)ξ-(i)ξ(han)ξ

‘traffic violation’

(hut)ξ-to-(bo)ξ(keji)ξ-ru

‘football’

(kii)ξ-to-(be)ξ(keji)ξ-to

‘seat belt’

N2 = 5μ

Example

(iN)ξ(ga-(kan))ξ(keee)ξ

Gloss

‘cause-and-effect relationship’

(kuti)ξ-(ya)ξ(keji)ξ(soku)ξ

‘verbal agreement’

(aiisu)ξ-ku(riji)ξ-mu

‘ice cream’

(riki)ξ-(a)ξ(me)ξ-(riki)ξ

‘Latin America’

b.

Long N2

N2 ≥ 5μ
Example | Gloss
---|---
(yama)$_{\Sigma}$-(hoto)$_{\Sigma}$(to$_{\Sigma}$gi)$_{\Sigma}$<su> | ‘mountain quail’
(hot)$_{\Sigma}$to-(kapu)$_{\Sigma}$(ti)$_{\Sigma}$ji$_{\Sigma}$<no> | ‘hot cappuccino’
(gek)$_{\Sigma}$(kaN)$_{\Sigma}$-gu(raN)$_{\Sigma}$pu<ri> | ‘monthly grand prix’

Inaba (2005)’s accentuation rules illustrated in (37) and (38) appear to be more sophisticated in comparison with prior suggestions, rendering some accentuation patterns predictable in a more systematic way than formerly proposed generalisations. In addition to this advantage, his footing theory is unique as enabling exhaustive parsing within a prosodic word.

However, we should make two questions here: first, we are still wondering whether a mora with lowering kernel should be regarded as metrically strong; and if so, what would be evidence for that. The second question will be if default accentuation rules proposed in Inaba (2005) and previous studies are free from exceptions. When some exceptional data are found, we will investigate the reason for them instead of ignoring them as a statistic minority.

The centre of our discussion on the second question will be, generally speaking, if we should be in favour of uniform default accentuation pattern in Japanese, which in fact is less persuasive due to a certain number of problematic cases (see section 5 and 6 in this chapter). The possibility of multiple default patterns in terms of pitch accent was mentioned briefly in subsection 1.7 in this chapter (‘-ingu words), which obviously is a theoretical problem for Inaba (2005)’s footing theory as it premises uniform default of pitch accent. If multiple default patterns are nevertheless present, his footing theory would be less convincing.

4 **Lowering kernels and metrical strength**

To question if lowering kernels in Japanese are metrically strong, we will start with some examination on the phonetical reality of Japanese pitch accent (see subsection 4.1). Summarising previous studies, it does not seem that there is neither strength effect nor iterative pattern in Japanese pitch accent.

As to iterativity of tonal features, which is absent in Tokyo Japanese, Irabu Ryukyuan spoken in Okinawa Prefecture (a branch of Japonic languages: Shimoji 2009:85, see subsection 4.2) would be an interesting example. The author reports that a binary iterative pattern
composed of bimoraic low tone and bimoraic high tone is present in this language. Along with the fact of not tolerating monomoraic words, Irabu Ryukyuan gives some interesting insights about feet in Japanese.

In subsection 4.3, subsequently, this thesis will point out the fact that lowering kernel may shift when it is placed on a heavy syllable: like in oJndo and oMJdo ‘temperature’ (see Hayata 1999 and others). This phenomenon would be an unfavolable fact for the position in favour of feet in Japanese, as this means that trochaic head (lowering kernel) may assimilate following non-head, against the common understanding of metrical stress which should be dissimilated from unaccented non-head.

As some previous studies have suggested (such as Hayata 1999), there may be some conditions which increase the possibility of shifted lowering kernels. This issue will be discussed in subsection 4.4.

Since it does not seem thoroughly convincing that Japanese lowering kernels are metrically strong, the idea of interpreting some lowering kernels as degenerate feet (see Hayes 1995 and others) should be reconsidered; otherwise a new theory should be reintroduced which may tolerate degenerate feet regardless of its metrical strongness.

4.1 Phonetical reality of Japanese lowering kernels

Inaba (2005)’s default accentuation theory presupposes that a mora where lowering kernel is placed would be metrically strong, and that it would be therefore able to be the head of a trochaic metrical foot.

Before starting the main discussion, it should be precisely investigated whether Japanese lexical pitch accent system may be put on par with the concept of metrical strength. This section will make some attempts to examine the validity of Inaba (2005)’s suggestion and its theoretical background where lowering kernel should be treated as equivalent to stressed syllable in so-called stress languages such as Germanic ones.

It would be true that various phonetical factors such as intensity and duration are involved in the representation of pitch accent. Parallel to the fact that every English content word has a phonetically salient syllable characterised with some special features such as relatively greater intensity and duration, Japanese content words are distinguishable in
accordance with the difference in lowering kernel position which triggers the occurrence of following low tonal sequence. Due to steep fall of tone caused by lowering kernel, kernelled morae have sometimes been understood as phonetically salient.

Despite certain similarities, nevertheless, there are striking differences between Japanese pitch accent and typical stress accent: for example, content words without salient part are not altogether disfavoured in Japanese. In the data from Japanese in (39a) below, kernelled morae are emphasised with capital letters.

(39) Pitch accent and stress accent

a. Pitch accent (Japanese): non-culminative pattern available

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\sigma_H\sigma_L-\sigma_L) (\omega)</td>
<td>HA(si)=ga</td>
<td>‘chopsticks=NOM’</td>
</tr>
<tr>
<td>(\sigma_L\sigma_H-\sigma_L) (\omega)</td>
<td>ha(SI)=ga</td>
<td>‘bridge=NOM’</td>
</tr>
<tr>
<td>(\sigma_L\sigma_H-\sigma_H) (\omega)</td>
<td>hasi=ga</td>
<td>‘edge=NOM’ (non-culminative)</td>
</tr>
</tbody>
</table>

b. Stress accent (English): non-culminative pattern unavailable

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\sigma_w\sigma_w) (\omega)</td>
<td>PRO(ject) (n.)</td>
</tr>
<tr>
<td>(\sigma_w\sigma_s) (\omega)</td>
<td>pro(JECT) (v.)</td>
</tr>
<tr>
<td>* (\sigma_w\sigma_w) (\omega)</td>
<td>-</td>
</tr>
</tbody>
</table>

Due to this difference, it seems difficult to account for the equivalence between lowering kernel and other phonological phenomena such as lexical stress: as a great number of non-kernelled content words demonstrate, culminativity is not an obligatory feature of Japanese pitch accent.

Since decades, a great number of suggestions about this issue have been made, where, however, their position differs from each other. Kozasa (2004)’s relatively recent research could be a good summary, who collected a number of previous researches questioning whether Japanese pitch accent should be characterised only by fundamental frequency. Therefore, this section will mainly deal with Kozasa (2004)’s claim along with previous studies mentioned in her research.
Giving a glance at some previous studies, influential studies have commonly given negative comments to the interaction between lowering kernel and other phonetical properties. McCawley (1968:135), for example, states that the phonetical characteristics of pitch falling are primarily based on its relatively high pitch, whereas there is no significant difference in intensity and duration between kernelled morae and non-kernelled ones.

It was Homma (1973, 1981) that showed the absence of transparent correlation between pitch accent and vowel duration in Japanese with some empirical data. She collected bimoraic words from a native speaker of Kyoto dialect, whose pitch accent pattern however differs from that of Tokyo dialect. Her study concludes that the second mora is consistently longer than the first one in any accentual environment.

Some researchers are suspicious to her claim, though, questioning if external factors other than pitch accent could have influenced the result. Kozasa (2004) gives a comment towards Homma’s suggestion that her data might be affected by phrase final lengthening effect as the data in Homma (1973) were taken from isolated utterances. Furthermore, personal effect on mora duration is not taken into consideration in Homma (1973), having only one participant in her experiment.

Subsequent reports made by Beckman (1982ab), who used five Tokyo Japanese native speakers in her experiment, provide dozens of test words with different usage frequency. She also concludes that there would be only minimal duration effect on lowering kernel (Beckman 1982a:115). We can here question, though, if the difference in frequency of test words might have affected the result of her mora duration measurement. There are some rare words in her test word inventory, which are not senseless but look as if almost spontaneously created. The frequency of test words should have been adjusted to avoid frequency effect on participants’ utterance, although Beckman (1982a)’s experiment contained a training phase for the subjects to get familiar with test words.

On the other hand, some other studies suggest phonetical effects (such as increase in intensity and duration) caused by lowering kernels. Han (1962), as one of them, claims that higher pitch slightly increases intensity and duration. Her research uses accentual minimal pairs

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59 Such as 異服 ihuku ‘different clothes’ and 異見 iken ‘dissenting view’, whose accentuation pattern seems difficult to uniformly define to me due to low frequency in usage, whereas their minimal pair counterparts 衣服 ihuku ‘clothes’ and 意見 iken ‘opinion’ are relatively frequent and their pitch accent patterns are clear as well.
uttered “in various ways and by a number of native speakers” (Han 1962:104), which would minimalise the effect of personal factors. Hoequist (1983), who compares syllable duration effect in languages with different timing units\(^{60}\), performed an experiment using four Tokyo Japanese native speakers. He reports that the duration of a kernelled mora is slightly but consistently longer than that of a non-kernelled one throughout his experiment, although the lengthening effect is much smaller than on the stressed syllable in Spanish (Hoequist 1983:208).

What we can conclude from the discussions above, at the very least, will be that the question on interaction between lowering kernel and other acoustic properties seems controversial in general, although Kozasa (2004) herself claims that there would be a mutual effect between lowering kernels and duration even if it would be small. As long as we do not find out any obvious evidence for pitch-stress interaction in Japanese, the validity of theoretical background of Inaba (2005), who regards a mora which contains lowering kernel as metrically strong, would not be robust.

Here, I would point out an additional fact that multimoraic high tone sequence is frequently observed in Japanese, where the register tone stays high through some morae until the word ends or until the high tone concatenation is blocked by lowering kernel. From the traditional view of binary feet, however, the tonal representation of these sequences should be expected to have an alternating nature: such as *HLHLHL for a sexamoraic prosodic word. This pitch representation never occurs, of course, since this tonal representation violates maximal frequency constraint for lowering kernels in a prosodic word: lowering kernel in a prosodic word in Japanese is allowed to appear maximally once.

There could be natural alternating pattern of utterance in a purely musical sense, as speaking is a certain kind of musical action despite its essentially non-musical purpose; however, it should be discussed with great care if prosodic structure of natural speech can be directly analogised from musical phenomena. Here, we should give a special remark to the research of Lerdahl & Jackendoff (1983) on hierarchic structure of tonal music, which proposes periodic pattern of beat saliency. A quadruple musical bar is, for example, composed of two binary feet, as shown in (40):

\(^{60}\) English for stress-timed, Spanish for syllable-timed and Japanese for mora-timed language.
Beat structure in 4/4 metre (Lerdahl & Jackendoff 1983:19)

In a musical sense, periodic pattern of beat may be universal; however, this fact does not guarantee the same structure in language prosody, while there are some attempts to investigate periodic structures in Japanese in purely musical or acoustic terms.

On this issue, there is an interesting approach to Japanese feet made by Tajima (1998), who tried to discover a foot-based alternating pattern in prosody. He claims that “foot-initial syllables show greater temporal stability than foot-internal syllables do” (Tajima 1999:74), in accordance with the result of his own experiments. In his study, evidence for the prominence of trochaic feet is reliant upon the temporal stability of odd-numbered morae, where the effect of time displacement within some similar utterance sets is smaller (Tajima 1998:110).

There seem to be, however, certain problems in his study. First, participants were requested to pronounce the stimuli with an artificial (three-beat, waltz-like in his word) rhythm for the sake of his experiment’s procedure, which may have caused deviation from natural representation of rhythm and melody of utterances. Second, the stimuli in his experiment do not contain special morae which may render foot parsing in Japanese more complex. Third, his result premises that feet be established from the left to the right, which would contradict with backward footing proposed by many of previous studies (Poser 1990, Inaba 2005 and others).

Due to these shortcomings, it would be difficult to support his argumentation without further discussion. Taking the claim of Lerdahl & Jackendoff (1983) into consideration again, the alternating pattern found in Tajima (1998)’s experiment could have been a realisation of the periodic structure in utterance as a musical phenomenon, which apparently is less related to prosody.

Without observable alternating pattern in speech prosody, there would be no persuasive way to define metrical heads and non-heads in the high tone sequence presented in (41). The footing of the words below is based on Inaba (2005)’s claim.

(41) pre-kernel long high tone
<table>
<thead>
<tr>
<th>Example</th>
<th>Tone</th>
<th>Tentative footing</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>oputimi[zumu</td>
<td>LHHH</td>
<td>LL</td>
<td>L(HH)₂(H)L₃&lt;LL&gt;</td>
</tr>
<tr>
<td>herasutore[esyōN</td>
<td>LHHHH</td>
<td>LLL</td>
<td>(LH)₂(HH)₃(H)L₃&lt;LL&gt;</td>
</tr>
<tr>
<td>ekasukurame[esyōN</td>
<td>LHHHHH</td>
<td>LLL</td>
<td>L(HH)₂(HH)₃(H)L₃&lt;LL&gt;</td>
</tr>
<tr>
<td>ekasuperime[Nto</td>
<td>LHHHHH</td>
<td>LLL</td>
<td>L(HH)₂(HH)₃(H)L₃&lt;LL&gt;</td>
</tr>
</tbody>
</table>

According to his default accentuation theory where the iteration of head and non-head within a (trochaic) foot is premised, for example, a prosodic word ekasukurame\[esyōN ‘exclamation’ will be parsed into e(kusu)₂(kura)₂(me)ₑ<SYON> (see (41)), whose tonal representation should be L(HH)₂(HH)₃(H)L₃<LL> with natural high (H) tone sequence present between the second and the sixth mora. Here, a tentative alternation pattern should be like *L(H₁H₅)₂(H₁H₅)₃(H)L₃<LL> or *L(H_{HEAD}H_{NONHEAD})₂(H_{HEAD}H_{NONHEAD})₃(H)L₃<LL>, which will not be realised as there is no phonological fact which suggests the metrical strongness of odd-numbered high tone morae.

In a typical foot-based language such as English, on the other hand, there is a clearly perceivable strong-weak alternation rhythm, which allows us to find a transparent foot structure with heads and non-heads. Considering an English content word reconcili\[ation, this word can be footed like (ˌrecon)₂(cili)₃(ˈation)ₑ, where we can recognise a cycle pattern which can be transcribed as (ˌsw)₂(sw)₃(ˈsw)ₑ (Selkirk 1984) in accordance with the difference in relative saliency.

