Japanese Dialects and General Linguistics

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Abstract: This paper considers how general linguistics can shed new light on the structure of Japanese, on the one hand, and how empirical and theoretical studies of Japanese dialects can contribute to the development of general linguistics, on the other. It tackles this question by analyzing several phonological phenomena in Japanese that are related to word accent in one way or another. This includes the accent of standard Tokyo Japanese and various processes that conspire to avoid creating superheavy syllables. Various seemingly unrelated phenomena can be generalized by introducing the notion of syllable weight into Japanese phonology; moreover, analyzing Japanese phenomena helps us widen our perspectives about the overall diversity of languages. Along these lines, the second half of this paper discusses accentual analyses of various Japanese dialects. These considerations demonstrate the extent to which studies on Japanese dialects and general linguistics can be related to each other.*

Key words: Japanese dialects, general linguistics, word accent, superheavy syllable, syllable weight

1. Latin and Japanese accent

Japanese and Latin accent have been studied independently and have been formulated in different ways in the literature. The accent rule of Latin, which is well known in general linguistics, is found not only in many European languages including English, German, Spanish and Romanian, but also in non-European languages around the world such as Lebanese Arabic and Klamath (Hayes 1995: 181). This rule consists of two parts given in (1), where 'heavy' syllables are defined as those either with a long vowel or diphthong or with a short vowel followed by a coda consonant. In (1), accented syllables/moras are indicated by capital letters and syllable boundaries are denoted by dots.

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(1)   a.   Place an accent on the penultimate syllable if it is heavy, i.e. bimoraic.
          e.g. for.TUU.na 'fortune', a.lex.AN.der 'Alexander'
       b.   Move the accent onto the antepenultimate syllable if the penult is light,
          i.e. monomoraic.
          e.g. PO.pu.lus 'people', IN.te.grum 'perfect'

This accent rule is decomposed into several independent principles or 'constraints' in the recent phonological theory known as Optimality Theory (Prince and Smolensky 1993/2004):

(2)   a.   Avoid choosing the very final syllable as the docking site of the accent.
       b.   Avoid placing an accent on a syllable too far from the end of the word.
       c.   Avoid placing an accent on light syllables.

The accent of standard Tokyo Japanese has been studied in depth, too, but has been analyzed in quite different ways. It has been formulated as in (3) in the traditional literature (Akinaga 1985) and as in (4) in generative analyses of Japanese (McCawley 1968, Haraguchi 1977, Poser 1984).[1] The 'dependent mora' in (3b) refers to (i) the second half of long vowels and diphthongs, (ii) moraic nasal (*hatsuon*), or (iii) the first half of geminate consonants (*sokuon*). Following traditional descriptions, the accent in Tokyo Japanese is indicated in this paper by an apostrophe placed immediately after the accented mora. The location of the accent in this description corresponds to the position of an abrupt pitch fall, which is the primary phonetic correlate of lexical prominence in this dialect (Hattori 1960, Poser 1984, Beckman 1986, Kubozono 1988).

(3)   a.   Place an accent on the antepenultimate mora, i.e. the third mora from the
          end of the word.
          e.g. a.za'.ra.si 'seal (animal)', ga.ku'.mon 'learning', ku.ri.su'.ma.su 'Christmas'
       b.   Move the accent one mora to the left if the antepenultimate mora is a
          dependent mora traditionally called *fuzoku-haku* or *tokushu-haku*.
          e.g. o.ba'.a.san 'grandmother, old woman', ka'n.ko.ku 'Korea', wa.si'n.ton
          'Washington'

(4)   Place an accent on the syllable containing the antepenultimate mora.

The Latin accent rule in (1) and the Japanese rules in (3)–(4) are similar in that they both compute the position of phonological prominence from the right edge of the word. Apart from this feature, however, it remains unclear what they have in common, namely, how they resemble and differ from each other. Notably, the Latin rule measures phonological distances by counting the number of syllables, while the Japanese rules count the number of moras to compute the position of

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[1] The rule in (4) is superior to that in (3) not only because it employs the general, language-independent concept of 'syllable' but also because it explains why the accent placed on the dependent mora moves one mora to the left rather than one mora to the right (Kubozono 1994).

phonological prominence.

   This problem can be solved in a straightfoward manner if one introduces the notion of syllable weight into the description of Japanese. This is a notion combining the mora and the syllable and was traditionally used in the description of ancient Greek (Allen 1973). Specifically, it assumes that syllables fall into three types depending on their phonological weight or length which can be structurally defined.

(5)   a.   light syllables (L)
      b.   heavy syllables (H)
      c.   superheavy syllables (SH)

   By definition, these types of syllables consist of one, two and three moras, respectively. What counts as a heavy syllable varies slightly from one language to another (Zec 1995, Hayes 1995): in Latin and most Japanese dialects including Tokyo Japanese, heavy syllables consist of (i) open syllables with a long vowel or diphthong, or (ii) closed syllables with a short vowel. The existence of superheavy syllables is controversial as there are many kinds of evidence showing that they are avoided in many languages, as we will see shortly.

   Putting superheavy syllables aside for a moment, Latin and Japanese accent rules both place an accent either on the second or third syllable from the end of the word (or on the final syllable if the word is monosyllabic). This preliminary observation allows us to focus on the three syllables in word-final position, which logically permit the eight combinations in (6), depending on whether each syllable is heavy or light.

(6)   a. HHH   b. HHL   c. LHH   d. LHL
      e. HLH   f. HLL   g. LLH   h. LLL

   The Latin rule in (1) places an accent on the underlined syllables in (7): (7a–d) exhibit penultimate accent because of the rule in (1a), while (7e–h) display an accent on the antepenultimate syllable due to (1b).

(7)   a. H<u>H</u>H   b. H<u>H</u>L   c. L<u>H</u>H   d. L<u>H</u>L
      e. <u>H</u>LH   f. <u>H</u>LL   g. <u>L</u>LH   h. <u>L</u>LL

   On the other hand, the Tokyo rule formulated in (3)–(4) makes the predictions in (8) by counting heavy syllables as bimoraic and light syllables as monomoraic.

(8)   a. H<u>H</u>H   b. H<u>H</u>L   c. L<u>H</u>H   d. L<u>H</u>L
      e. H<u>L</u>H   f. <u>H</u>LL   g. L<u>L</u>H   h. <u>L</u>LL

   Focusing on the accented, i.e. underlined, syllables, a comparison between (7) and (8) reveals a high degree of similarity between the two rules (Kubozono 1996, 2006a/b, 2008b). In fact, they place an accent on the same position in six out of eight environments, while making different predictions in only two contexts, i.e. (7/8e) and (7/8g). In these contexts, which involve a sequence of light and heavy syllables in final position, accent is placed on the antepenultimate syllable to avoid

a light penult in Latin, while it is placed on the penultimate syllable in Japanese even though it is light.[2] Apart from these two contexts, the two rules make one and the same accent placement. Thus, the notion of syllable weight shows similarities and differences between the two accent rules in an explicit way.