### 4.2 Tonal system in Irabu Ryukyuan

As to periodic pattern of rhythm and melody among Japonic languages, which generally do not employ stress accent in the level of prosodic word, there is an interesting report on Irabu Ryukyuan⁶¹ (Shimoji 2009). In this research, it is claimed that iterative pattern of high and low tones is present in this language. Depending on alternating tonal parameters, therefore, feet can be introduced, while this language lacks any prosody-based lexical contrast (Shimoji 2009:97).

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⁶¹ Citation from Shimoji (2009:85): “… a north-west variety of Miyako Ryukyuan, spoken in Okinawa Prefecture, Japan.” Miyako Ryukyuan is a branch of Ryukyuan languages spoken in Miyako Islands, located in the southwest of Okinawa Islands.
Different from Tokyo Japanese, moreover, there is minimal word constraint in Irabu Ryukyuan, which prohibits monomoraic prosodic word. This appears to play a supporting role for binary foot structure in this language (Shimoji 2009:87). Due to monomoraic word circumscription, underlyingly monomoraic roots (e.g. /v/ ‘sell’) undergo augmentation to acquire canonical bimoraic surface forms (e.g. /vv/ ‘sell (non-affixed word form)’).62

(42) Alternating pattern of tone representation in Irabu Ryukyuan (Shimoji 2009:99)

<table>
<thead>
<tr>
<th>Example</th>
<th>Tone</th>
<th>Footing</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>pana</td>
<td>HH</td>
<td>(μμ)_H</td>
<td>‘nose’</td>
</tr>
<tr>
<td>katana</td>
<td>HHH</td>
<td>(μμμ)_H</td>
<td>‘knife’</td>
</tr>
<tr>
<td>utugaja</td>
<td>HHLL</td>
<td>(μμμ)(μμμ)_L</td>
<td>‘jaw’</td>
</tr>
<tr>
<td>bancikira</td>
<td>HHLLL</td>
<td>(μμμ)(μμμ)_L</td>
<td>‘guava’</td>
</tr>
<tr>
<td>koozaburoo</td>
<td>HHLLL</td>
<td>(μμμ)(μμμ)(μμμ)_L</td>
<td>proper name</td>
</tr>
<tr>
<td>oositoraria</td>
<td>HHLLLL</td>
<td>(μμμ)(μμμ)(μμμ)_L</td>
<td>‘Australia’</td>
</tr>
<tr>
<td>amifibammai</td>
<td>HHLLHHLL</td>
<td>(μμμ)(μμμ)(μμμ)(μμμ)_L</td>
<td>‘rain meal’</td>
</tr>
</tbody>
</table>

In Irabu Ryukyuan, the presence of feet without heads is postulated (Shimoji 2009:107), which reportedly are attested in some languages (e.g. Yidiny: see Crowhurst & Hewitt 1995). Crowhurst & Hewitt (1995) call this term headless feet or flat feet. Despite the absence of heads,

62 It should be noted that lengthening of monomoraic words into bimoraic is not a very rare case in Japanese, as this can be seen, for example, in Keihan dialect such as Kyoto Japanese (Uwano 2012). Some data are given below where double right angle bracket [] denotes pitch fall within the preceding syllable (falling tone). Although there is no officially acknowledged annotation for syllable-internal pitch fall in Japanese, we can transcribe it with the additional tone symbol H_H here (see (62-1b).

While bare monomoraic words are obligatorily lengthened, the effect of lengthening is not operative when the word is combined with a particle. This is an interesting contrast to originally bimoraic monosyllabic words, as they are never shortened even before particles. We can consider some examples such as [to]=o=ga (‘ten=NOM’ (Uwano 2012:1420)).

(62-1) Kyoto Japanese pitch accent (Uwano 2012:1420)

a. initial-high

<table>
<thead>
<tr>
<th>Example</th>
<th>Tone</th>
<th>+ particle</th>
<th>Tone</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[to]:</td>
<td>[H][H]</td>
<td>[to(ː)=ga]</td>
<td>[H][H]</td>
<td>‘door(=NOM)’</td>
</tr>
<tr>
<td>[ha]:</td>
<td>[H][H]</td>
<td>[ha(ː)=ga]</td>
<td>[H][H]</td>
<td>‘leaf(=NOM)’</td>
</tr>
<tr>
<td>[kaze]</td>
<td>[H][H]</td>
<td>[kaze=ga]</td>
<td>[H][H]</td>
<td>‘wind(=NOM)’</td>
</tr>
<tr>
<td>[o]to</td>
<td>[H][L]</td>
<td>[o]to=ga</td>
<td>[H][L]</td>
<td>‘sound(=NOM)’</td>
</tr>
</tbody>
</table>

b. initial-low

<table>
<thead>
<tr>
<th>Example</th>
<th>Tone</th>
<th>+ particle</th>
<th>Tone</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>tef:</td>
<td>[L][H]</td>
<td>[te(ː)=ga]</td>
<td>[L][H]</td>
<td>‘hand(=NOM)’</td>
</tr>
<tr>
<td>hu[ne]</td>
<td>[L][H]</td>
<td>[hun[=ga]</td>
<td>[L][H]</td>
<td>‘ship(=NOM)’</td>
</tr>
</tbody>
</table>
this type of feet are definable in Irabu Ryukyuan due to alternating pattern of tonemic features where bimoraic or trimoraic sequences of high or low tones is realised in an iterative manner.

In Tokyo Japanese, however, this type of tone-dependent exhaustive footing will be impossible as such alternation of phonological features is absent in this language. In some previous studies on Tokyo Japanese feet, moreover, the notion of feet has basically been argued within the traditional view of feet, where head is supposed to be an essential element. While numerous Japanese foot studies have been published from the position in favour of head structure of feet, the notion of head structure have provided some problems since the binary structure made up with iteration of heads and non-heads is hardly seen in Japanese prosody.

### 4.3 Lowering kernel shift in syllables

Through the preceding subsections we have investigated the interaction between lowering kernel and metrical strength with respect to phonetical reality in Japanese (particularly in Tokyo Japanese). As we have already seen, however, previous studies have commonly shown the fact that there is no obvious interaction between lowering kernel and phonological saliency in Japanese, despite some affinity to alternating melody pattern having been reported within Japonic languages (such as Irabu Ryukyuan: see subsection 4.2 in this section); therefore, as to this topic I conclude that there is no crucial evidence to interpret lowering kernels as metrical heads.

Although there has been no positive evidence found heretofore, we will carry on our investigation on the hypothesised relationship between lowering kernel and metrical headedness in the following. Here, I will introduce some arguments on Japanese metrical heading with the notion of lowering kernel placement, whose result will not be favourable for the trochaic foot structure in Japanese.

It should be noted first that the position of lowering kernel may move within a heavy syllable, as Hayata (1999) pointed out. While Inaba (2005)’s proposal demands lowering kernel to be fixed on the first mora of a heavy syllable since it is supposedly indicating the trochaic head of a foot. On the other hand, Hayata (1999:14) claims that there is no semantic difference between shifted and non-shifted lowering kernels and both options are possible in natural
speech: such as o\(\hat{N}d\)o H\(\hat{L}\)L ‘temparature’, which may also be pronounced as o\(\hat{N}d\)o HH\(\hat{L}\)L. Native speakers of Japanese would perceive an explicit lowering tone in the first syllable in the former case, whereas only a level-high tone would be perceived in the latter representation. A brief description of lowering kernel movement is given in (43) below:

(43) Shifted vs. non-shifted lowering kernels

<table>
<thead>
<tr>
<th>Prosodic structure</th>
<th>Non-shifted</th>
<th>Shifted</th>
</tr>
</thead>
<tbody>
<tr>
<td>((\mu))(\mu)(...</td>
<td>((\mu))(\mu)(...</td>
<td></td>
</tr>
<tr>
<td>Tonal representation</td>
<td>H(L)</td>
<td>H(H)</td>
</tr>
</tbody>
</table>

It seems that the occurrence of shifted lowering kernel is controlled by several different variables: such as speech rate, sociolinguistic register, generation, gender, birthplace and others. Hayata (1999:203) posits that shifted lowering kernels may be tolerated in some compound boundaries as well: for example, we can consider aioi ‘Aioi (place name)’, which may be compounded as aioi\(-s\)i ‘Aioi City’. While non-shifted tonal representation (aioi\(-ji\)-s\)i) is expected in this case, he claims that both forms are possible. According to his observation in general, the tighter compound elements are connected with each other, the more they prefer non-shifted lowering kernel. This issue will be treated in detail in the following.

Fujikawa (2013)’s main argument on lowering kernel movement was that the position of lowering kernel in heavy syllables may move within a heavy syllable, and that syllable boundary may be defined by measuring the possible maximum of its moving range. Fujikawa (2013) reports that there is ideolectal inconsistency of lowering kernel position in heavy syllables, which has been found even amongst professional announcers in the public broadcaster in Japan (NHK), who are expected to be ideal speakers of Tokyo Japanese.

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63 This fact does not conflict with the traditional view of Japanese lexical accentuation system to be mora-counting and syllable-based (McCawley 1968:134). McCawley (1968) states that there is no word-level contrast between kernelled first mora and kernelled second mora within a heavy syllable, while it is simultaneously claimed there that only the first mora of a long syllable may be kernelled.

Considering previous studies, it seems to be true that there is basically no lexical discrimination caused by the difference in lowering kernel position within a syllable.

64 Note that some earlier studies such as Uwano (1984) have already pointed out the possibility of lowering kernels placed on special morae (e.g. ito\(\hat{o}\)-eki ~ itoo\(\hat{e}\)-eki ‘Ito station’, komekui\(-ji\)-mus\(\hat{i}\) ~ komeku\(\hat{e}\)ui\(-ji\)-mus\(\hat{i}\) ‘rice bug’ etc.). The idea of lowering kernel movement itself is nota recent one, while it has been traditionally presumed that the first mora of a heavy syllable may have a lowering kernel.
Fujikawa (2013) collected 21 utterance data from two different news articles, which were uttered by two different NHK announcers respectively. There he coded both as F1 (female announcer) and M1 (male announcer). I present his research data in (44), from which he yielded result. Each of kernelled heavy syllable extracted from their announcements is classified into [+shift] or [-shift] according to the presence of kernel shift in author’s perception. The + and - signs next to data numbers in (44) stand for [+shift] and [-shift] respectively. He takes also f0 contours into account in his study, while he questions if the perception of shifted or non-shifted lowering kernels is consistently correspondent with the shape of f0 contours.

(44) Data for lowering kernel shift (Fujikawa 2013)

a. F1’s announcement (8 data in total)

No.65 Example / Gloss

1+ kooʃya=no
  school building=GEN
  ‘of the school building’

2+ kyuuzyu hati-mai
  ninety eight-sheet
  ‘ninety-eight sheets’

3+ syokuinʃi=no
  staff room=GEN
  ‘of the teachers’ room’

4+ waruɾu-water
  shatter-as if
  ‘as if it would shatter’

5+ kINʃyɔ=no hito=wa
  neighborhood=GEN person=TOP
  ‘the neighbors’

6+ keŋzoo=bu tu
  building

---

65 Numbering is based on Fujikawa (2013)’s data number.
‘building’

7- \textit{sojosa si-te i-masu}

\begin{tabular}{lll}
\text{investigation} & \text{do.REN’YOOKEE-CONN} & \text{be.REN’YOOKEE-POL} \\
\end{tabular}

\text{‘(the police) are investigating’}

8- \textit{koojya=no}

\begin{tabular}{ll}
\text{school building=GEN} \\
\text{‘of the school building’} \\
\end{tabular}

b. M1’s announcement (13 data in total)

\begin{tabular}{ll}
\text{No.} & \text{Example / Gloss} \\
1+ & \textit{seenN-syoojokoo-ra}=ga \\
& \text{young person-military officer-PL=NOM} \\
& \text{‘young military officers’} \\
2- & \textit{seNkyo si} \\
& \text{occupation do.REN’YOOKEE} \\
& \text{‘(they) occupied and’} \\
3+ & \textit{seeJhu yooziN-ra}=o \\
& \text{government important person-PL=ACC} \\
& \text{‘leading figures in the government’} \\
4+ & \textit{syuugeki-geNba=ni} \\
& \text{attack-site=LOC} \\
& \text{‘at the attack site’} \\
5- & \textit{syoojra=N=o} \\
& \text{testimony=ACC} \\
& \text{‘the testimony’} \\
6- & \textit{tejepu=ga} \\
& \text{(audio) tape=NOM} \\
& \text{‘the (audio) tape’} \\
7- & \textit{seenN-syokoo-ra}=ga \\
& \text{young person-military officer-PL=NOM} \\
& \text{‘young military officers’} \\
8- & \textit{seNkyo si} \\
\end{tabular}
Fujikawa (2013) claims his research has attained following result: F1’s announcement data have tendencially greater frequency of shifted lowering kernel (seven samples out of eight: all data other than the data 7), whereas M1 has given relatively fewer shifted patterns in ratio (6 samples out of 13: data 1, 3, 4, 9, 11, 13).

The most interesting fact which the results of M1 suggest is that there may be inconsistent lowering kernel placement for the same word even within a single speech made by a single speaker. For example, the word *seenen*-syoo]koo ‘young military officer’ in data 1 (see (44b)) is pronounced with a shifted lowering kernel while the same word in data 7 (*seenen*-syoo]koo: see (44b)) has the non-shifted pattern. It is obvious, considering the entire data and previous researches, that the difference in lowering kernel position within a heavy syllable has only a minimal role for lexical distinction, which may be a reason why the kernel shift within a syllable is permitted.
Moreover, Fujikawa (2013)’s suggestion for lowering kernel movement may also be useful to distinguish hiatus from heavy syllables, which is possibly a favourable fact for Japanese syllables, whose phonological role has been suspected by some researchers (such as Labrune 2012ab). Bracketed syllable with a right square bracket in the column Syllable in (45) indicate that lowering kernel will be placed somewhere within round brackets, tolerating the syllable-medial pattern or the syllable-final one. An apostrophe in some data depicts a syllable boundary, which will block kernel movement according to Fujikawa (2013). His principles for lowering kernel movement can be summed up like in (46):

(45) Kernel shift and syllable boundaries (based on Hayata 1999 and Fujikawa 2013)

<table>
<thead>
<tr>
<th>Example</th>
<th>Syllable</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>oNdo ~ on/do</td>
<td>(oN)σ(do)σ</td>
<td>‘temperature’</td>
</tr>
<tr>
<td>syo/koo ~ syoo/koo</td>
<td>(syo)σ(koo)σ</td>
<td>‘military’</td>
</tr>
<tr>
<td>kyu/zyuu ~ kyuu/zyuu</td>
<td>(kyuu)σ(zyuu)σ</td>
<td>‘ninety’</td>
</tr>
</tbody>
</table>
| wasi/
| toN | (wa)σ(siN)σ(toN)σ | ‘Washington’ |
| tye/N-teN ~ tyeN-teN ~ tyeen/-teN | (tyeN)σ(teN)σ | ‘chain store’ |
| *wa'/iN-teN ~ wa'iN-teN ~ wa'iN/-teN | (wa)σ(iN)σ(teN)σ | ‘wine store’ |
| wai/-teN | (wai)σ(teN)σ | ‘store Y’ |
| wii/-eki ~ wiiN/-eki ~ wiiN/-eki | (wiiN)σ(e)σ(eki)σ | ‘Vienna station’ |
| ko/-oo ~ *ko’/-oo ~ *ko’/-oo | (ko)σ(oo)σ | ‘king of Hu’ |
| so/-oo ~ soo/-’oo ~ *soo’/-’oo ~ *soo’/-’oo | (soo)σ(’oo)σ | ‘King Zhuang’ |
| ko/-’oo ~ koo/-’oo ~ *koo’/’oo | (koo)σ(’oo)σ | ‘like and dislike’ |
| e/e/-eki ~ ee/-’eki | (ee)σ(’eki)σ | ‘station A’ |
| *e’i/-eki ~ e’i/-eki | (e)σ(i)σ(eki)σ | ‘Ei station’ |

(46) Lowering kernel movement (Fujikawa 2013)

a. Lowering kernels may move within a syllable when the syllable contains more than one mora. They never cross over hiatus boundaries.

b. The maximal extent of lowering kernel movement coincides syllable boundary.
From the data given above we can see certain difference in kernel placement between the identical segmental concatenations. For example, despite the identical segmental structure in *ko]-'oo and *ko]o'o, lowering kernels never cross over syllable border depicted with apostrophes, keeping hiatus intact.

A further interesting fact is that Japanese word-level phonology will generally rule out superheavy (trimoraic) syllables whose nuclei are diphthongs. Here, we can contrast some words presented above: while lowering kernels in *tyee[N-ten and *wii[N-eki may move toward the final special mora /N/ (tyee[N-ten ~ tyeeN]-ten, wii[N-eki ~ wiiN]-eki), lowering kernel in *wai[N-ten is not allowed to be shifted to the initial mora (*wai[N-ten). This suggests the effect of syllable boundary within the vowel sequence /ai/. This combination does not make up a diphthong despite general expectation, constructing a hiatus structure instead.

While superheavy syllables are tendencially avoided (Trimoraic Syllable Ban: Mayers 1987, Kuwamoto 1998), it seems Japanese has no absolute ban on superheavy structure (see below and (47)). There have been a certain number of prior discussions on the presence of superheavy syllables in Japanese (Tateishi 1994, Kubozono 1994b, 1995, Kuwamoto 1998 and others). This constraction have traditionally been regarded as rather marked structures, hardly attested in earlier Japanese phonology (Kubozono 1994). Words which contain superheavy syllables are usually found in the foreign lexical stratum.

While this thesis is clearly in favour of superheavy syllables, as well as being an advocate for the notion of syllable in Japanese, some researchers (such as Kubozono 1994) have claimed that superheavy moraic status of a syllable is subject to some repair strategies (vowel shortening in particular) in order to avoid a marked structure. Despite certain tendency of vowel shortening, however, it should be noted that the effect of vowel shortening in superheavy syllable is not obligatory. We can immediately find some examples of optionality in the shortening process, as shown in (47) and (48):

(47) Optional superheavy syllable avoidance

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66 This fact should not be construed that there is no heavy syllable whose nuclear is diphthong (see Uwano 1984). Along with plenty of data given before, we can consider the possibility of kernel shift in waii-teN ~ waii-teN *store Y* in (45): this data obviously demonstrates the presence of diphthong distinguished from hiatus in terms of phonology.
So far, we have seen that lowering kernel may move within a syllable and may indicate hiatus boundary in some cases. This fact suggests some active roles of syllable in Japanese, which controls the breadth of lowering kernel movement, and which is phonologically distinguished from hiatus.

The possible lowering kernel movement, however, leads us to a question why a lowering kernel may move onto (in other words, why high tone on the kernelled mora may assimilate) the following special mora, which should establish non-head of a trochaic foot. Following

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67 This form is supposed to be dated in contemporary use of Japanese. In Contemporal Japanese, speakers will mainly use *aisu-kuriimu* instead.

68 It should be noted, however, that lowering kernel movement is not always possible within a syllable. There are a handful of special words where their lowering kernels appear to be fixed on certain morae: as an example I will give the word *wii* ‘onomatopoeic imitation for a movement of mechanical joints’. This word apparently does not permit any lowering kernel movement, being fixed on the final mora (e.g. *wii*=*to ugo*ku ‘move with a mechanical sound’), creating a trimoraic high tone sequence (HHH) in a single syllable. While onomatopoeic vocabulary should be treated separately from lexical words, interestingly, the principle of syllable boundary may also be applied to non-lexical words. Lowering kernel in the onomatopoeic *wii* given above is suggesting the presence of syllable boundary on */N/ and monosyllabicity of itself.

Onomatopoeic words with final superheavy syllables (e.g. *bataan/ and *gataan/: both are imitation of colliding sound) generally have fixed lowering kernels on their final morae, which presumably is due to less lexicalisation and more affinity to the original sound. On the other hand, more lexicalised varieties with
Inaba (2005)’s proposal on feet in Japanese, who states that “the left mora is strong and the right one is weak” (Inaba 2005:78) in a tentative bimoraic trochaic foot, there should be clear distinction between both strength registers. However, that distinction is suspicious, as the possibility of kernel movement has shown. There should be explanation why an accented mora may assimilate unaccented one despite the non-assimilative nature of stress.

4.4 Lowering kernel shift and compound words

Through the preceding discussion we have collected some evidence that lowering kernel in Japanese (Tokyo Japanese in particular) should not be treated as equivalent to trochaic heads of feet, though some regional varieties of Japanese show certain preference to foot-like bimoraic structure in some cases: such as Kyoto Japanese and Irabu Ryukyuan, as addressed in common in subsection 4.2 in this chapter.

Generally speaking, previous studies have not paid great attention to lowering kernel movement while this phenomenon seems acoustically obvious in natural speech, as some prior researches (e.g. Uwano 1984, Hayata 1999) had pointed out before Fujikawa (2013) recently did.

In this subsection, we will re-investigate what triggers lowering kernel movement. Here, we should consider the statement of Hayata (1999) that some compound elements may cause lowering kernel to be shifted rightwards (e.g. aioi ‘Aioi (place name)’ > aioi]-si ‘Aioi City’) instead of being kept in the middle of a heavy syllable (aioi]-si). He claims that there are two different categories of compound words in Japanese in terms of N1 kernel deletion: the former class changes the accentual feature of the first compound element into non-kernelled. While almost all of compound words treated in this thesis belong to the first group, accentuation pattern of the first element is kept intact in the second type compounds. Both of different types of compound are listed in (49) and (50).

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final heavy syllables may undergo lowering kernel movement (e.g. bata[N ~ bataN] and gata[N ~ gataN]: these varieties imply less acoustic emphasis than the longer forms above). While the degree of lexicalisation may also play a role in lowering kernel movement, we will not discuss it in this thesis.

69 N1-final lowering kernel (such as in kyo[oto ‘Kyoto’ + si] ‘city’ > kyooto]-si ‘Kyoto City’: see (50) in this chapter) in a compound word may be treated as N1 kernel deletion in a broader sense, interpreting N1-final kernel as N2-preinitial (on the zeroth syllable). Construing the N1-final kernel as an N2 kernel, we can achieve a simple generalisation for regular compounding: in this process, every N1 kernel is deleted.
(49)  **N1 Kernel-deleting compounds**

<table>
<thead>
<tr>
<th>Example</th>
<th>Compound</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ky</td>
<td>oto</td>
<td>kyo</td>
</tr>
<tr>
<td>si</td>
<td>mazu</td>
<td>simazu]-si</td>
</tr>
<tr>
<td>ze</td>
<td>emu</td>
<td>zemu-syo</td>
</tr>
<tr>
<td>do</td>
<td>itu</td>
<td>doitu-go</td>
</tr>
<tr>
<td>kam</td>
<td>ina]ri</td>
<td>kaminari-gu]mo</td>
</tr>
<tr>
<td>mi[nsyu</td>
<td>miNsyu-too</td>
<td>‘democracy, Democratic Party of Japan’</td>
</tr>
<tr>
<td>se</td>
<td>nsyu</td>
<td>seNsyu-mura</td>
</tr>
<tr>
<td>ne]ko</td>
<td>neko-da]masi</td>
<td>‘cat, cat trick (a sumo technique)’</td>
</tr>
</tbody>
</table>

(50)  **N1 Kernel-preserving compounds**

<table>
<thead>
<tr>
<th>Example</th>
<th>Compound</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>toku</td>
<td>gawa</td>
<td>toku</td>
</tr>
<tr>
<td>yamada</td>
<td>yamada]-ra</td>
<td>‘Yamada (family name), Yamada and others’</td>
</tr>
<tr>
<td>sa</td>
<td>too</td>
<td>sa</td>
</tr>
<tr>
<td>sa</td>
<td>too</td>
<td>sa</td>
</tr>
</tbody>
</table>

In the category of (49), it is traditionally claimed that lowering kernel on the N1-final position moves leftward if the first element ends with a heavy syllable (see (51) below), which shows some parallel to the regular foreign accentuation in Japanese whose antepenultimate regular lowering kernel is moved leftward if the antepenultimate mora is special (see (13) in chapter 4). This appears to be a natural consequence as Japanese word prosody tends to avoid lowering kernel on a special mora, although they are even tolerated in certain cases rather than strictly prohibited (see Hayata 1999, Fujikawa 2013).

(51)  **Short N2 morpheme and N1 lowering kernel**

a.  **N1-final lowering kernel: light syllable on the N1-final position**

\(^{70}\) Compare with tokugawa]-si ‘Tokugawa City, Tokugawa Clan’, where the difference in kernel position is involved in lexical interpretation.
bizyutu]-bu ‘painting club’, kagaku]-bu ‘chemistry club’, syoogi]-bu ‘chess club’, rakurosu]-bu ‘lacrosse club’

b. non-N1-final lowering kernel: heavy syllable on the N1-final position
gassyojo]-bu ‘chorus club’, sadojo]-bu ‘tea ceremony club’, suiefe]-bu
‘swimming club’, tooro]/N-bu ‘discussion club’

Hayata (1999) claims that non-N1-final lowering kernel will be less obligatory if the second element is semantically independent from the first one. In his research, he gives four homophonic final elements: 氏 -si ‘Mr. / Ms.’, 市 -si ‘city’, 史 -si ‘history’ and 紙 -si ‘paper’. The first morpheme -si ‘Mr. / Ms.’ shows a striking difference from the others since it preserves accentuation pattern of the first element intact, also showing the greatest tolerance to lowering kernel on a special mora (e.g. sa-too]-si ‘Mr. / Ms. Sato’). According to Hayata (1999)’s claim, this category of compound element has the strongest power of independence, assuming that the degree of semantic independence is involved in the acceptability of kernel shift. Detailed data is presented in (52) and (53):

(52) Independence graduation (Hayata 1999)
a. independence power
   -si ‘Mr. / Ms.’ > -si ‘city’ > -si ‘history’ > -si ‘paper’

b. tolerance to special mora falling kernels
   -si ‘Mr. / Ms.’ > -si ‘city’ > -si ‘history’ > -si ‘paper’

(53) Lowering kernels on special morae (Hayata 1999)71
a. -si ‘Mr. / Ms.’

<table>
<thead>
<tr>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>itoo]-si</td>
<td>‘Mr. Ito’</td>
</tr>
<tr>
<td>kondoo]-si</td>
<td>‘Mr. Kondo’</td>
</tr>
</tbody>
</table>

b. -si ‘city’

<table>
<thead>
<tr>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
</table>

71 We should be careful in treating his data since they are primarily based on his ideolectal examination as a native speaker of Japanese. I do not evaluate the validity of his self-examination in this thesis.
While we will not make any attempt to evaluate the validity of Hayata (1999)’s independency theory in this thesis, the data given in (53) are commonly suggesting that lowering kernels on special morae are not overall disfavoured, being even more acceptable than syllable-middle kernel in certain cases (see (53a)). While other researches such as Fujikawa (2013) emphasised random occurrence of delayed lowering kernels, there might be some rules in which the kernel delay may be expected.

To summarise the entire discussion in this section, against the traditional belief about Tokyo Japanese pitch accent system, which was supposed to be generally avoiding lowering kernel to be placed on a special mora (McCawley 1968, Kibe 1984, Inaba 2005), the process of kernel assignment does not strictly rule out lowering kernel to be placed there (Uwano 1984, Hayata 1999, Fujikawa 2013)\textsuperscript{73}.

\textsuperscript{72} \textit{Ito}o\-si is a possible alternative form (Uwano 1984).

\textsuperscript{73} While the issues on pitch accent in Tokyo Japanese have almost exhaustively studied since last century, there seems no detailed knowledge on lowering kernels placed on special morae: influences from external conditions such as birth place or age group are possible but unknown. Especially, those from the first language would be an interesting research question, as there are a great number of non-native speakers of Tokyo Japanese from various districts in Japan. They will speak Tokyo Japanese with certain influence from their home dialects.
As seen before, some recent studies have been attempting exhaustive parsing into feet in Japanese using the traditional view of pitch accent and alternating feet, analogising lowering kernels to heads of feet. However, the facts I have presented throughout this section give some further questions on such analogy. In contrast to some Japonic languages (e.g. Irabu Ryukyuan: see Shimoji 2009), which demonstrate certain prosodic natures in favour of exhaustive foot structure such as alternating tone and minimal word constraint, Tokyo Japanese appears to lack any of them. Moreover, the tendency to tonal assimilation within a syllable in Tokyo Japanese pitch accent is seemingly showing less affinity to stress, which generally does not assimilate unstressed adjacent elements. With respect to assimilating power onto surroundings as well, it seems difficult to interprète lowering kernels as equivalent to stressed morae, and as heads of bimoraic trochaic feet.

5 Multiple default accentuation

The second question to the argumentation of Inaba (2005) is if accentuation patterns presented by him is an absolute default (see subsection 5.1). Since the classical study of McCawley (1968), known as basic literature on default accentuation in Japanese, previous studies have generally supported uniform default pattern of pitch accent. If prosodic word in general could be regularly footed in accordance with Inaba (2005)’s suggestion, this fact could be powerful evidence of exhaustive feet in Japanese.

On the contrary to traditional understanding, however, this thesis will attempt to find some further default accentuation patterns. If some new patterns are discovered, the parsing theory of Inaba (2005) will be less convincing for exhaustive foot structure of a prosodic word in Japanese. As an example of new defaults, we could consider -ingu foreign words (see 5.2 and Giriko 2010) again, which is known as being frequently non-kernelled.