In addition to this, the comparison based on the same notion enables us to understand the nature of ongoing accent changes and variations observed in Tokyo Japanese. Kubozono (1996, 2006a/b) and Katayama (1998) independently pointed out that accent positions are quite variable in modern Tokyo Japanese in the two contexts where the Latin and Japanese rules make different predictions.[3] Some examples are given in (9): words in (9a) follow the Japanese rule in (4), while those in (9b) are accented in accordance to the Latin rule in (1). Kubozono (1996, 2002) reports that the pattern in (9b) is much more dominant than that of (9a) in contemporary Tokyo Japanese as far as loanwords are concerned.

(9)   a.   pi.ka’.chuu ‘Pikachu’, bi.ta’.min ‘vitamin’, a.se’.an ‘ASEAN’, su.to’.roo ‘straw’, i.e’.men ‘Yemen’, baa.be’.kyuu ‘BBQ’, kan.ga’.ruu ‘kangaroo’
      b.   bi’.gi.naa ‘beginner’, to’.ro.fii ‘trophy’, a’.ma.zon ‘Amazon’, ka’.ra.yan ‘Karajan (conductor)’, i’n.ta.byuu ‘interview’, go’o.ri.kii ‘Gor'kiy (a Russian novelist)’

Not surprisingly, there are many loanwords and pseudo-loans that are variable between the two accent patterns.

(10)   re.ba’.non~re’.ba.non ‘Lebanon’
       myuu.zi’.syan~myu’u.zi.syan ‘musician’
       en.de’.baa~e’n.de.baa ‘endeavor’
       hi.ko’.nyan~hi’.ko.nyan ‘Hikonyan, a mascot character’

Given the examples in (9) and (10), one might suspect that the Latin-type patterns may be attributable to the accent pattern of English words which account for over 80% of all loanwords in modern Japanese (Sibata 1994). However, this idea cannot be empirically supported for two reasons. For one thing, many examples displaying the Latin-type patterns in Japanese are accented in different positions in the source language: e.g. /bi’.gi.naa/ ‘beginner’ and /myu’u.zi.syan/ in Japanese *vs. begínner* and *musícian* in English. Obviously, these loanwords did not borrow the accent pattern of the source words. Moreover, most words that are coined in Japanese—pseudo loanwords—follow the Latin accent rule (1) rather than the traditional Japanese rule in (4). This can be illustrated by the names of pocket monsters in animation most of which are pronounced in accordance to the Latin rule:

(11)   ni’.do.ran, go’o.ri.kii, ka’i.ri.kii, wa’n.ri.kii, sa.wa’.mu.raa

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[2] A representative example showing this difference is a pocket monster’s name /pi.ka’.chuu/ ‘Pikachu’, which is accented on the antepenultimate syllable in English, i.e. *Píkachu*.

[3] The other six contexts do not show such variability in accent. Words with the structure in (6c), for example, do not generally allow variant accent patterns: e.g. /wa.si’n.ton/, */wa’.sin.ton/ ‘Washinton’.

One may wonder here if the Latin rule applies only to loanwords and pseudo loans in modern Japanese. This is partially correct since native and Sino-Japanese (SJ) words ending in a sequence of light and heavy syllables are still accented according to the rule in (4). However, most of these words are compounds as exemplified in (12), where hyphens are used to denote morpheme boundaries. The SJ word in (12a), for example, consists of two SJ morphemes /ga.ku/ and /mon/.[4] The word /pi.ka'-chuu/ in (12b) is also a compound made up of two mimetic morphemes, /pi.ka/ 'with a flash' and /chuu/ 'squeak'. The accentuation of these compounds can be accounted for by the compound accent rule of the language in a straightforward manner (Kubozono 1997, 2008b).

(12) a. ga.ku'-mon 'learning' (Sino-Japanese)
      b. pi.ka'-chuu 'Pikachu' (mimetic)
      c. su.zu'-ran 'lily of the valley' (hybrid of native and SJ morphemes)

In summary, the general notion of syllable weight provides the common grounds on which the accent rules and system of Tokyo Japanese can be compared with those of other languages including Latin and English in an explicit and quantitative manner. Moreover, the same notion sheds new light on the nature of the ongoing accent changes and accent variations in modern Japanese that would otherwise remain unexplained. This line of research, if expanded to various Japanese dialects, is expected to reveal the general nature of accent rules in a variety of pitch accent systems of the language.

2. Superheavy syllables

While superheavy syllables form a third type of syllable in the theory of syllable weight in (5), the existence of superheavy syllables is controversial since many languages exhibit a tendency to avoid them. This is very evident in the history of European languages. Latin, for example, attempted to avoid this marked structure by turning long vowels into short ones in closed syllables. This process, generally known as 'closed syllable vowel shortening', had an effect of changing trimoraic syllables into bimoraic ones. Another process affecting the weight of syllables is 'open syllable vowel lengthening', by which short vowels became long in open syllables. These two processes are illustrated in (13) (Martinet 1955, Kubozono 1995).

(13) a. Open syllable vowel lengthening (Light → Heavy)
          rŏ.ta → rō.ta 'wheel'
      b. Closed syllable vowel shortening (Superheavy → Heavy)
          stēl.la → stĕl.la 'star'

The two processes in (13) are two sides of a single coin: they conspired to transform the trichotomous system in (5) into a system which only permits the intermediate syllable weight, i.e. heavy syllables. They also served to make vowel length

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[4] There is a strict size restriction on SJ morphemes, which are maximally bimoraic. Native morphemes are also relatively short, ranging from one mora to three moras in most cases.

a redundant and predictable feature in the system: long and short vowels appear in a complementary manner in the new system as long vowels occur only in open syllables and short vowels only in closed syllables.[5] This lack of phonological contrast in vowel length is known as 'isochrony' (or 'isochronie') in the literature (Martinet 1955).

The history of 'isochrony' can be more clearly reconstructed in English, where the two processes in (13) occurred over more than one thousand years. Specifically, open syllable vowel lengthening first occurred in monosyllabic words and spread to polysyllabic words, whereas closed syllable vowel shortening occurred in the opposite direction (Árnason 1980, Kubozono 1995). The state of isochrony was not fully established in this language since the two processes, especially closed syllable vowel shortening in monosyllabic words, did not occur completely.