While confirming the possibility of new default accentuation patterns, next subsection will tackle the question about what would cause non-kernelled defaults (see subsection 5.3). It should be carefully examined, of course, if the thereafter proposed default patterns are true.

As Shibata (1962) pointed out, for example, there are some dialects in Japanese whose tonal unit is syllables rather than morae (シラビーム方言 sirabiimu-hojagen ‘syllabeme dialect’: see footnote 6). In Kagoshima Japanese, for example, a high level tone will last within an entire syllable, without putting lowering kernels on the intermediate position of a syllable (i.e. HH] instead of *H[J[L]). Non-native speakers of Tokyo Japanese from such dialect areas might have greater tendency to use syllable-final lowering kernels.
default accentuation patterns. There is certain possibility of my proposals not being true defaults due to some external effects; such as that of pseudo-compound.

Paying great attention to this point, this thesis nonetheless will conclude that, for example, -iNGu foreign words could be considered as having a new default pattern of pitch accent, without interpreting the trimoraic ending -iNGu as a kernel-deleting second element of a pseudo-compound. The reason for this will be given in subsection 5.3. Along with the aforementioned case, there is further possibility of more various default patterns in foreign word accentuation: this question will be treated in section 6.

In subsection 5.4, subsequently, we will conduct more precise investigations on the word group of foreign words with ending -iNGu. It should be noted again that these words may be kernelled in certain cases, while they have otherwise non-kernelled default pattern (Giriko 2010 and others: see subsection 1.7 in this chapter). This argument will be concluded that we should pay attention to some conditions latently involved in defining default patterns: such as semantic category and word length.

The entire discussions in this section will suggest some reconsideration for the exhaustive footing theory of Inaba (2005). While his foot-based default accentuation rules will reportedly enable foot structure to be visible, we have some further patterns of default accentuation which do not obey his foot-based default accentuation rules.

5.1 Traditional default accentuation

In subsection 4.1 in this chapter, I made two questions about the foot-based regular accentuation theory proposed by Inaba (2005). The first one, if a kernelled mora is metrically strong and it is therefore construed as head of a foot, was concluded negatively in the preceding discussion above: there I pointed out some shortcomings such as the absence of alternating rhythm pattern and the possibility of lowering kernel movement within a syllable.

By discarding presumed relationship between metrical strength and pitch accent in Japanese, moreover, we can avoid to use the notion of degenerate feet, which should be highly marked structure especially in the languages where there is no stress effect in lexical level: such as Japanese.
The second question, which will be discussed in this section, is if there are further patterns of default accentuation in Japanese. From a traditional viewpoint, the most famous default accentuation rule in Japanese is known as antepenultimate rule, first proposed by McCawley (1968) (see (13) in this chapter). Subsequent studies on default accentuation in Japanese (such as Kubozono 1996, Inaba 2005, Shirase 2014) have generally agreed with McCawley (1968)’s suggestion. The recent proposal of Inaba (2005) is essentially a theoretical improvement of traditional default accentuation rules.

If traditionally known default accentuation patterns are reflecting usually invisible exhaustive foot structure in this language, we could investigate whether there would be further default patterns in which presumed foot structure is less relevant. We will develop our discussion from this point of view, questioning the possibility of exhaustive footing proposed by Inaba (2005). Although the behaviour of default accentuation in Japanese has been well investigated, there has been apparently no comprehensive discussion about whether further default patterns are available which conventional accentuation rules do not expect.

In this section, we focus on prosodic structure of foreign words and compound words again. As we have seen before, McCawley (1968)’s default accentuation rules and subsequent proposals have enabled us to predict the default position of lowering kernels to some extent; however, they have generally ignored some important factors such as phonological or morphological structure of words. Those conditions may cause some further default patterns which are faithful neither to traditional antepenultimate rule nor to more recent alternatives (see Inaba 2005 and others).

5.2 Why -ing foreign words are frequently non-kernelled

Here, we go back to the study of Giriko (2010) again, which we have already discussed in subsection 1.7 in this chapter. His approach will provide us a good account for our question about multiple defaults in terms of pitch accent. He claims that some Japanese foreign words with certain endings (especially with -ing) are tendentially non-kernelled, although foreign words have traditionally been said to be tendentially kernelled (Akinaga 1995, Kubozono 1996, 2006, 2008, Sakamoto 2005). Kubozono (1996) summarises the condition where non-kernelled foreign words will emerge, as given in (54):
(54) Conditions for non-kernelled foreign word (Kubozono 1996)
    a. The word is quadrimoraic.
    b. The rightmost mora is light.
    c. The rightmost mora is not epenthetic.

As typical examples for non-kernelled foreign words, we can consider some data such as "itaria ‘Italy’, macaroni ‘macaroni’, atorie ‘atelier’, sutereo ‘stereo’, which satisfies all of these conditions. According to Kubozono (1996)’s report, if foreign words satisfy all of these conditions, they are non-kernelled with a probability of 90%. Therefore, it has been traditionally believed that foreign words which do not satisfy those non-kernel conditions are basically kernelled, obeying traditional default accentuation patterns.

However, it seems that previous researches have left following problem unsolved: one would wonder why certain types of foreign words are tendentially non-kernelled despite their unfaithfulness to aforesaid non-kernel condition. For example, every foreign word with ending -ingu violates the clause (54c) since the rightmost mora contains an epenthetic /u/ (ING > INgu: epenthetic vowel is emphasised with bold font). This problem is the main issue of Giriko (2010)’s investigation. He assumes that foreign words with ending -ingu have so-called pseudo-compound structure which may trigger the unpredictable non-kernelled pattern.

Cross-linguistically, it seems there is common tendency that simplex words are not always perceived simplex. In some cases, for example, words can be parsed into several prosodic (or morphological) pseudo-words with imaginary partitions which do not actually exist. As Hayes (1995) points out, English native speakers tend to interpret English word gobbledy|gook, where the pipe | depicts psychological partition point, as if this word were composed of two morphemes (and prosodic words) despite its essentially monomorphemic structure.

Here, I will give further data for pseudo-compound effect in some languages from different origins: the data presented in (55) are based on Giriko (2010) and his references. In Malagasy, noun reduplication demonstrates pseudo-compound structure for loan words, whose initial two syllables are reduplicated like in true compound words, whereas main-stressed syllable and subsequent one are reduplicated in true simplex words (Martin 2005: see (55a)).
Finnish, the rule of stress placement is closely tied up with syllable structure: the quantity-sensitive secondary stress is placed on the heavy syllable in a non-initial foot (Karvonen 2005: see (55b)). If the suffixation process creates a heavy syllable in a simplex word (e.g. *ka.le.va.la* ‘Kalevala’ > *ka.le.va.las.sa* ‘Kalevala.INESS’: periods denotes syllable boundaries), the secondary stress is assigned on the CVC unit. On the other hand, compound words do not undergo such stress change since the first syllable of every compound element should be stressed (Karvonen 2005). In (55b), interestingly, loan words show an identical behavior to compound words concerning the secondary stress placement.

(55) Pseudo-compounds in loan words (Giriko 2010, Martin 2005, Karvonen 2005)

a. Malagasy

<table>
<thead>
<tr>
<th>Example</th>
<th>Reduplicated</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>simplex word</td>
<td><em>manaˈdala</em></td>
<td><em>mana,dalaˈdala</em></td>
</tr>
<tr>
<td>compound word</td>
<td><em>vavaˈ fu</em></td>
<td><em>vava,vavaˈ f u</em></td>
</tr>
<tr>
<td>loan word</td>
<td><em>sokoˈ la</em></td>
<td><em>soko,sokoˈ la</em></td>
</tr>
</tbody>
</table>

b. Finnish

<table>
<thead>
<tr>
<th>Example</th>
<th>+ Inessive -ssa</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>simplex word</td>
<td><em>ˈka.le.ˌva.la</em></td>
<td><em>ˈka.le.va.ˌlas.sa</em></td>
</tr>
<tr>
<td>compound word</td>
<td><em>ˈsa.la.ˌsa.na</em></td>
<td><em>ˈsa.la.ˌsa.nas.sa</em></td>
</tr>
<tr>
<td>loan word</td>
<td><em>ˈa.la.ˌba.ma</em></td>
<td><em>ˈa.la.ˌba.mas.sa</em></td>
</tr>
</tbody>
</table>

In Japanese, I would give a similar constructuion in the word *zakkubaran* ‘informally’, which does not appear to be dimorphemic, but which tends to be pronounced in isolation as if it would consist of two prosodic words. If foreign words with ending -*iNgu* may be interpreted as phonologically compound words with deaccenting second element, we do not need to regard this as a new default pattern for foreign word accentuation.

However, if these words demonstrate no evidence for having a compound-like structure, we should propose a new default accentuation pattern for the simplex foreign word group which end with prefix -*iNgu*. 

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5.3 Non-kernel conditions

It should be noted first that Giriko (2010) does not claim that all foreign words with final -iNGu (henceforth -iNGu words) are non-kernelled. According to his statement, there are certain conditions which render -iNGu words non-kernelled (see subsection 3.3 in chapter 3). His research concludes that at least two variables have crucial roles for the occurrence of non-kernelled pattern: phonological length and semantic category. The condition where -iNGu words prefer non-kernelled pattern is summarised like in (56):

(56) Non-kernelled -iNGu words (Giriko 2010)
   a. The words are quinquemoraic or sexamoraic.
   b. The words have verbal meaning.

Giriko (2010) posits that non-kernelled -iNGu words are pseudo-compounds with deaccenting second element due to their unfaithful behaviour to the conventional default accentuation pattern. Hereafter, the non-verbal -iNGu words, which are generally kernelled, are not discussed in detail. We will stay focused on verbal -iNGu words that are non-kernelled in certain condition.

Here, I will address Uwano (1999)’s statement on foreign word accentuation again: foreign words with five or more morae are treated as compounds since their original accentual patterns are preserved in compound formation, whereas original lowering kernel position of the second element may be lost if its length is less than five morae (see subsection 3.3 in chapter 3). Furthermore, Uwano (1999) claims that the accentuation pattern of a compound word is preserved if the compound word in question is incorporated in a larger compound structure (e.g. tai-go ‘Thai language’ > zyookyuu-tai-go ‘basic Thai language’, haril-si ‘acupuncturist’ > onna-haril-si ‘female acupuncturist’: see subsection 3.3 in chapter 3). In terms of relationship between accentuation and the second element of a compound word, previous studies have presented numerous second elements of compound or pseudo-compound words which produce non-kernelled outputs (Giriko 2010, Kubozono 2011: see 57 and 58 below).
(57) Deaccenting morphemes (Giriko 2010, Kubozono 2011)

a. native

<table>
<thead>
<tr>
<th>Example / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>iro</em> ‘color’</td>
<td><em>orenzi-iro</em> ‘orange colour’</td>
</tr>
<tr>
<td><em>yama</em> ‘mountain’</td>
<td><em>asama-yama</em> ‘Mt. Asama’</td>
</tr>
<tr>
<td><em>mura</em> ‘village’</td>
<td><em>tookai-mura</em> ‘Tokai Village’</td>
</tr>
<tr>
<td><em>kar</em>ri ‘hunting’</td>
<td><em>kinoko-gari</em> ‘mushroom hunting’</td>
</tr>
<tr>
<td><em>huki</em> ‘roofing’</td>
<td><em>kawara-buki</em> ‘tile roofing’</td>
</tr>
<tr>
<td><em>ori</em> ‘folding’</td>
<td><em>tudura-ori</em> ‘hairpin turn (lit. vine-folding)’</td>
</tr>
</tbody>
</table>

b. Sino-Japanese

<table>
<thead>
<tr>
<th>Example / Gloss</th>
<th>Compound / Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>go</em> ‘language’</td>
<td><em>perusya-go</em> ‘Persian language’</td>
</tr>
<tr>
<td><em>to</em>lo ‘party’</td>
<td><em>miNSyu-too</em> ‘Democratic Party’</td>
</tr>
<tr>
<td><em>ta</em>li ‘team’</td>
<td><em>tankeN-tai</em> ‘expedition team’</td>
</tr>
<tr>
<td><em>ka</em>J24 ‘expert’</td>
<td><em>sakkyoku-ka</em> ‘componist’</td>
</tr>
<tr>
<td><em>si</em>ki ‘method’</td>
<td><em>dooria-siki</em> ‘Doric order’</td>
</tr>
</tbody>
</table>

(58) Deaccenting pseudo-morphemes (Kubozono 2011)

a. *-ia*25

o*setia* ‘Osetia’, *itaria* ‘Italy’, *girisia* ‘Greece’, *dooria* ‘Doria’, ka*Nbozia

‘Cambodia’, *karedonia* ‘Caledonia’, *assiria* ‘Assirya’, *ruumania* ‘Romania’,

*kariforunia* ‘California’

24 Although Kubozono (2010) states that this morpheme is kernelled, it does not seem obvious whether it is kernelled since Japanese native speakers seldom use it in isolation, mainly using it in compound words instead: such as *gheezyutu-ka* ‘artist’, *seezi-ka* ‘politician’, *hatumeN-ka* ‘inventor’, *taNkeN-ka* ‘explorer’.

25 Non-kernelled outputs with this ending are apparently not preferred if entire words are very short or very long: for example, *keNnia* ‘Kenya’, *roNzia* ‘Russia’, *s*ifiNia ‘Syria’, *andaNrusia* ~ *andaNruNia* ‘Andalusia’ *fiNraNdia’ ‘Finlandia’, *bugesbiNria* ‘bougainvillea’.

In the case of longer words, pseudo-compound structure is visible. Sato (2002) concluded that participants in his experiment had tendency to divide longer foreign words (≤ 5 µ) into two sections near the middle of the word and the partition was frequently overlapping the position of lowering kernels (i.e. *koresute-roforu* ‘cholesterol’, *iruri-saNtatoru* ‘irrigator (ger. Irrigator)’, *kon-soNiosamNia* ‘consortium’: see (21) in chapter 3). This fact may be parallel to conventional compound accentuation rules since compound words are tendentially kernelled on the first syllable of the second element (Akinaga 1985, Sato 2002:71).

Considering this parallelism, we can suppose that imaginary partition may function as pseudo-compound word boundary, and that lowering kernel indicates the boundary of partition.

However, Giriko (2010)’s conclusion that foreign words end with -ingu have pseudo-compound structure, interpreting the ending as a deaccenting morpheme, is apparently incorrect in several reasons. First, it is suspicious that there are deaccenting morphemes or pseudo-morphemes composed of three or more morae, as most of deaccenting factors are monomoraic or bimoraic (see (57) and (58)). There is a theory that the second element of a compound word should be classified into two (or three) types according to the difference in length and in preference to accentuation patterns of outputs (such as Sato 1989, Sato 2002): the three-way classification being given in (59). Final elements which deaccent the entire compound word or which assign lowering kernel on the final syllable of the prefinal element are only seen in the data in (59a). Some non-kernelled words in (59c) are produced as a result of preserving final elements’ accentuation patterns rather than their deaccenting effect.

Compound word classification according to the length of final elements

\begin{enumerate}
\item \(\mu \geq 2\) (deaccenting elements are present)
\begin{itemize}
\end{itemize}
\item \(3 \leq \mu \leq 4\) (no deaccenting element)
\begin{itemize}
\end{itemize}
\end{enumerate}

\textsuperscript{76} Here also, short outputs are tendentially kernelled (e.g. riN ‘lysine’, saN ‘sarin’, aN ‘amine’, miN ‘myosin’, tiN ‘thyrosine’, zuN ‘dulcin’, kazeN ‘casein’, kaF ‘caffeine’). Interestingly, long outputs with greater length than the data given in (58b) are also tendentially kernelled (e.g. saitoN ‘cytokinin’, anK ‘anthocyanin’, suK ‘streptomycin’).
c. \( \mu \geq 5 \) (N2 kernels preserved)

- **ekitai-anmonia** ‘liquid ammonia’,
- **densi-haamonika** ‘electric harmonika’,
- **minami-kariforunia** ‘southern California’,
- **bođii-ra]Ngeezi** ‘body language’,
- **hangaa-sutorajiki** ‘hunger strike’

Some apparently exceptional cases such as **korosi** ‘killing’ > **hito-gorosi** ‘murderer (lit. human-killing)’ or **tamari** ‘accumulation’ > **mizu-tamari** ‘pool (lit. water accumulation)’ would not be powerful evidence for trimoraic deaccenting elements, as these morphemes prefer kernelled patterns in regular combinations: such as **ko-go]rosi** ‘infanticide’, **titi-go]rosi** ‘patricide’, **onna-go]rosi** ‘ladykiller’, **kyooryuu-go]rosi** ‘dinasaur killing’, **urutora-go]rosi** ‘ultra killing’ as well as **hi-da]mari** ‘sunny spot’, **ti-da]mari** ‘blood pool’, **maguma-da]mari** ‘magma chamber’, **tikasui-da]mari** ‘groundwater concentration’, **urutora-da]mari** ‘ultra accumulation’. As long as the principle of compound accentuation in (59) is valid, it is not expected for ending -**ingu** to be a deaccenting (pseudo-)morpheme (\( \mu = 3 \): see (59b)).

Moreover, as the second problem of interpreting non-kernelled -**ingu** word as having undergone the influence of pseudo-compound effect, we should point out following fact. The words in this category tend to be kernelled in compounding: for example, **peįnįningu** ‘painting’ > **bođii-peįnįningu** ‘body painting’ (see also (19) in this chapter), which violates Uwano (1999)’s compound accentuation rule. According to Uwano (1999)’s generalisation, the compound word **bođii-peįnįningu** should be non-kernelled (*bođii-peįnįingu), supposing that the second component **peįnįingu** is a pseudo-compound with a deaccenting second element -**ingu**. The absence of kernel preservation suggests that this word category is equivalent neither to true compounds nor to virtual ones.

To solve these problems, it would be reasonable to hypothesise that there is a *non-kernelled default pattern* for quinquemoraic and sexamoraic -**ingu** words, supposing that they are no pseudo-compounds due to lack of evidence in accentuation.

### 5.4 A default pattern of pitch accent: -**ingu** words

Taking the discussion above into account, it would not be strange to suppose that there may be a variety of default patterns for foreign accentuation in general; moreover, for example, it is
widely known that quadrimoraic foreign words prefer some varied accentuation patterns, depending on their phonotactically natures (Kubozono 1996, Kubozono 2002, Sato 2002, Kubozono & Ogawa 2004, Inaba 2005 and others). Some data is given in (60) and (61) below and epenthetic vowels are denoted with bold font.

While antepenultimate rule has been regarded as basic accentuation pattern for foreign words, some subsequent researches have demonstrated that quadrimoraic foreign words with certain phonological conditions prefer non-kernelled pattern to kernelled one (Kubozono 1996, Kubozono 2002, Sato 2002), which is not expected from the foot-based generalisation of default accentuation. According to Kubozono (2002:92)’s statistical evaluation, about 60 % of quadrimoraic words from foreign stratum, which ends in two light syllables (LLLL or HLL), are non-kernelled. Depending on some prior studies such as Kubozono (1996) and Kubozono & Ota (1999), he presumes that quadrimoraic foreign words are tendentially kernelled when they end with epenthetic vowels, which are used to repair vowelless condition of source word as this structure is highly disfavoured in Japanese phonology.

(60) Non-kernelled quardimoraic foreign words (based on Kubozono 2002, Sato 2002)
   a. LLLL
          ‘stamina’, sutereo ‘stereo’, huresuko ‘fresco’, makaroni ‘macaroni’
   b. HLL
      bandana ‘bandana’, aiowa ‘lowa’, aNgora ‘Angola’, kaNtera ‘kandelaar (dut.)’

(61)Lowering kernel and epenthetic vowels (based on Kubozono 2002)\textsuperscript{77}
   a. LLLL
      suto\textit{resu} ‘stress’, bor\textit{asiti} ‘borsch (rus. / ukr. ďoporţi)’, bara\textit{tsuto} ‘ballast’
   b. HLL
      a\textit{Ndesu} ‘Andes’, ka\textit{ppuru} ‘couple’, ra\textit{lageri} ‘lager (rus. лárзеръ)’, to\textit{suto}
          ‘toast’

\textsuperscript{77} According to Kindaichi (2010), some diefferent patterns in terms of pitch accent are attested for the data in (60ab): such as non-kernelled bor\textit{siti}, bar\textit{asuto}, to\textit{suto}. Interestingly, the author comments that those non-kernelled variations are seen more recently in comparison with kernelled ones, which might suggest some inclination to non-kernelled patterns for current foreign word accentuation.
As we have seen so far, there have been a number of suggestions for a possible further default pattern for quadrimoraic foreign word accentuation, which are non-kernelled (see (60)). This fact seems to be contradicting Inaba (2005)’s claim that default accentuation patterns for quadrimoraic foreign words can be explained with the notion of foot structure (see (41)), presuming that footing for short words (including quadrimoraic ones) is operated from the left to the right. Inaba (2005)’s generalisation, which presupposes that a lowering kernel coincides with head of a trochaic foot. While it is supposed that the default kernel position reflects the foot-based bimoraic structure of prosodic words, his generalisation does not account for the existence of non-kernelled quadrimoraic default.

Now that we are questioning if a new default accentuation pattern for foreign word could be defined, we should return to the topic about default accentuation pattern of -ingu words. Previously, we hypothesised that there is a non-kernelled default for a certain group of -ingu words instead of agreeing with pseudo-compound structure proposed by Giriko (2010).

Since the non-kernel condition for -ingu words is governed by several variables such as word length and semantic category (for example, having verbal meaning as well as having quinque- or sexamoraic length: see (56)), -ingu words excluded from the non-kernel condition in (56) are tendentially kernelled. It seems that, at the very least, preference to kernelled longer outputs (µ ≥ 7) might be accounted for with the notion of pseudo-compound structure as investigated in the following.

As to quadrimoraic -ingu words in general, which should be possible minima in length, it seems difficult to find any uniform tendency for pitch accent type especially due to lack of sufficient data, as they are usually longer than four morae. To some initial-kernelled words such as halmingu ‘humming’ we could apply the left-to-right footing rule of Inaba (2005) for short foreign words with four morae or less.

In the following we will investigate if the putative pseudo-compound structure is visible in longer kernelled -ingu words. Based on preceding discussion in this thesis, the accentual defaults for verbal -ingu foreign words may be summarised as given in (62), where pseudo-compound structure is expected in certain cases (see (62b)). On the other hand, the presence of pseudo-compound effect is examined in (63).
To evaluate the existence of pseudo-compound structure, we will be based on Sato (2002)'s judgement model (see (21) in chapter 3) with some simplification, interpreting lowering kernel as indicating a prosodic pseudo-compound boundary. The data in (63) will simultaneously demonstrate that antepenultimate lowering kernel is rarely seen in -ingu words with greater length.

(62) Verbal -ingu words and default accentuation (see also (23) in chapter 3)
   a. middle ($\mu = 5, 6$) > non-kernelled pattern (no pseudo-compound)
   b. long ($\mu \geq 7$) > pseudo-compound

(63) Pseudo-compound structure in (68b)
   a. $\mu = 7$
      Example | Pseudo-compound | Gloss
      --- | --- | ---
      howa[jitoningu] | ho-wa[jitoningu] | ‘whitening’
      ripe[jiŋtingu] | ri-pe[jiŋtingu] | ‘repainting’
      sutore[jtiŋingu] | suto-re[jtiŋingu] | ‘stretching’
      sukuri[jiniŋingu] | suku-ri[jiniŋingu] | ‘screening’
      sapure[jssiŋingu] | sapu-re[jssiŋingu] | ‘suppressing’
   b. $\mu = 8$
      Example | Pseudo-compound | Gloss
      en[zi]jariŋingu | enze-ni[jariŋingu] | ‘engineering’
      oo[so]rajiziŋingu | ooso-rajiziŋingu | ‘authorising’
      kategora[jiziŋingu] | katego-rajiziŋingu | ‘categorising’
      akuwa[jiaringu] | aku-wa[jiaringu] | ‘acquiring’
   c. $\mu = 9$
      Example | Pseudo-compound | Gloss
      interogejetiŋingu | intero-gejetiŋingu | ‘interrogating’
      sinkurona[jiziŋingu] | sinkuro-na[jiziŋingu] | ‘synchronising’
      hurasutore[jetiŋingu] | hurasuto-re[jetiŋingu] | ‘frustrating’
The words presented in (63) may be examined if they are phonological pseudo-compound using Uwano (1999)’s compound kernel preservation rule (e.g. ho-wa[jitoningu ‘whitening’ > suupaa-ho-wa[jitoningu ‘super whitening’, enzi-ni[jariingu ‘engineering’ > suupaa-enzi-ni[jariingu ‘super engineering’, sinkuro-na[jiziingu ‘synchronising’ > suupaa-sinkuro-na[jiziingu ‘super synchronising’), where there is no lowering kernel shift. Lowering kernels of the original words in (63) are preserved even after compounding, which suggests the presence of pseudo-compound effect. It should be noted, however, that non-verbal words end in -ingu (e.g. mo[oniingu ‘morning’) generally show similar behaviours to kernelled -ingu words in (63) with respect to lowering kernel assignment, being mostly kernelled regardless of their phonological length.

To summarise, we can conclude that at least middle-long (µ = 5, 6) verbal -ingu words are not pseudo-compound particularly due to the absence of evidence which supports the claim that this ending is a trimoraic deaccenting final morpheme, along with that of pitch accent preservation for long N2s. Therefore, we consequently need a non-kernelled default for -ingu words with certain length and from verbal derivation.

This hypothesis may be a new suggestion for studies on default accentuation in Japanese, where it has been widely believed that there would be only one default or, at the very least, only a pair of derived patterns from that if entire prosodic word is long (µ ≥ 5). It could be partially because of previous studies having generally ignored possible candidates for further default patterns, treating them as irregular or unpredictable. Here, however, it should be emphasised again that there may be multiple types of default patterns in terms of foreign word accentuation: such as non-kernelled pattern for some quadrimoraic foreign words along with that seen in certain categories of -ingu foreign words, as presented in (62).

Looking over our discussions from a sceptical viewpoint to relationship between default accentuation patterns and exhaustive feet in Japanese throughout this section, it appears that the exhaustive prosodic word footing theory of Inaba (2005), which reportedly enables foot structure to be visible in default accentuation patterns for foreign words and compound words, has only limited effect to default definition, failing to predict other possible patterns of default accentuation.

As next topic, I will make further investigations about the issue on whether there are other default patterns in foreign words in general, to find additional counterarguments for the
foot-based accentuation analysis in Japanese, and to emphasise limited presence of binary structures in Japanese prosody.

6 Further default patterns

In this section, a further default pattern in terms of foreign word accentuation in Japanese will be proposed (see subsection 6.1 and 6.2): although more comprehensive discussions will be needed, our argument will suggest the importance of considering further default accentuation patterns which previous studies have never thoroughly investigated.

6.1 -meNto foreign words

Since there have been hardly any in-depth researches on multiple default accentuation patterns in Japanese, it might be difficult to make a precise discussion on this issue. Although I should admit lack of sufficient data due to poor accumulation of previous studies, I will give some typical English suffixed words which seemingly will generate pseudo-compound structure. As an example, we can consider some words such as *apa|atomeNto ‘apartment’, which obviously has a pseudo-compound structure between stem and suffix -meNto ‘-ment’. Despite the absence of such a suffixive element in Japanese, many native speakers of Japanese would recognise virtual morphological boundary between both parts of this word.

For the next step, we will investigate if we need to establish a new default accentuation pattern for the words end in the same element (hereafter -meNto words). At the very least, it would be easy for Japanese native speakers to find a pseudo-morphological boundary of, for example, the word *apa|atomeNto. While the rear element does not have true morphological status in Japanese, native speakers may psychologically tell the boundary thanks to high frequency of foreign words containing this suffix.

The (pseudo-)morphologically complex strcture of *apa|atomeNto may be revealed in word truncation. This word is typically clipped into *apa|ato, erasing the second-half segments (meNto), and avoiding a possibly better candidate *apa. This truncation process looks parallel to that of a true compound word where deletion of the second element is possible (back truncation: see subsection 3.2 in chapter 3). On the other hand, it appears the accentuation
pattern of *apaato-meNto is not directly reflecting its (pseudo-)morphological structure, having a lowering kernel on the second mora instead of the initial mora of the second trimoraic element (*apaato-meNto), which regular compound accentuation would expect.

Here, we should consider the fact we have confirmed in a previous discussion (see subsection 3.3 in chapter 3): virtual morphological boundary does not overall coincide with lowering kernel. For example, a foreign word *kanTaJa-bire ‘cantabile’ has a lowering kernel before the virtual morphological partition denoted with hyphen (for actual discussion on this issue, see 3.3. in chapter 3 and footnote 26). In other words, there may be inconsistency between virtual morphological boundary and virtual phonological boundary, interpreting lowering kernel as visualising pseudo-phonological boundary.

With great attention to this point, we will consider following questions in the discussion below: if we can establish a new default pattern for the category of -mento words and how we can theorise it.

For the sake of generalisation, I will give some -mento words in (64). The data presented in (64) have at least five and more than five morae, as -mento words shorter than five morae are statistically scarce; moreover, the accentual pseudo-compound structure becomes visible when a foreign word have at least quinquemoraic length, as claimed in previous studies (see Uwano 1999 and others). Phonological pseudo-compound boundaries in the following data are denoted with hyphens, following Sato (2002)’s method again.