(14) a. Open syllable vowel lengthening in stressed syllables (Light → Heavy)
           hwă → hwā 'who' (4ᵗʰ century~)
           nŏ.se → nō.se 'nose' (12–14ᵗʰ century)
      b. Closed syllable vowel shortening in stressed syllables (Superheavy → Heavy)
           gōd spell → gŏdspell 'gospel' (6–7ᵗʰ centry)
           kēp.te → kĕp.te 'kept'; mēt.te → mĕt.te 'met' (11ᵗʰ century)
           gōn → gŏn 'gone'; dūn → dŭn 'done'; sēd → sĕd 'said' (15–16ᵗʰ century)

Having understood the general tendency towards heavy syllables in European languages, one will naturally wonder if Japanese might show the same tendency, particularly the tendency to avoid superheavy syllables. However, this question was not at issue in Japanese phonology until quite recently. The main reason is that long vowels and diphthongs cannot take a coda consonant in native and SJ morphemes. In historical perspectives, neither long vowels/diphthongs nor coda consonants existed in Old Japanese and they did not co-occur in a syllable even after they were introduced into the language (Kubozono 1995). Because superheavy syllables did not exist in the history of the language, this type of syllable weight was not discussed in Japanese phonology. If one looks at loanword phonology, however, one finds several seemingly independent phenomena that can all be attributed to the tendency against this syllable type. These phenomena are described in (15) (Kubozono 1995, 2015).

(15) a. Consonant gemination and antigemination
           kap.pu 'cup' vs. kaa.pu, *kaap.pu 'carp'
           bak.ku 'back' vs. bai.ku, *baik.ku 'bike'
      b. Pre-nasal vowel shortening
           su.ten.re.su 'stainless', fan.dee.syon 'foundation', ken.bu.rid.dzi 'Cambridge'
           kon.bii.fu 'corned beef', gu.rin.pii.su 'green peas', men.te.nan.su 'maintenance'

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[5] This is closely related to the well-known fact that vowels in closed syllables are phonetically shorter than those in open syllables across languages (Maddieson 1985).

    c. Nasal deletion
       a.<u>rai</u>.men.to 'alignment', en.taa.<u>tei</u>.men.to 'entertainment'
    d. Vowel insertion
       ai.su.ku.rii.mu, *ai.su.ku.riin 'ice cream'
    e. Vowel coalescence (au → o)
       <u>pon</u>.do 'pound', <u>on</u>.su 'ounce'

    The phenomenon in (15a) shows a contrast between gemination and so-called 'anti-gemination'. Gemination is a very popular process in Japanese loanwords which takes place after short vowels but not after long vowels or diphthongs (Lovins 1975, Quackenbush and Ohso 1990, Kubozono, Takeyasu and Giriko 2013, Kawagoe 2015). This restriction was attributed to a phonotactic constraint prohibiting long vowels/diphthongs from cooccuring with geminate obstruents, but this generalization is merely a restatement of the fact that is far from an explanation. Seen from the viewpoint of syllable weight, gemination after short vowels yields heavy syllables in words that would otherwise have light syllables: e.g. /kap.pu/, */ka.pu/ 'cup'. On the other hand, non-gemination after long vowels and diphthongs also results in heavy syllables, while gemination in this context would yield trimoraic syllables: e.g. /kaa.pu/, */kaap.pu/ 'carp'. Considered together, consonant gemination after short vowels and non-gemination after long vowels or diphthongs exerted a common effect: they both produced heavy syllables in preference to light and superheavy syllables. Seen in this light, the occurrence or non-occurrence of consonant gemination in Japanese loanwords achieves the same function that vowel lengthening in open syllables and vowel shortening in closed syllable played in the systems of Latin and English above.

    Vowel shortening in (15b) can also be interpreted in the same way. English tense vowels and diphthongs are usually borrowed as long vowels and diphthongs in Japanese, but they tend to be shortened when they are followed by a coda nasal, which is borrowed as a moraic nasal. In other words, Japanese tends to convert CVVC syllables into CVC by shortening long vowels or deleting the second half of diphthongs. Lovins (1975) called this process 'pre-nasal vowel shortening', but this does not explain why long vowels and diphthongs tend to be shortened in this particular context. On the other hand, an analysis based on syllable weight provides a principled account. Under this analysis, the bimoraic vowel sequences are converted to monomoraic length because they would otherwise create superheavy syllables together with the coda nasal. Vowel shortening in this context yields heavy syllables out of superheavy ones: */su.<u>tein</u>.re.su/ → /su.<u>ten</u>.re.su/ 'stainless', */<u>faun</u>.dee.syon/ → /<u>fan</u>.dee.syon/ 'foundation'.[6]

    The processes in (15c–e) are minor ones, each of which accounts for sporadic examples. In (15c), coda nasals were deleted in syllables which would otherwise have resulted in superheavy ones (CVVC): e.g. */en.taa.<u>tein</u>.men.to/ → /en.taa.

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[6] This process permits quite a few exceptions that are discussed below.

<u>tei</u>.men.to/ 'entertainment'.[7] The word 'ice cream' in (15d) shows an interesting history, too. This word first entered Japanese as /ai.su.ku.rin/, whose final syllable consisted of a short vowel and a moraic nasal. In the course of time, however, the vowel became long probably because it comes from a tense vowel in the source language. Interestingly, this change was accompanied by a change in the status of the final consonant: it changed from the coda nasal into an onset consonant to form a new syllable together with the following epenthetic vowel. This seemingly strange phenomenon can be accounted for in a reasonable way if interpreted in terms of syllable weight. Since Japanese did not tolerate superheavy syllables in the final position, i.e. */riin/, it chose to divide it into two syllables by inserting an epenthetic vowel at the end, turning the nasal into the onset of a new syllable: i.e. */riin/ → /rii.mu/. Finally, (15e) shows sporadic instances of vowel coalescence in loanwords whereby /au/ was shortened to /o/ (see Kubozono 2015 for more details about vowel coalescence). This change, too, exerted an effect of creating heavy syllables out of strings that would otherwise have yielded trimoraic ones: e.g. */<u>paun</u>.do/ → /<u>pon</u>.do/ 'pound'

   In summary, all the phenomena in (15) can be generalized in a principled manner under the analysis of syllable weight. In segmental terms, they represent different processes that seem unrelated to each other. If seen from the viewpoint of syllable weight, however, they can be seen to occur for a common target—to avoid creating superheavy syllables. This is a case of 'conspiracy' in Kisseberth's terminology (Kisseberth 1970). In the current framework of Optimality Theory, all the phenomena in (15) can be accounted for by the universal constraint in (16) (Prince and Smolensky 1993/2004).