(64) -mento words

<table>
<thead>
<tr>
<th>µ = 5</th>
<th>Example</th>
<th>Pseudo-compound</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>toJimento</td>
<td>-</td>
<td>‘torment’</td>
</tr>
<tr>
<td></td>
<td>moJomeNto</td>
<td>-</td>
<td>‘moment’</td>
</tr>
<tr>
<td></td>
<td>gaJameNto</td>
<td>-</td>
<td>‘garment’</td>
</tr>
<tr>
<td></td>
<td>re/zimeNto</td>
<td>-</td>
<td>‘regiment’</td>
</tr>
<tr>
<td></td>
<td>seJgumeNto</td>
<td>-</td>
<td>‘segment’</td>
</tr>
<tr>
<td></td>
<td>gaJbameNto</td>
<td>-</td>
<td>‘government’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>µ = 6</th>
<th>Example</th>
<th>Pseudo-compound</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudo-compound</td>
<td>Gloss</td>
<td></td>
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<td>-----------------</td>
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<tr>
<td>to</td>
<td>oname</td>
<td>Nto</td>
<td>‘tournament’</td>
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<tr>
<td>be</td>
<td>esume</td>
<td>Nto</td>
<td>‘basement’</td>
</tr>
<tr>
<td>zya</td>
<td>zzime</td>
<td>Nto</td>
<td>‘judgement’</td>
</tr>
<tr>
<td>se</td>
<td>turume</td>
<td>Nto</td>
<td>‘settlement’</td>
</tr>
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<td>Nto</td>
<td>hu-ra</td>
<td>gumento</td>
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<td>sume</td>
<td>Nto</td>
<td>ha-ra</td>
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<td>ase</td>
<td>sume</td>
<td>Nto</td>
<td>a-se</td>
</tr>
<tr>
<td>salpurime</td>
<td>Nto</td>
<td>‘suppliment’</td>
<td></td>
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<tr>
<td>ma</td>
<td>nezime</td>
<td>Nto</td>
<td>‘management’</td>
</tr>
<tr>
<td>sakurame</td>
<td>Nto</td>
<td>sakura-me</td>
<td>Nto</td>
</tr>
<tr>
<td>depa</td>
<td>omatemo</td>
<td>Nto</td>
<td>de-pa</td>
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<tr>
<td>ati</td>
<td>jibume</td>
<td>Nto</td>
<td>a-ri</td>
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<td>are</td>
<td>Nzime</td>
<td>Nto</td>
<td>a-re</td>
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<tr>
<td>pan</td>
<td>ssyume</td>
<td>Nto</td>
<td>pa-ni</td>
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<td>inme</td>
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<td>jime</td>
<td>Nto</td>
<td>agu-ri</td>
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<tr>
<td>azya</td>
<td>subsetemo</td>
<td>Nto</td>
<td>a-zya</td>
</tr>
<tr>
<td>dibe-ru</td>
<td>timo</td>
<td>Nto</td>
<td>dibe-ru</td>
</tr>
<tr>
<td>hurufi</td>
<td>rumo</td>
<td>Nto</td>
<td>huru-fi</td>
</tr>
<tr>
<td>eNro</td>
<td>orume</td>
<td>Nto</td>
<td>eN-ro</td>
</tr>
<tr>
<td>iNbe</td>
<td>subsetemo</td>
<td>Nto</td>
<td>iN-be</td>
</tr>
<tr>
<td>eNbara</td>
<td>sume</td>
<td>Nto</td>
<td>eNba-ra</td>
</tr>
<tr>
<td>eNpawa</td>
<td>lame</td>
<td>Nto</td>
<td>eNpa-wa</td>
</tr>
<tr>
<td>disapo</td>
<td>ntomo</td>
<td>Nto</td>
<td>disa-po</td>
</tr>
<tr>
<td>enTaate</td>
<td>inme</td>
<td>Nto</td>
<td>enTaa-te</td>
</tr>
</tbody>
</table>

- **c.** \( \mu = 7 \)
- **d.** \( \mu \geq 8 \)
In (64a), there generally is no pseudo-compound structure since our parsing method (basically reliant on Sato 2002) cannot divide initial-kernelled words into two pseudo-units. The data show that the position of lowering kernel is mostly stable and uniform, being independent from the weight of the initial syllable. On the other hand, it seems more difficult to find a consistency of kernel position in longer words, as given in (64b-d).

Here, we should consider external variables which may influence kernel position of -mento words: such as syllable weight, vowel epenthesis and stress accent pattern of source word. The data in (64) show that -mento words have generally lowering kernels placed on the fifth mora from the right edge (henceforth [-5] position) when that place is filled with an independent mora. [-5] positioning will be understood as a regular pattern from which other similar patterns are derived; for example, lowering kernel will shift to adjacent mora on the left side when [-5] position is occupied by a special mora. The avoidance of putting lowering kernel on a special mora has been known since last century which will cause leftward kernel shift (e.g. koma]asyaru ‘commercial’ < (*koma[a]syaru: see also (45) in this chapter).78 I portrait the leftward movement of lowering kernel for -mento word in (65):

(65) Leftward movement of lowering kernels
   a. independent mora on the [-5] position: no kernel movement  
      (e.g. hara]sume] nto, ase]sume] nto)
   b. special mora on the [-5] position: leftward kernel movement
      (e.g. too]name] nto > to]oname] nto, sen]time] nto > se]ntime] nto)

Looking at some irregularities of accentuation pattern seen in (64), where the initial-kernelled pattern is possible despite having an independent mora in [-5] slot (e.g. se]turume] nto ‘settlement’), special mora is not an absolute element which triggers leftward movement of lowering kernel. We could assume some influence from mora epenthesis: as Kubozono (2005) remarks, there is a general tendency that epenthetic mora avoids to be kernelled (see also Alderate 1993, Shinohara 2000, Kubozono 2001, Sato 2002). Taking this fact into consideration,

78 As previously argued, lowering kernel on a special mora is not strictly forbidden in Contemporary Japanese, opposing conventional generalisation of kernel placement (Kibe 1984, Hayata 1999, Fujikawa 2013: see also subsection 4.3 in this chapter). This research field seems still relatively uncultivated and many questions stay open: such as which variables are responsible for such kernel placement.
we can conclude that the word *seturumNto* is initial-kernelled due to the effect of vowel epenthesis (/tl > tu), while the regular [-5] position is occupied by an independent mora.

Further irregular words such as initial-kernelled *ma]nezimeNto* do not obey the expected [-5] accentuation pattern as well, whose kernel position cannot be predicted with leftward movement triggered by a special mora or an epenthetic one. The process of lowering kernel placement for these words could be influenced by the stress pattern of their corresponding words in source language: such as *management* in English, which may have influenced the pitch accent pattern of the borrowed form *ma]nezimeNto* (Endo 1969, Sibata 1994, Kubozono 2005, Sakamoto 2005 and others). The initial-kernelledness of *salpurimeNto* can also be explained with the same reason (or with the influence of vowel epenthesis).

The irregularly kernelled *sakurame]Nto* apparently has phonological pseudo-compound structure which coincides with its morphological structure (*sakura-me]Nto*), although this type of accentuation pattern seldom occurs within *-me]Nto* words. Due to low frequency, this word could be treated as an exceptional case, which has an irregular accentuation pattern. This pattern coincides also with antepenultimate default accentuation rule, although usually being ineffective for *-me]Nto* words.

(66) *-me]Nto* words (mostly $5 \leq \mu \leq 8$): [-5] default accentuation pattern

<table>
<thead>
<tr>
<th></th>
<th>Antepenultimate</th>
<th>Else</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>segumeNto</em></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><em>mojomeNto</em></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><em>harasumeNto</em></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><em>sakurame]Nto</em></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td><em>ma]nezimeNto</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>diberu]timeNto</em></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><em>depa]atomeNto</em></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><em>enbara]sumeNto</em></td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

6.2 Summary and possible further candidates
Summarising the entire argument above, we may construe that -meNto words has a default accentuation pattern kernelled at [-5] position regardless of their phonological length, while this default pattern may be influenced by some external conditions such as special mora, epenthetic mora and stress pattern of source word. As to the shortest and stably initial-kernelled quinquemoraic words, they cannot be chunked into pseudo-compound structure due to lacking sufficient phonological length (e.g. se\jumento > *Œ-se\jumento). Although -meNto words with more than five morae are usually kernelled at [-5] position as well, they should be interpreted as having pseudo-compound structure, as presented in (64b-d). Default accentuation patterns of -meNto words can be illustrated like (67) below.

(67) -meNto words and pseudo-compound structure

<table>
<thead>
<tr>
<th>Mora</th>
<th>Default</th>
<th>Pseudo-compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>[-5]</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>[-5]</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>[-5]</td>
<td>+</td>
</tr>
<tr>
<td>≥ 8</td>
<td>[-5]</td>
<td>+</td>
</tr>
</tbody>
</table>

So far in our investigations, we have shed some light on question whether there is only a single (or at most a handful of) default accentuation pattern in Japanese foreign words in general, for which we can have a negative conclusion. It seems we do not have to carry on further discussion on this issue here as we have already collected evidence in favour of hypothesising multiple default patterns of foreign pitch accent, in contrast to the traditional view of foreign word accentuation (especially for superquadrimoraic words). We should take some variables into consideration which may cause multiple default patterns: such as phonological structure, morphological structure and even semantic category.

As Sato (2002) states, it appears that default accentuation pattern shows greater influence especially on foreign vocabulary, which contains a great number of peripheral words (Sato 2002:68) such as technical terms, buzzwords and product names. Due to their limited use and short life in comparison with traditional lexical strata (native Japanese and Sino-Japanese), speakers have to face new words frequently, which may cause accentual regularity.
Moreover, Sato (2002) points out the influence of writing system in Japanese, where the traditional words are mainly written in Chinese characters, while foreign words are usually written in katakana. In contrast to Chinese characters which visualise the structure of words, phonetic katakana does not have this function. The visual opacity of structure could also be a reason for the preference to default accentuation.

While foot-based generalisation of default accentuation explains the uniform model well, this assumption does not seem useful for the multiple default model. From the position in favour of feet in Japanese, it should be explained why certain default patterns are faithful to the tentative structure of bimoraic feet whereas other patterns are not reliant thereupon.

To visualise the invalidity of traditional assumptions, I compare accentuation patterns for quinquemoraic -meNto words with those which traditional generalisation (antepenultimate rule and foot-based rule) will predict, giving some data in (68):

(68) Default accentuation for quinquemoraic -meNto words

<table>
<thead>
<tr>
<th>[-5]</th>
<th>Antepenultimate</th>
<th>Foot-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>tojomeNto</td>
<td>*(too)(me)N&lt;to&gt;</td>
<td>*(too)(me)N&lt;to&gt;</td>
</tr>
<tr>
<td>mojomeNto</td>
<td>*(moo)(me)N&lt;to&gt;</td>
<td>*(moo)(me)N&lt;to&gt;</td>
</tr>
<tr>
<td>gaJameNto</td>
<td>*(gaa)(me)N&lt;to&gt;</td>
<td>*(gaa)(me)N&lt;to&gt;</td>
</tr>
<tr>
<td>reJzimeNto</td>
<td>*(rezi)(me)N&lt;to&gt;</td>
<td>*(rezi)(me)N&lt;to&gt;</td>
</tr>
<tr>
<td>seJgumeNto</td>
<td>*(segu)(me)N&lt;to&gt;</td>
<td>*(segu)(me)N&lt;to&gt;</td>
</tr>
<tr>
<td>gaJbameNto</td>
<td>*(gaba)(me)N&lt;to&gt;</td>
<td>*(gaba)(me)N&lt;to&gt;</td>
</tr>
</tbody>
</table>

Lastly, it should be worth noting that there may be other potential candidates which would violate traditional default accentuation rules. For example, quinquemoraic foreign words with suffix -tibu⁷⁹ ‘-tive’ (henceforth -tibu words) and initial heavy syllables, such as koJozatibu ‘causative’, seJnsiJibu ‘sensitive’, fyuJuJziJibu ‘fugitive’, a]agaJfibu ‘ergative’, have possibly [-5] default pattern as well as -meNto words do.

---

⁷⁹ Palatalised -tibu /tɕiJibu/ is a possible alternative which may be seen in relatively older words. In some cases, paratalised alveolar consonant is exchangeable with non-palatalised one: such as inisiJatibu ~ inisiJaJibu ‘initiative’.
On the other hand, initial-light quinquemoraic -tibu foreign words seem to be faithful to the antepenultimate rule (e.g. nominā|tibu ‘nominative’, derība|tibu ‘derivative’, efeku|tibu ‘effective’), while neither traditional antepenultimate rule nor foot-based default accention rule will correctly predict the position of lowering kernel for initial-heavy -tibu words. Here, the moraic weight of the word-initial syllables may play a role for lowering kernel assignment.

In the case of initial-heavy -tibu foreign words, pronunciation of source words may be (at least partially) responsible for its borrowed form into Japanese: such as ‘causative > ko]oza|tibu, ’ergative > a|aga|tibu. Although we have denied interactive relationship between lowering kernel and lexical stress due to the possibility of kernel shift (see section 4 in this chapter), it seems the both culminating accentuation phenomena have nonetheless certain common natures.

To summarise our discussion on multiple default accentuation in Japanese, the foot-based lowering kernel prediction of Inaba (2005) is ineffective for multiple defaults. His theory is, therefore, not a good option to explain the tentative foot structure in Japanese, supporting my assumption.

While previous studies have relatively emphasised uniformity of foreign words’ default pitch accent pattern in Japanese, the possibility of multiple default accentuation is an unexplored field. There may be still further undiscovered default patterns which do not behave faithfully to the generalisation of previous literature.

7 Binarity and dialects

The last topic addressed in this chapter is the relationship between binarity and regional variations in Japonic languages. While binarity effect in Tokyo Japanese does not convincingly manifest exhaustive structure of binary feet, we will question how the connection between binarity and exhaustive feet looks in different regional variations in Japonic languages. This argument will also give some hint for the relationship between binarity and historical change in terms of Japonic comparative linguistics.

After briefly introducing Japanese dialectology in subsection 7.1 and 7.2, we will mainly focus on some dialects with special types of lexical accentuation system: such as Kumamoto Japanese, Sendai Japanese and Kagoshima Japanese (see subsection 7.3). Despite
some phenomena where binarity is apparently involved (e.g. accentuation system of Kagoshima Japanese), it does not seem there is clear interaction between bimoraicity and regional varieties.

Taking a close look at Japonic dialectology, we can see that syllable-middle falling pattern typically found in Tokyo Japanese is not overall typical in Japanese language area. Instead, syllable-final falling may be more frequent in some dialects such as Kumamoto Japanese and Kagoshima Japanese. This fact may lead us to some questions: if syllable-middle falling should be regarded equivalent to a trochaic foot, and if the notion of feet is generally meaningful in Japonic prosody. As the first question has been concluded negatively (see subsection 4.3 in this chapter), we may focus on the second question throughout this section.