(16)   Trimoraic syllable ban ($*\sigma_{\mu\mu\mu}$)

   Seen conversely, the five cases in (15) have demonstrated a wide range of options that languages can take to avoid superheavy syllables. Vowel shortening in closed syllables in (13) and (14), which is widely observed in European languages, is certainly not the only solution to avoid this marked syllable structure. Japanese data can thus contribute to general linguistics by showing that the marked structure can be avoided in multiple ways in a single language. The data and discussions in the following section reinforce this argument.

3. More on superheavy syllables
3.1. Pseudo superheavy syllables
Given the arguments for the constraint banning superheavy syllables in Japanese, one might point out that this marked syllable structure is still observed in a good number of loanwords of the language. This can be exemplified in (17), where what appears to be a trimoraic syllable is shown underlined without syllable boundar-

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[7] Coda nasals were deleted in these words probably because of the nasal /m/ in the immediately following syllable.

ies. These words, which apparently failed to undergo the processes in (15), may be either morphologically simplex, e.g. /toon/ 'tone', /su.pein/ 'Spain', or complex, e.g. /su.pein-ka.ze/ 'Spanish flu', /rain-ga.wa/ 'Rhine River', in Japanese. The three words ending in /kko/—/too.kyook-ko/ 'a native of Tokyo' in (7a), /gen.daik-ko/ 'a child of the new generation' in (17b), and /ron.donk-ko/ 'a native of London' in (17c)—involve a geminated /k/ that emerged as two words combined to form a compound: e.g. /too.kyoo/ + /ko/ → /too.kyook-ko/.

(17)   a.   long vowel + coda nasal/obstruent
             <u>toon</u> 'tone', <u>koon</u> 'corn', <u>roon</u> 'loan', to.ron.<u>boon</u> 'trombone', rin<u>kaan</u> 'Lin-
             coln', gu.<u>riin</u> 'green', too.<u>kyook</u>-ko 'a native of Tokyo, Tokyoite'
       b.   diphthong + coda nasal/obstruent
             <u>sain</u> 'sign, signature', <u>rain</u> 'line, Rhine', <u>koin</u> 'coin', su.<u>pein</u> 'Spain',
             ko.<u>kain</u> 'cocaine', a.<u>naun</u>.saa 'announcer, news reader',
             su.<u>pein</u>-ka.ze 'Spanish flu', <u>koin</u>.syoo 'coin dealer', <u>rain</u>-ga.wa 'Rhine River',
             de.<u>zain</u>-ha.ku 'Design Exposition', gen.<u>daik</u>-ko 'a child of the new gen-
             eration'
       c.   short vowel + coda nasal + coda obstruent
             ron.<u>donk</u>-ko 'Londoner, a native of London'

The existence of these words may suggest that superheavy syllables do exist in Japanese and are tolerated rather freely albeit the arguments to the contrary in the preceding section. However, phonological analyses of these words reveal that most, if not all, of the trimoraic sequences in question are composed of two syllables rather than one unified syllable.

3.2. An accent test in Tokyo Japanese
The first argument against the monosyllabic interpretation of the trimoraic sequences comes from an analysis of word accent in Tokyo Japanese. As mentioned in (3b) above, this dialect does not permit word accent to be assigned to non-head moras of syllables.[8] If an accent is placed by a certain rule on such a mora, it auto-matically shifts to the head mora of the relevant syllable. This accent shift can be shown as in (18), where word accent is denoted by H'.

(18)   *σ   σ

          μ   μ   ⇒   μ   μ

                 | |
                H'   H'

_____
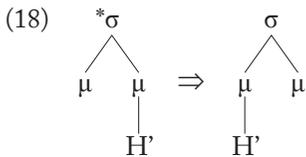
[8] Head and non-head moras are labeled in several different ways in the literature: the for-mer is also termed 'independent mora' or 'syllabic mora', whereas the latter is also variously called, e.g. 'dependent mora', 'deficient mora' , 'special mora', or 'non-syllabic mora' (Kubozo-no 1989).

In simplex nouns, for example, word accent is usually assigned to the antepen-ultimate mora according to the rule in (3a) above. If the antepenultimate mora is a non-head mora, as in (19a), the accent moves one mora to the left, i.e. onto the head mora of the same syllable. Accent shifts of the same kind take place in compound nouns, too, as illustrated in (19b): while the default position of the compound accent is the final mora of the first member if the second member is 'short' (monomoraic or bimoraic), it moves one mora to the left if the first member ends in a non-head mora. In either case, the accent docks on the head mora of a relevant syllable in this dialect.

(19) a. wa.sin'.ton → wa.si'n.ton 'Washington'
          sai'.daa → sa'i.daa 'lemonade'
          e.re.bee'.taa → e.re.be'e.taa 'elevator'
      b. hok.kai'-doo → hok.ka'i-doo 'Hokkaido (placename)'
          syoo.nai'-gawa → syoo.na'i-gawa 'Shonai River'

This rule can be used to test the syllable structure of the trimoraic sequences in (17). This test reveals that most of the trimoraic sequences in question constitute two syllables, i.e. a light syllable followed by a heavy syllable, instead of a single trimoraic syllable. /rain-gawa/ in (20a), for example, is accented on /i/ rather than /ra/, suggesting that /i/ is the head mora of /in/, whereas /ra/ forms an indepen-dent syllable on its own. Native speakers' intuition fluctuates in some words as in (20e–f), but even in such cases, the most natural accent pattern is the one with an accent on the second mora of the trimoraic sequences in question.

(20) a. rain'-gawa → ra.i'n-gawa, *ra'in-gawa 'Rhine River'
      b. su.pein'-ka.ze → su.pe.i'n-kaze, *su.pe'in-ka.ze 'Spanish flu'
      c. koin'-syoo → ko.i'n-syoo, *ko'in-syoo 'coin dealer'
      d. a.naun'.saa → a.na.u'n.saa, *a.na'un.saa 'announcer'
      e. ron.donk'-ko → ron.do.n'k-ko, ˀron.do'nk-ko 'Londoner'
      f. rin.kaan'-hai → rin.ka.a'n-hai, ˀrin.ka'an-hai 'Lincoln Cup'

One potential exception to the general pattern in (20) is the past tense form of the verb /kooru/ 'to freeze', i.e. /koot-ta/, where the accent placed at the end of the stem moves to the left by two moras rather than one: /koot'-ta/ → /ko'ot-ta/, */ko.o't-ta/ 'froze'. This is a case similar to the variant accent pattern in (20f), /rin. ka'an-hai/, where the trimoraic sequence constitutes one single syllable if the first two moras form a long vowel. Long vowels thus seem to be more resistant than diphthongal vowel sequences to being split into two syllables.

3.3. *Kattobasee* test

Another phonological test that we can use to examine the structure of trimoraic sequences in question is the so-called *Kattobasee* test, which is based on the chant that baseball fans use to cheer their favorite player. This chant consists of the phrase *kattobasee* 'hit a homerun' followed by the player's name (XXX).