If foot is an obligatory structure of Japonic prosody, one may question why the historical change of Japonic languages has caused lowering kernel to be simplified or to be utterly lost. As is well known, there are some dialects in Japonic languages whose pitch accent system is simplified or absent: the three dialects mentioned above commonly have this simplified nature of pitch accent. They are an interesting contrast to languages whose prosody is strongly based on metrical stress and feet: such as some Germanic languages (e.g. English and German).

7.1 Keihan-type and Tokyo-type dialects

We have discussed throughout this chapter whether there would be binary foot structure in Japanese, which becomes visible in certain accentuation-related phenomena. Despite some reportedly (but not convincingly) positive suggestions for binary feet in previous studies, I generally have made negative conclusions on the existence of exhaustive feet.

As an additional topic on the issue related to feet and pitch accent, I will examine some Japanese dialects in this section, while previous foot studies have mainly focused on Tokyo Japanese. The interaction between binary feet and metrical structure of non-Tokyo dialects have mostly been unstudied: for example, it will be an interesting question whether there is metric-based foot structure in so-called accentless dialects which have no distinctive lexical pitch accent system. I will give a brief description of Japanese dialect studies in the following.

As is widely known, the Japanese language includes a great variety of dialects, whose accentuation patterns are highly different from each other (Hirayama 1951, Hirayama 1968, Hayata 1999, Kibe 2010, Kindaichi 2010 and others). According to predominant view on
Japanese accentuation system, dialects in Japanese mainland are roughly classified into three categories; Keihan type (京阪式 keehan-siki) spoken in central Japan, Tokyo type (東京式 tokyoo-siki) spoken in central western and most of eastern Japan, and special type which can be categorised into neither of both groups. Keihan-type dialects, which include some influential dialects such as Kyoto Japanese and Osaka Japanese, preserve the oldest pitch accent system attestable by the dictionary 集聚名義抄 ruizyu-myooogi]syoo written by anonymous authors in Heian period (eleventh or twelfth century).

The most salient characteristic of Keihan-type dialects is that they have two distinctive lexical tones along with place pitch accent (Hayata 1999) like in Tokyo-type dialects: in Tokyo-type place pitch accent, the place of lowering kernel is lexically meaningful (see hasi]=ga LHL ‘bridge.NOM’ and ha]si=ga HLL ‘chopsticks.NOM’ in Tokyo Japanese). As to the collateral existing lexical tone, both tones are called initial-high (高起式 kooki-siki) and initial-low (低起式 teeki-siki) (Hayata 1999, Kibe 2010 and others) respectively. Some data is given in (69) and (70) below. Left square bracket [ denotes the beginning of high pitch. R (rising) and F (falling) tokens in Tone column represent contour tones which cannot be described with conventional register tone (L-H) annotation. The data below are mostly taken from Hayata (1999) for Kyoto Japanese. It should be noted that monomoraic words in Keihan-type dialects tend to be lengthend as if they were bimoraic (Hirayama 1968, Kibe 2010 and others).

(69) Kyoto Japanese: initial-high

a. non-kernelled

<table>
<thead>
<tr>
<th>Example</th>
<th>Tone</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ti]</td>
<td>H</td>
<td>‘blood’</td>
</tr>
<tr>
<td>[kaze]</td>
<td>HH</td>
<td>‘wind’</td>
</tr>
<tr>
<td>[sakura]</td>
<td>HHH</td>
<td>‘cherry tree’</td>
</tr>
<tr>
<td>[tomodati]</td>
<td>HHHH</td>
<td>‘friend’</td>
</tr>
</tbody>
</table>

b. kernelled

<table>
<thead>
<tr>
<th>Example</th>
<th>Tone</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[hi]</td>
<td>F</td>
<td>‘sun’</td>
</tr>
<tr>
<td>[ya]ma</td>
<td>HL</td>
<td>‘mountain’</td>
</tr>
<tr>
<td>[i]noti</td>
<td>HLL</td>
<td>‘life’</td>
</tr>
</tbody>
</table>
Lexical distinction of initial tones must not be conflated with place pitch accent, since the former is discriminated purely according to tonal feature whether the initial tone is high or low. The system of tonal discrimination in Kyoto Japanese could be associated with the lexical tone system found in China and Southeast Asia due to its nature of distinguishing different types (e.g. high or low) rather than different places of accent fall (e.g. on the first mora, on the second mora).

Thus, coexistence of place accent and lexical tone is possible and may be seen universally: some European languages such as Swedish and Rimburgian Dutch would be well-known examples among those (Riad 2010, Bruce 1977, Gussenhoven 2004, Lahiri, Wetterlin & Jönsson-Steiner, 2005 and others). On the other hand, Tokyo-type dialects have no tonal word distinction system, where only the position of lowering kernel is phonologically meaningful.

7.2 Special type dialects
The third type, special type dialects, are mainly found in northeastern Japan (e.g. Mito, Utsunomiya, Fukushima, Sendai, Yamagata) as well as in southwestern districts, which includes large part of southwestern Kyushu Island (e.g. Kagoshima, Miyakonojo). Special type dialects are categorised into two-type pitch accent in southwestern Kyushu and one-type pitch accent in northeastern Honshu and in a belt-shaped area in central Kyushu. The geographical distribution of Japanese dialects is illustrated in (71) (Kindaichi 2011).

(71) Japanese dialect map (Kindaichi 2011)

Hayata (1999), concerning the distribution of tone languages in East Asia, argues that lexical tone system is found in a broad area stretching from China and Korean Peninsula (e.g. a four-type pitch accent system in Jinju Korean: Hayata 1999) to western Japan, which includes the region where two-type pitch accent system is available. Place accent languages and n-type (lexical tone in a broad sense; Hayata 1999) ones are contrasted in (72). Bracketed Numbers in column n-type accent denote the number of distinctive (pitch or stress) accent patterns of each language shown below.
(72) Place accent and n-type accent (lexical tone)

<table>
<thead>
<tr>
<th>Language</th>
<th>Place accent</th>
<th>n-type accent (lexical tone)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kyoto Japanese</td>
<td>+</td>
<td>+ (2)</td>
</tr>
<tr>
<td>Stockholm Swedish</td>
<td>+</td>
<td>+ (2)</td>
</tr>
<tr>
<td>Limburgian Dutch</td>
<td>+</td>
<td>+ (2)</td>
</tr>
<tr>
<td>Tokyo Japanese</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>English</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>German</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Kagoshima Japanese</td>
<td>-</td>
<td>+ (2)</td>
</tr>
<tr>
<td>Jinju Korean</td>
<td>-</td>
<td>+ (4)</td>
</tr>
<tr>
<td>Mandarin</td>
<td>-</td>
<td>+ (4)</td>
</tr>
<tr>
<td>Southern Min</td>
<td>-</td>
<td>+ (7)</td>
</tr>
<tr>
<td>Seoul Korean</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

7.3 One-type pitch accent and accentless dialects

One-type pitch accent dialects in Japanese have only one lexical pitch pattern. Namely, there is no distinctive pitch accent in these dialects. A typical example for one-type dialect would be Miyakonojo Japanese spoken in the area stretches on the border between Miyazaki prefecture and Kagoshima prefecture in southern Kyushu (number 8’ area in (71)). It is widely known that this dialect has nothing but final-high pattern (Hirayama 1952 and others). Case markers take over final high tone of their host words, which is common in adjacing Kagoshima Japanese. I will give some empirical data from Miyakonojo Japanese in (73) below. Especially monomoraic words in this dialect are likely to be polysemic due to the absence of distinctive pitch accent, which is commonly seen in other dialects which employ simplified pitch accent systems (e.g. see (74) and (75) for Kumamoto Japanese prosody).

(73) Miyakonojo Japanese (Hirayama 1951, 1968)

<table>
<thead>
<tr>
<th>Example</th>
<th>Tone</th>
<th>Gloss</th>
</tr>
</thead>
</table>

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Despite lack of distinctive pitch accent, Miyakonojo Japanese is seldom called accentless since the fixed final-salient pattern is present. Meanwhile, dialectal researches have discovered another type of non-distinctive pitch accent system where there is no phonetical saliency in the level of a prosodic word.

These accentuation systems are termed differently: termed broken accent (崩壊アクセント hookai-a[kuseNto] or accentless (無アクセント mu-a[kuseNto]: e.g. Fukushima Japanese and Kumamoto Japanese: Hirayama 1937, 1951, 1968 and others) by different researchers. In conventional studies, one-type and accentless dialects have generally been treated separately. In the dialect map in (71), accentless dialects are classified into number 8 whereas final-high Miyakonojo-type pitch accent is categorised as number 8'.

Here, I will mainly treat accentless dialects, especially Kumamoto Japanese, which is spoken in Kumamoto City and surrounding areas in central Kyushu Island. This dialect has been regarded to have a typical broken accent system, where there is neither distinctive pitch accent nor pitch saliency on a certain tone bearing unit. As to research history of Kumamoto Japanese, for example, Hirayama (1968:34) states that homophones discriminable in Tokyo Japanese are pronounced “very randomly” in broken accent dialects including Kumamoto Japanese.

It is still controversial whether the pitch accent system in Kumamoto Japanese should be counted in one-type category (non-falling one-type) or it should be treated as truly accentless. However, terms like accentless or broken accent seem to be inadequate for Kumamoto Japanese prosody in some aspects. Particularly, it should be taken into account that tonal representation in accentless dialects is not overall random.
Recently, there was a proposal that Kumamoto Japanese should be understood as a one-type dialect with a default non-falling melody\(^{80}\): as Maekawa (1992:68) states that “… Kumamoto-iNtone]esyoN=wa, hatuwa bootoo=wa hiku]ku hazimari, tokutee=no iNritu-kyo]okai=no i]ti=made reNzokutekini zyoosyoo=o tuduke, iNritu-kyo]okai=ni oite kyuugekini kakoo suru seesitu=o mo]tte iru. […] Kumamoto intonation begins with low onset tone, which is followed by a continuous rising tone until a certain phonological boundary, and the tone falls acutely at the prosodic boundary)” (author’s translation). I overview default melody pattern in Kumamoto Japanese in (74) and (75). Non-falling tone in (74) is denoted with traditional H (high) token due to acoustic similarity and to lack of official tone annotation system. While register-based annotation is useful to describe the word prosody of Tokyo Japanese, it is not clear if this system can be always applied to other variations in Japonic languages.

(75) Kumamoto Japanese: non-falling one-type pitch accent

<table>
<thead>
<tr>
<th>Example</th>
<th>Tone</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>hana ~ hana=ba</td>
<td>HH ~ HHH</td>
<td>‘flower, nose(=ACC)’</td>
</tr>
<tr>
<td>hasi ~ hasi=ba</td>
<td>HH ~ HHH</td>
<td>‘chopsticks, bridge, edge(=ACC)’</td>
</tr>
<tr>
<td>kaki ~ kaki=ba</td>
<td>HH ~ HHH</td>
<td>‘oyster, hedge, persimmon(=ACC)’</td>
</tr>
</tbody>
</table>

(76) Tone contours (Maekawa 1992)

\[ \text{(naN=mo} \ miyut-to]=ne) \]

\( \text{what=NOM \ see-NOMINALISATION=INT} \)

‘What do you see?’

\(^{80}\) Of course, it does not mean that there is no intonational pitch movement in these dialects at all. As previous studies have presented (Maekawa 1983, Tagawa 2007, Kori 2006 and others), it is widely known that even dialects with a non-culminative pitch accent system like Kumamoto Japanese may have phonologically meaningful pitch movement in higher Prosodic Hierarchy.
Maekawa (1992)’s tone contours provide empirical evidence of non-falling default prosody in Kumamoto Japanese rather than of randomness in pitch movement. He claims that the long-range rising (or non-falling) tone within a prosodic phrase may be observed in this dialect, which is a result of absent word-level boundary features. Hence, a nominal phrase nagasaki=no raameN ‘Chinese-style noodle in Nagasaki’ in this dialect may be pronounced with a consistent non-falling tone, as if it were made up with a single noun. On the other hand, this string is precisely divided into two prosodic words in Tokyo Japanese ((naga)saki=no)ω(ra)ameNω), where locus of lowering kernel is preserved in every prosodic word.

In other accentless dialects, non-falling prosody is commonly seen as well. This type of pitch accent should be termed as non-falling one-type (平板一型 heeban-ikkée ‘flat board one-type’) rather than accentless for the sake of accuracy. I give some further examples from Sendai Japanese and Ibaraki Japanese in (77), as they are in common non-falling one-type dialects spoken in northern Honsyu Island (Lee 1997, Hayano 2006)81. According to Hayano (2006), who contrasts two one-type dialects in geographically distant places (Ibaraki Japanese and Miyazaki Japanese), basic prosody of the dialects spoken in northern Kanto district including Ibaraki Japanese is characterised with a continuous flat tone like long-range rising tone in Kumamoto Japanese.

In the data in (77) presented in some studies on (middle-)northern Japanese dialects’ prosody (see Lee 1997, Hayano 2006), I annotate IP boundary tones with tokens X% (L% / H%) on the both edges of each data.

(77) Further one-type dialects: Sendai Japanese (Lee 1997)

81 Different from Kumamoto Japanese prosody characterised with slightly rising long-range tone and acute falling tone at prosodic phrase boundary, Sendai Japanese and other non-falling one-type dialects in the surrounding areas (e.g. Fukushima Japanese in Shirakawa 2011 and Tochigi Japanese in Takamaru 2012) generally have no sharp falling tone at prosodic boundary. According to Lee (1997), Sendai Japanese mainly use pauses to indicate boundaries, whilst Kumamoto Japanese marks prosodic phrase terminals with a specific boundary tone.
a. Sendai Japanese (Lee 1997)

L% nomura-kuN=wa kinoo nagoya=ni

proper name-Mr.=TOP yesterday place name=LOC

_tuki-masi-ta_ L%.

arrive-POL-PERF

‘Mr. Nomura arrived at Nagoya yesterday.’

b. Ibaraki Japanese (Hayano 2006)

L% wagai musume-da-doga wagai odogo=no sitio=a L%

young girl-be-and young man=GEN human=TOP

‘Young girls and young men are’

Now, we should return to the first question if metrical feet may be defined in non-falling one-type dialects (such as Kumamoto Japanese and Sendai Japanese) despite the absence of distinctive pitch accent. With respect to the metrical footing theory proposed in previous studies, there would be no visible bimoraic structure in these dialects’ prosody: as some previous studies
on putative metrical feet in Tokyo Japanese have attempted, this essentially bimoraic structure should be defined with lexical accentuation rules, including default accentuation.