(21)   Kattobasee XXX

Since the latter half of this chant consists of three slots (XXX), possibly followed by a pause, trimoraic names can fit the template very easily, irrespective of their syllable structure: /su.zu.ki/ 'Suzuki' (LLL), /po.pai/ 'Popeye' (LH), or /rai.to/ 'Wright' (HL). This is shown in (22), where dashes (–) are used to denote the boundaries between each slot.[9]

(22)   Kattobasee X X X
                    | | |
                    su–zu–ki 'Suzuki'
                    po–pa–i 'Popeye'
                    ra–i–to 'Wright'
                    pu–u–ru 'Pool'

   The chant is sensitive to the syllable structure of words if they are four moras long or longer. The basic rule employed in such cases is to link the last *syllable* of the name to the third X slot in the template (Tanaka 1999). This is illustrated in (23), where the syllable structure of each word is given in parentheses.

(23)   Kattobasee X X X
                    | | |
                    i–chi–roo 'Ichiro' (LLH)
                    na–gasi–ma 'Nagashima' (LLLL)
                    da–a–win 'Darwin' (HH)
                    sa–nta–na 'Santana' (HLL)
                    zu–ree–ta 'Zuleta' (LHL)
                    wa–sin–ton 'Washington' (LHH)
                    makudo–naru–do 'McDonald' (LLLLLL)

   Applying this rule to the names with the pseudo superheavy syllables in (17) yields the results summarized in (24).

(24)   a.   su–pe–in, ?su–pei–n, *su–u–pein 'Spain'
       b.   de–za–in, ?de–zai–n, *de–e–zain 'design'
       c.   ko–ka–in, *ko–kai–n, *ko–o–kain 'cocain'
       d.   se–meda–in, ?seme–dai–n, *se–me–dain 'Cemedine'
       e.   kya–ro.ra–in, ?kya.ro–rai–n, *kya–ro–rain 'Caroline'
       f.   rin–kaa–n, ri–n–kaan, *ri–nka–an 'Lincoln'
       g.   ha.ri–kee–n, ha–ri–keen, *ha–ri.ke–en 'Hurricane'

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[9]   If the name consists of only two moras, the first mora is linked to the first two X slots, whereas the second mora is associated with the third slot. This means that the vowel of the first mora is lengthened with the result that the two-mora name is pronounced in the same way as the originally HL names like /puu.ru/ 'Pool' in (22). The tendency to turn LL bisyllables into HL bisyllables is observed in a wide range of phenomena in Japanese (Kubozono 2003).

Overall, the trimoraic sequences in question split into two chunks, with only the last two moras being linked to the third X slot in the three-X template. This is by far the best option for sequences involving a diphthong, as shown in (24a–e). This means that three-mora sequences consisting of a diphthongal vowel sequence and a coda consonant are actually composed of two syllables, i.e. a light syllable followed by a heavy one. The second best option in these instances is the one dividing the same sequences into a bimoraic syllable and a monomoraic one, e.g. /su–pei–n/, where the moraic nasal constitutes a syllable by itself. In contrast, the option that integrates the three mora sequences into one syllable, e.g. /kya–ro–rain/, is the worst.

However, the situation is slightly different if the trimoraic sequences involve a long vowel as in (24f, g). In these instances, the option dividing them into HL bisyllables is the best, e.g. /kaa–n/, and so is the option accommodating them into one syllable, e.g. /kaan/. This suggests that long vowels show resistance to being split into two syllables even when they are followed by a coda consonant.

3.4. Evidence from Kagoshima Japanese

More compelling evidence against the existence of superheavy syllables comes from an accent analysis of Kagoshima Japanese, a dialect spoken in the south of Japan (Kubozono 2004, 2006b, 2015). The accent system of this dialect is different from the systems of most other Japanese dialects in that it computes the position of the accent—or, equivalently, the position of H(igh) tone in this dialect—by counting the number of *syllables* from the end of the word. This system permits only two accent classes or types and is hence called a two-pattern system (Hirayama 1951, Uwano 1999, Kibe 2000). Specifically, Type A has an H tone on the penultimate syllable, whereas Type B has an H tone on the final syllable. Phonologically, these two types therefore contrast either in the position of the H tone (Hirayama 1951, etc.) or in the presence or absence of a pitch fall (Shibatani 1990, Kubozono 2011a, forthcoming/b). Most loanwords take Type A pattern (Kibe and Hashimoto 2003), as shown in (25), where capital letters indicate H-toned syllables.

(25) a. ku.ri.su.MA.su 'Christmas', su.to.RE.su 'stress', su.TO.roo 'straw'
       b. RON.don 'London', wa.SIN.ton 'Washington'
       c. e.re.BEE.taa 'elevator', e.su.ka.REE.taa 'escalator'
       d. SAI.daa 'lemonade', a.ru.KAI.da 'Al-Qaeda'
       e. SAT.tyaa '(Mrs.) Thatcher', RES.sun 'lesson'

Being sensitive to syllable boundaries, this accent rule can be used to show how the trimoraic syllables in (17) are syllabified in this dialect. This phonological test reveals that all the pseudo superheavy syllables function as two syllables.[10] This is demonstrated in (26), which shows that all three groups of trimoraic sequences in

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[10]This analysis is based on the author's fieldwork study employing five native speakers of the dialect.

(17a–c) are decomposed into a monomoraic syllable plus a bimoraic one. In particular, long vowels as well as diphthongal vowel sequences split into two syllables as in (26g–j),[11] often showing an alternation between two accent patterns depending on whether the vowels are actually pronounced as long or short: e.g. /rin.KA.an/~ /RIN.kan/ 'Lincoln', /to.ron.BO.on/~/to.RON.bon/ 'trombone'. Similarly, trimoraic sequences ending in the first half of a geminate consonant show the same segmentation pattern, as shown in (26k, l). These instances, too, show an alternation between two accent patterns depending on whether they involve a gemination or not: /gen.da.IK-ko/~/gen.DAI-ko/ in (26k) and /ron.do.NK-ko/~/ron.DON-ko/ in (26l).

(26) a. de.ZA.in, *DE.zain 'design'; de.za.IN-tyoo 'design notebook'
      b. ba.ren.TA.in, *ba.REN.tain 'Valentine'; ba.ren.ta.IN-dee 'Valentine's Day'
      c. su.PE.in, *SU.pein 'Spain'; su.pe.IN-zin 'Spanish people'
      d. ko.IN-syoo, *KOIN-syoo 'coin dealer'
      e. u.IN.naa, *UIN.naa 'wiener sausage'
      f. a.na.UN.saa, *a.NAUN.saa 'announcer'
      g. rin.KA.an, ?RIN.kaan 'Lincoln' (cf. RIN.kan)
      h. rin.ka.AN-hai, *rin.KAAN-hai 'Lincoln Cup'
      i. to.ron.BO.on, ?to.RON.boon 'trombone' (cf. to.RON.bon)
      j. ha.ri.KE.en, *ha.RI.keen 'hurricane'
      k. gen.da.IK-ko, *gen.DAIK-ko 'a child of the new generation' (cf. gen.DAI-ko)
      l. ron.do.NK-ko, *ron.DONK-ko 'Londoner' (cf. ron.DON-ko)

Not surprisingly, the same accent test shows that trimoraic sequences split into two syllables in inflected forms of verbs, too, which, as discussed at the end of section 3.2 above, apparently form superheavy syllables in Tokyo Japanese. The accent patterns in (27) clearly show that long vowels form one syllable when followed by no coda but split into two syllables if followed by a coda.

(27) a. ko.OT.ta 'froze, frozen' (cf. KOO.ru 'to freeze')
      b. o.OT.ta 'covered' (cf. OO.u 'to cover')
      c. su.ki.to.OT.ta 'became transparent' (cf. su.ki.TOO.ru 'to become transparent')

To summarize, all the trimoraic sequences that seem to form superheavy syllables at a glance actually function as a sequence of two syllables in Kagoshima Japanese. Even those consisting of a long vowel and a coda consonant in fact form two syllables, a light syllable followed by a heavy one, i.e. /CV.VC/.

3.5. Evidence from Koshikijima Japanese
Koshikijima Japanese provides another source of data regarding the markedness of

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[11] Long vowels tend to be shortened when they are combined with the following coda consonant to form what appears to be a superheavy syllable: e.g. /RIN.kaan/~/RIN.kan/ 'Lincoln'.

superheavy syllables. It is a highly endangered language spoken on a small island in the south of Japan, with only three thousand native speakers. This language actually consists of several dialects which differ from each other considerably in their word accent patterns. The dialect that is discussed in this section is the Teuchi dialect, spoken by about 800 people at the southern edge of the island. Being a sister language to Kagoshima Japanese, Koshikijima Japanese including the Teuchi dialect has a two-pattern accent system like Kagoshima. These two accent classes (Type A and Type B) correspond to the two accent classes in Kagoshima in such a way that most words that belong to Type A in Kagoshima belong to the same class in Koshikijima, whereas most words that take Type B pattern in Kagoshima take Type B in Koshikijima.[12] However, the two languages significantly differ from each other in the phonological shapes of the two accent types. Different dialects of Koshikijima differ from each other in a similar fashion.

Unlike its sister language, Koshikijima Japanese is basically a mora-counting language in that it counts the number of moras and not syllables in computing the position of phonological prominences. Moreover, most dialects of Koshikijima are different from Kagoshima Japanese in showing two pitch peaks or H tones in relative long words, one at or near the end of the word and the other at its beginning. The phonologically primary prominence or H tone generally appears on the penultimate mora in Type A words and on the final mora in Type B words. It is this tone that appears in short words showing only one prominence. In the Teuchi dialect, all other syllables are H-toned as secondary prominence except the syllable (or syllable-sized unit) immediately before the mora associated with the primary H tone (Kubozono 2010, 2012c/d). This is illustrated in (28).

(28) a. Type A words
      o.NA.go 'woman', ba.NA.na 'banana', A.ma.ZA.ke 'sweet drink made from fermented rice', NA.TU-ya.SU.mi 'summer holiday', WA.sin.TOn 'Washington', KE.da.MO.no 'wild animal', KE.da.MOn 'wild animal (colloquial)'
      b. Type B words
      O.to.KO 'man', A.SA.ga.O 'morning glory (flower)', HA.RU.YA.su.MI 'spring holiday', NI.hon-GO 'Japanese language'

This accent rule is basically a mora-counting one as can be seen from the comparison between /KE.da.MO.no/ and /KE.da.MOn/ 'wild animal', both of which receive a primary H tone on the penultimate mora irrespective of the difference in syllable structure.[13] However, it is sensitive to syllable structure, too, in two crucial

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[12]Many native speakers of Koshikijima Japanese are able to speak Kagoshima Japanese, too, although not vice versa. This is because Kagoshima Japanese is socially more prestigious than Koshikijima Japanese: local people on the Koshikijima Island speak their native language at home but are taught in Kagoshima Japanese at school, where most teachers come originally from the mainland of Kagoshima.
[13]The same words are pronounced as /ka.da.MO.no/ and /ka.DA.mon/, respectively, in the syllable-counting system of Kagoshima Japanese: cf. (25).

ways (Kubozono 2010, 2012c/d). First, the two H tones are usually separated by one L(ow)-toned *syllable*, not by one L-toned *mora*.[14] This can be seen very clearly in words like /WA.sin.TOn/ (Type A) in (28a) and /NI.hon-GO/ 'Japanese language' (Type B) in (28b). Secondly, the primary H tone moves to the head mora of the same syllable if it falls on a non-head mora by rule. This H tone shift is identical in nature to the accent shift in Tokyo Japanese described in (19) above. Strangely enough, however, this H tone shift occurs only in Type A words, but not in Type B words.[15] This is illustrated in (29).

(29)   a.   Primary H tone shift in Type A words
            paN.tu → PAn.tu 'pants'
            puU.ru → PUu.ru 'swimming pool'
            raI.to → RAi.to 'light, right'
       b.   Lack of H tone shift in Type B words
            MI.kaN, *mi.KAn 'orange'
            KOO.TYOO-SEN.seI, *KOO.TYOO-sen.SEi 'school principal'

    Being sensitive to syllable boundaries as well as mora boundaries, the accent rules described in (28) and (29) can give an insight into the nature of trimoraic sequences in (17). It actually allows us to conduct two accent tests, one regarding the L-toned portion between the two H tones and the other concerning the shift of the primary H tone in Type A words described in (29a).[16] Based on the generalizations given in (28) and (29), the word /ba.ren.tain/ 'Valentine', for example, is expected to produce /BA.ren.TAin/ if /tain/ forms one syllable: the primary H tone originally assigned to /i/ would shift to the head mora of the same syllable, i.e. /ta/, while the secondary H tone would be realized on /BA/ with /ren/ as an intervening L-toned syllable. Similarly, the word /ba.ren.tain-dee/ 'Valentine's Day' would yield /BA.REN.tain-DEe/ if /tain/ formed one syllable. These predictions cannot be borne out, however. What is actually observed instead is /BA.REN.ta.In/ and /BA.REN.TA.in-DEe/, which both indicate that /tain/ consists of two syllables, /ta/ plus /in/. The same results are obtained for other types of trimoraic sequences involving a diphthong-like vowel sequence in (30).