Moreover, the unmarked falling pattern in Kumamoto Japanese is syllable-final rather than syllable-medial, while Inaba (2005) attempted to interprete syllable-medial kernel in Tokyo Japanese as head of a trochaic foot. Although there is no lexical pitch fall in this dialect, which has a characteristic long-range rising (see (76)) speech melody until phrase edge (Maekawa 1992, Baba 2005, Kori 2006 and others), a steep phrase-marking fall may occur. The falling begins in the end of the penultimate syllable rather than in the middle of it.

For example, while the word na نها ‘something’ given in (78) should be pronounced with flat tone in non-final position of a prosodic phrase, this tone will change into na نها (*نا نها) in the phrase-final position as a result of phrase-final falling. As syllable-medial falling does not occur in the prosody of Kumamoto Japanese, and the falling is a phrase-level phenomenon, it is impossible to interprete pitch fall as head of a trochaic foot.

(78) Final vs. non-final word melody (Kumamoto Japanese)
   a. final نها
      (نا نها)φ (ميتدى-ne)φ
      something see-be=INT
      ‘Do you see anything?’
   b. non-final نها
      (نaha مىتى-ra)φ (وسيتى-كودائى)φ
      something see-if tell-please
      ‘Please tell me if you see something.

There is a special intonation which typically expresses emphasis or irritation of speaker: in this intonation, the slightly rising melody in neutral speech may be changed into a low tone sequence, allowing only maximally a single syllable to be high (see (79) below). When the high-tone part is a heavy syllable, there are some different ways of tonal representations, where, however, only syllable-middle falling does not occur:

(79) Emphasising low tone and partial high tone
a. the entire syllable is high
\[(si-ki[r]-N=te)\]φ
do-can.MIZENKEE\textsuperscript{82}-not=that
LLL[HH]L
‘I told you I can’t.’

b. only the second mora is high
\[(si-kira-[N]=te)\]φ
do-can.MIZENKEE-not=that
LLL[HH]L
‘I told you I can’t.’

c. only the first mora is high
*\[(si-ki[r]-N=te)\]φ
do-can.MIZENKEE-not=that
*LLL[HH]LL

From the view of historical linguistics, generally speaking, it appears that the historical change of Japanese has not been in favour of trochaic bimoraic structure which may parse an utterance into feet. If falling tone is essentially tied up with trochaic bimoraic feet in Japanese (or Japonic) prosody, there would be no historical change which would nihilate the relationship between falling and feet: we should consider the fact again that there are numerous regional varieties in Japonic languages where lexical pitch accent is partially or totally absent. This is a clear contrast to other tone-based lexical accentuation system such as that in Han Chinese languages, where their (contour) tonal system is almost overall present.

While the relationship between lowering kernel and putative trochaic bimoraic feet may be visible in certain cases in Tokyo Japanese, it is difficult to generalise the falling-foot relationship in Japonic dialectology, except for some interesting cases of tonal binarity such as that seen in Irabu Ryukyuan (Shimoji 2009). As this topic being beyond our research scope, however, we will not treat this issue in this thesis.

\textsuperscript{82}未然形 mizenkee (lit. incomplete form) is an inflected form of Japanese verb (see also 連用形 ren’yookee).
8 Conclusion

Throughout our investigation to discover the interactive relationship between regular accentuation and foot structure, we have seen that the interaction is not always operative despite some presence of affinity to bimoraic structure.

As to the interaction between regular accentuation and feet, on the other hand, Poser (1990)’s foot-based generalisation of default compound accentuation has some shortcomings in parsing because it forces syllable structure to be ignored in certain processes of footing (see section 1 in this chapter).

While there have been some discussions against syllables in Japanese (e.g. Labrune 2012), it seems syllables are nevertheless present in this language, taking its prosodic reality into account: such as syllable-based antepenultimate rule (McCawley 1968), one of famous traditional generalisations for regular foreign word accentuation. We should consider the fact again that regular antepenultimate lowering kernel is shifted to the left to prevent a special mora from being kernelled: we have a huge amount of examples like komajasyaru ‘commercial’, which should have antepenultimate lowering kernel (*komaa]syaru ‘commercial’)83 according to antepenultimate rule. In this case, the antepenultimate kernelling is blocked due to special mora on the antepenultimate position.

After the emergence of Weak Layering (Itô & Mester 1992: see section 2 in this chapter) in Prosodic Phonology, there have been some attempts for exhaustive footing in Japanese, most of which are closely tied up with the notion of regular accentuation; however, it seems those attempts have not been entirely successful, while they have given us plenty of information about the preference to bimoraicity in Japanese. Despite relatively unfruitful results of finding some consistent behaviours of putative exhaustive feet, it would be an interesting question why there is such a preference while there is seemingly no consistently defined foot structure.

As we have investigated in section 3 in this chapter in detail, it should not be ignored that there is a certain amount of foreign words which seem faithful to the bimoraic right-to-left footing (Inaba 1998, Inaba 2005) despite the possibility of multiple default patterns (see section

83 Despite traditional assumption which rules out syllable-final lowering kernels, we have confirmed this type of pitch accent representation is possible (see 5.3 in this chapter). According to more recent proposals, therefore, komajasyaru is not absolutely impossible despite wide agreement among phonologists that the canonical form should be medial-kernelled komajasyaru.
5 and 6 in this chapter). Although multiple default patterns do not necessarily obey the proposed foot-based analysis, the interaction between bimoraic parsing and default accentuation could be still an interesting suggestion since the effect of bimoraicity in Japanese is not entirely absent.

Looking at previous studies on periodic rhythm pattern, it seems controversial if there is such structure in natural speech in Japanese. Some possible iterativity in speech rhythm (e.g. Tajima 1998) could be construed as universal nature of tonal music (Lerdahl & Jackendoff 1983) rather than that of speech. While some researchers have tried to interpret lowering kernels as the heads of trochaic feet (Inaba 2005: see section 3 and 4 in this chapter), we have arrived at the conclusion that lowering kernel should not be treated as equivalent to head of a trochaic foot, especially considering lowering kernels which may shift within a syllable in a speech (Hayata 1999, Fujikawa 2013).

Although periodic rhythm structure is seemingly absent in Tokyo Japanese, there is a remarkable report from Japonic dialectology. Shimoji (2009) argues bimoraic feet are present in Irabu Ryukyuan, whose prosody is reliant upon the iterative pattern of different tone registers. While consistent relationship between kernel position and foot head is suspicious with regard to dialectology (and also in Tokyo Japanese) in Japonic languages in general (see section 7 in this chapter), Irabu Ryukyuan provides some interesting knowledge about headless feet (Crowhurst & Hewitt 1995), where foot heads are undefinable or unnecessary despite the presence of structure composed of two morae.

In order to interpret the bimoraic structure presented in this chapter as identical to that proposed in chapter 3, the direction of foot parsing may be an obstacle. As we have seen throughout this chapter, the bimoraic structure which becomes visible in some accentuation phenomena mainly employs right-to-left parsing direction, while the bimoraic cluster used for morphophonological purposes (see chapter 3) is usually parsed from left to right. Due to the inconsistency of parsing direction, we could also question if both structures are identical despite having bimoraicity in common.
Chapter 5

Conclusion
In the entire text we have looked at the presence of bimoraic structure in Japanese from a critical point of view toward previous studies. While previous studies in general have emphasised the role of bimoraic structure in Japanese, which may be called feet, we have revealed there are some problems in previous proposals.

As to the minimal structure of prosodic words, it is controversial if there are degenerate feet in Japanese while there are a huge number of monomoraic words. Although we have seen some special cases where the minimal bimoraicity is apparently present (e.g. some kind of word enumeration: see chapter 2), it does not seem demonstrating exhaustive bimoraic feet. While exhaustivity is an essential nature of traditional Prosodic Hierarchy, the putative feet used in morphophonological phenomena generally cannot parse an utterance into feet. In order to know the entire structure of feet in an utterance, there should be an alternative which can parse larger structure into feet (see chapter 4).

A further problem is the typological difference between Japanese and some language where foot structure is well definable. Japanese is a non-stress language which uses pitch accent for lexical distinction, while previous foot studies in various languages have mainly been successful in those where there is lexical stress and alternating pattern of relative strength. Typically, this structure in these languages suggests the presence of foot structure. We should not nevertheless completely deny the possibility of binary feet even in the languages which does not have any strength effect on lexical contrast; however, it is difficult to define exhaustive structure of feet in Japanese in a traditional way.

Although some phonetical studies have suggested the possibility of alternating speech rhythm in Japanese, it is dubious that the suggested rhythm alternation has a certain phonological role. As Lerdahl & Jackendoff (1983) point out, this rhythm alternation could be a common feature of musical phenomena in general, rather than implying foot structure in speech which serves as a component of Prosodic Hierarchy.

It would be true that bimoraic structure becomes visible in some word transformation processes such as foreign compound truncation (see Itô 1990) despite certain exceptions. While obligatory stem of single foreign word truncation is controlled by disyllabic structure (Stem_{σσ}) rather than bimoraic structure (Stem_{F}), the size of obligatory stem is based on the mora count in foreign compound word truncation (see subsection 4.1 in chapter 3). This thesis proposed
summing effect which may loosen disyllabic template restriction into bimoraic (see 4.3 in chapter 3).

While a certain type of female servants’ language \(\text{女房言葉 nyooboo-kojōba}\) prefers bimoraic structure (see subsection 2.2 in chapter 3), although another type of this word category requires monomoraic abbreviation from the source word (e.g. \(\text{kami} \text{‘hair’} > o-\text{kai}-\text{mozi}\). The template inconsistency is one of primary shortcomings of previous attempts to connect the notion of feet with morphophonological phenomena.

Word transformation can also breach original prosodic structure of source word, which would be a further problem. When the proper name \(\text{ta}roo\) is transformed into \(\text{ta}roo-\text{tyan}\) as a nickname, for example, syllable (and foot) structure of the source name is ignored. In fact, original word’s putative foot structure is not taken into consideration in many cases of nicknaming. In some uncommon examples of nicknaming truncation, original word’s element is taken even quite randomly (e.g. \(\text{mi}tiko > \text{mi}-\text{tyan}, \text{ti}ko-\text{tyan}, \text{mi}ko-\text{tyan}\)). On the other hand, interestingly, some foot-like natures of output (e.g. \(\text{ta}roo > \text{ta}ro-\), \(\text{mi}tiko > \text{tiko} - \text{mik}o-, \text{zyu}Nko > \text{zyuN}\)) are still present, where two morae are treated as equivalent to one syllable.

While the prosodic structure of original name does not influence the process of nicknaming, the preference to bimoraicity of output is consistent. Although it is generally difficult to find evidence for exhaustive foot structure in Japanese, some effect of binarity (e.g. bimoraic, disyllabic) is operative. As this topic is not our central research question, its reason could not be treated in this thesis.

Along with breaching original prosodic structure of source word, inconsistency of footing direction may also be a problem. In a certain word inversion process, there are some outputs produced by different footing direction: such as \(\text{huku}ro \text{‘bag’} > \text{rop}pu\text{k}\text{u}\) and \(\text{ku}suri \text{‘drug’} > \text{sur}i\text{ku}\) (see subsection 2.5 in chapter 3). To define consistent foot structure which presumably becomes visible through this process, it should be explained why different footing directions are possible.

In general, there is certain preference to binarity (including bimoraic) in terms of word transformation; however, prosodic structure of source word is tendentially ignored. As the last topic on word transformation, we should consider letters and writing system (e.g. \(\text{びっく} \text{‘surprised’} > \text{くりびつ}\)), which as well may influence the output. As such,
the preference of binarity in word transformation processes in general cannot be ascribed only to prosody despite some affinity of outputs to bimoraic feet.

With respect to interaction between word accentuation (pitch accent in Japanese) and foot structure, previous researches have discovered some tentatively positive links in terms of regular accentuation. Among them, a proposal of Inaba (2005), who attempted to generalise foreign words’ default accentuation rules based on foot parsing, succeeded to sophisticate traditional default accentuation theories with the notion of bimoraic feet.

However, there are some further regular pitch accent patterns which do not obey traditional lowering kernel placement (see section 6 in chapter 4), which cannot be predicted by the foot-based default accentuation rules. There should be, therefore, further investigations why not all patterns of default accentuation are faithful to Inaba (2005)’s foot parsing, considering the exhaustive nature of a prosodic constituent.

Taking a close look at Japonic dialectology (including Tokyo Japanese) as the last topic of chapter 4, we did not find any consistent relationship between kernels and metrical strength. For example, syllable-final falling is preferred in Kumamoto Japanese prosody, where there is no lexically distinctive pitch accent (non-falling one-type (平板一型 heeban-ikke)). This fact is a clear contrast to previous presumptions which premise syllable-middle kernels as head of a trochaic foot (see above).

As to Tokyo Japanese, kernel (lowering kernel for this dialect) may move within a syllable in lively conversations or even in professional announcements (Hayata 1999, Fujikawa 2013: see also subsection 4.3 and 4.4 in chapter 4), while it has been traditionally claimed that lowering kernel in Tokyo Japanese should be placed in the middle of a syllable if the kernelled syllable is heavy. This fact does not coincide with the foot-based regular accentuation rule of Inaba (2005), which presupposes lowering kernel to be placed on the first mora of a heavy syllable as head of a trochaic bimoraic foot. Moreover, his head-based foot parsing cannot parse non-kernelled part of prosodic word. Lowering kernel may occur maximally once within a prosodic word and there is no further implication of metrical feet such as alternating rhythm.

Looking at Japonic language history in terms of lexical accentuation, these languages’ pitch accent system has generally been losing its complexity, even resulting in a total loss of lexically distinctive pitch accent (e.g. Kumamoto Japanese, Sendai Japanese and Fukushima Japanese). This fact suggests that there has not been great need of indicating foot structure with
kernels in Japanese during its historical change. This fact would be a clear contrast to, for example, English stress accent and Mandarin contour tones, which have almost overall been present regardless of regional variation and historical change. Different from Japanese pitch accent, these lexical discrimination systems are also useful to define binary foot structure in these languages.
References


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84 In references, hyphenation of Japanese titles or texts (e.g. hyphen - for morphological boundary in general and double hyphen = for clitic boundary) is omitted. Lowering kernels are absent as well. As to transcription of Japanese titles or texts in references, there will be inconsistency due to some reasons: for example, when official Romanisation of a Japanese book is written in a different way from the style of this thesis, I will principally obey the style of official Romanisation used by the publisher. Inconsistency of transcription is a frequent problem in writing a paper on Japanese in a foreign language because official Romanisation of a book is usually based on conventional Hepburn style (ヘボン式 *heboN-siki*) while there is certain preference of Japanese linguists toward governmental Romanisation (訓令 式 *kuNree-siki*). This thesis basically uses governmental Romanisation with some modification.


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