(30)   a.   /ain/
            sa.In, *SAin 'sign, signature'
       b.   /aun/
            da.Un, *DAun 'down'
            BU.ra.Un, *bu.RAun 'brown'

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[14]This permits one notable exception. The syllable immediately preceding the primary H tone is also H-toned if it is a heavy syllable and is the only syllable in this word position: e.g. /BII.Ee/ 'BA', /RON.DOn/ 'London' vs. /o.NA.go/ 'woman', /E.MU.bii.Ee/ 'MBA'.
[15]This asymmetry between Type A and Type B can be attributed to a force to preserve the contrast between the two accent types. See Kubozono (2012c/d) for a detailed analysis.
[16]What is reported here is based on the author's fieldwork study that looked at two middle-aged native speakers of the dialect.

   BU.RA.un.KAn, *BU.raun.KAn 'TV tube'
   A.NA.un.SAa, *A.naun.SAa 'announcer'
   A.na.Un.su, *a.NAun.su 'announcement'
  c. /ein/
   SU.pe.In, *su.PEin 'Spain'
   SU.PE.in-KA.ze, *SU.pein-KA.ze 'Spanish flu'
   SU.PE.in-ZIn, *SU.pein-ZIn 'Spanish people'
  d. /oin/
   ko.In, *KOin 'coin'
   SAA.ro.In, *SAA.ROin 'sirloin'
   KO.in.SYOo, *KOIN.SYOo 'coin dealer'
  e. /uin/
   tu.In, *TUin 'twin'
   U.in.NAa, *UIN.NAa 'wiener sausage'
   KU.in-BIi, *KUIN-BIi 'Queen bee'

This said, we must hasten to add that other types of trimoraic sequences exhibit slightly different patterns. First, trimoraic sequences consisting of a long vowel and a coda consonant tend to form one syllable in this dialect, contra to what we observed in Kagoshima Japanese above. They actually yield the accent patterns in (31), where NOM denotes a nominative marker.[17] In these instances, /CVVC/ usually forms one syllable. (31a, b), for example, show that /keen/ forms one syllable with /ke/ as its head mora. (31c) more clearly indicates that /keen/ forms one syllable as it is L-toned between the two H tones. Overall, long vowels are integrated into one syllable together with the coda consonant immediately following them, thus supporting the interpretation of /CVVC/ as a superheavy syllable. The only exception to this is the variant pattern in (31f), i.e. /RIN.KA.an-KA.ra/, where /kaan/ splits into two syllables, /ka/+/an/.

(31) a. HA.ri.KEen, *HA.RI.ke.En 'hurricane'
  b. HA.ri.KEen-ga, *HA.RI.ke.En-ga 'hurricane-NOM'
  c. HA.RI.keen-KA.ra, *HA.RI.KE.en-KA.ra 'from (the) hurricane'
  d. RIN.KAan, *RIN.ka.An 'Lincoln'
  e. RIN.KAan-ga, *RIN.ka.An-ga 'Lincoln-NOM'
  f. RIN.kaan-KA.ra~RIN.KA.an-KA.ra 'from Lincoln'

Trimoraic words consisting of a long vowel followed by a consonant also often permit two accent patterns, as illustrated in (32). The first variants in these examples are H-toned on the initial mora. This indicates that this initial mora forms a syllable with the second mora, which, in turn, means that the long vowels form one syllable. On the other hand, the second moras are H-toned in the second variants in (32a, b). This accent pattern shows that the second mora functions as a head mora, which, in turn, indicates that the long vowels split into two syllables.

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[17] The domain of pitch accent assignment in this dialect is *bunsetsu*, or a content word plus one or more grammatical particles: see section 4.4 for more details about this domain issue.

(32) a. ROon~ro.On 'loan'
      b. TYEen~tye.En 'chain'

Trimoraic sequences involving a geminate consonant also display a monosyllabic behavior, as shown in (33), where /Q/ denotes the first half of a geminate consonant. The accent pattern in (33a) shows, for instance, that the first mora of /daik/ is a head mora, whereas the second and third moras of the same trimoraic sequence are not. The secondary H tone is realized on the word-initial heavy syllable in (33), with no intervening L-tone syllable before the primary H tone. This is a pattern very often observed in words where there is only one heavy syllable left before the primary H tone (Kubozono 2010, 2012c/d).

(33) a. /aiQ/ GEN.DAik-ko, *GEN.da.Ik-ko 'a child of the new generation'
      b. /onQ/ RON.DOnk-ko, *RON.do.Nk-ko 'Londoner'

In summary, the Teuchi dialect of Koshikijima Japanese consistently divide /CVVC/ into two syllables, /CV/ and /VC/, if /VV/ consists of a diphthongal vowel sequence. It is similar to Kagoshima Japanese in this respect. On the other hand, it shows a fluctuation between monosyllabic and bisyllabic patterns if /VV/ involves a long vowel. This is a situation similar to the one observed for Tokyo Japanese, where long vowels often belong to the same syllable even when they are followed by a coda consonant.

3.6. Summary

Our discussion regarding superheavy syllables can be summarized in the following three points. First, while Japanese did not have any morphemes containing a trimoraic syllable, this does not mean that the language is free from the constraint banning this type of syllable structure. On the contrary, careful analyses of the phonological structure of loanwords reveal that superheavy syllables have been avoided in various ways as they were about to enter the language. This includes the non-gemination of consonants after long vowels and diphthongs as well as vowel shortening before coda nasals.

Second, the language nevertheless permits three-mora sequences that appear to form superheavy syllables, but these sequences actually function as two syllables in phonological tests such as accent tests and the *kattobasee* test. In most cases, these trimoraic sequences form a sequence of a light syllable and a heavy one. Japanese does not show noticeable inter-dialectal differences as far as trimoraic sequences involving a diphthong-like sequence are concerned: e.g. /ra.in/ 'Rhine, line'. It is interesting to note that /ai/, for example, splits into two syllables—/a/ and /i/—when followed by a coda consonant, while it should otherwise form a well-formed diphthong and constitutes one syllable in the language.[18]

Third, trimoraic sequences involving a long vowel often behave differently

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[18]Japanese has three real diphthongs—/ai/, /oi/, and /ui/—while splitting /au/ into two syllables. See Kubozono (2008a, 2015) for a detailed discussion of Japanese diphthongs and the asymmetry between /ai/ and /au/.

from those involving a diphthong-like vowel sequence: they behave as a sequence of two syllables in many cases, but they are sometimes integrated into one syllable, i.e. a superheavy syllable. Interestingly, this type of trimoraic sequences shows a variation in phonological patterning between one dialect and another as well as between one phonological process and another within the same dialect (and maybe between one speaker and another).

Although we looked at only a few dialects of Japanese in the foregoing discussion, the language has many more dialects which are known for their diversity of pitch accent systems. In this respect, studies of Japanese dialects have great potential to reveal a wide range of possibilities and variations regarding how superheavy syllables are avoided. The diversity of pitch accent systems in Japanese can thus contribute to our better understanding of phonological structure. This possibility will be discussed in more detail in the next section.

4. Diversity of pitch accent systems in Japanese
4.1. Multiple-pattern versus N-pattern systems

Japanese is a pitch accent language where pitch or fundamental frequency is used as a dominant cue to word-level prominence. While most Japanese dialects share this feature,[19] they differ quite considerably in the way their prosodic systems are organized. The most standard typology of Japanese pitch accent systems is based on the number of (distinctive) pitch accent patterns defined at the word level (see Hirayama 1960 and Uwano 1999, to mention just a few). According to Uwano's (1999) typology, Japanese pitch accent systems fall into two groups, multiple-pattern and N-pattern systems. In the former group, the number of distinctive pitch patterns can increase as the word becomes longer. Thus, Tokyo Japanese has two patterns for monosyllabic nouns, three patterns for bisyllabic nouns, four patterns for trisyllabic nouns, etc. (McCawley 1968, Akinaga 1985). In contrast, N-pattern systems have a fixed number of pitch patterns defined independent of word length. Thus, Kagoshima and Koshikijima Japanese have a two-pattern system, contrasting between Type A and Type B, as we saw in the preceding section. Some dialects have a three-pattern system, as we will see in section 4.3 below.

The crucial difference between multiple-pattern and N-pattern systems lies not in the number of distinctive pitch patterns per se, but in the nature of pitch specifications in the lexicon (Hayata 1999, Kubozono 2012c). In multiple-pattern systems, a particular position of the word—either a particular syllable or a particular mora—is the docking site of phonological prominence. Since a particular position is designated as the locus of prominence at the lexical level, the number of potential loci for the prominence increases as the word becomes phonologically longer. Tokyo Japanese, for example, has n patterns plus one pattern for nouns with n syllables, with the extra one pattern being the unaccented pattern in which no syllable is specified for lexical pitch. In N-pattern systems, on the other hand, it is the

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[19] Some Japanese dialects are insensitive to pitch at the word level. These dialects are called 'accentless' dialects which lack word-level prominences defined by pitch.

overall pitch pattern or shape that is lexically determined, just as the 'tones' in typical tone languages like Mandarin Chinese (Pike 1948). Since a certain position of word is not marked in the lexicon, the number of patterns is independent of the length of the word. Seen in this light, the notion of multiple-pattern systems in Uwano (1999) basically corresponds to what Hayata (1999) called 'word accent', while Uwano's notion of N-pattern systems corresponds to Hayata's notion of 'word tone'.

Not surprisingly, the binary classification of Japanese pitch accent systems into multiple-pattern versus N-pattern types roughly corresponds to the dichotomy defining the domain of lexical pitch accent, i.e. word versus *bunsetsu* (see section 4.4 below). Since a certain position in the word is marked for lexical prominence in multiple-pattern systems, this position is invariant whether the word is pronounced by itself or with the following particle(s) and, hence, the word becomes the domain where the prominence is defined. In N-pattern systems, on the other hand, a certain word position is not marked in the lexicon, and, hence, the pitch pattern or shape that is lexically specified can spread over the domain of *bunsetsu*, i.e. the word plus one or more grammatical particles (Kubozono 2012c).

4.2. Syllable versus mora

While the number of distinctive pitch patterns is an important parameter to use in classifying Japanese pitch accent systems, it is certainly not the only one. Japanese dialects provide astonishing facts regarding the diversity and variability in how word prominence is computed. One of them concerns the phonological unit that is used to measure phonological distances. Tokyo Japanese counts the number of *moras* to compute the position of phonological prominence (McCawley 1978), as we saw in (3) and (4) above. While many other Japanese dialects also use the mora for this purpose, Kagoshima Japanese is a syllable-counting dialect, as mentioned in section 3.4 above. Particularly interesting is the fact that Nagasaki Japanese is a mora-counting dialect despite the fact that it is a sister dialect to Kagoshima. Thus, Type A words in Nagasaki bear an H tone on the second *mora* from the beginning of the word, whether this mora is the head mora of a syllable, as in (34a), or a non-head mora, as in (34b) (Sakaguchi 2001, Matsuura 2014).[20]

(34)   Type A words in Nagasaki Japanese
   a.   a.MA.za.ke 'sweet drink made from fermented rice'
        o.REn.zi 'orange'
   b.   ko.N.saa.to 'concert',
        paA.tii 'party'

Kagoshima Japanese, in contrast, places an H tone on the second *syllable* from the end of the word, whether it is a light syllable as in (35a) or a heavy syllable as in (35b) (Kibe 2000, Kubozono 2004, 2006b, 2011a).

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[20]Type B words in this dialect exhibit a rather flat pitch pattern, with a possible pitch rise towards the end of the word (Matsuura 2014). This pitch pattern is independent of the mora-counting vs. syllable-counting debate.

(35) Type A words in Kagoshima Japanese
    a. a.ma.ZA.ke
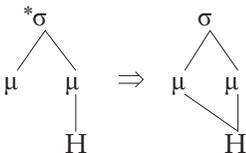   b. o.REN.zi
       kon.SAA.to
       PAA.tii

While Nagasaki and Kagoshima Japanese rely exclusively on the mora and the syllable, respectively, many other dialects of the language display a 'hybrid' system where the two phonological units are both used. Tokyo Japanese, for example, relies on the syllable as well as the mora, as we saw in (3) and (4) above. Thus, the accent assigned to the third mora from the end of the word moves to the head mora of the same syllable if falls on a non-head mora. Some examples are repeated in (36). This type of prominence shift is observed rather widely in Japanese dialects including the Teuchi dialect of Koshikijima Japanese, as we saw in (29a) above.

(36) wa.sin'.ton → wa.si'n.ton 'Washington'
      hok.kai'-doo → hok.ka'i-doo 'Hokkaido'

The Taira dialect of Koshikijima Japanese also has a hybrid system where the syllable functions as a secondary phonological unit. This system is different from the prosodic systems of all other Koshikijima dialects in displaying only one pitch peak, or H tone, within the word. Specifically, it assigns the H tone to the penultimate *mora* in Type A words and to the final *mora* in Type B words. This is illustrated in (37).

(37) a. HA.na 'nose', o.NA.go 'woman', ba.NA.na 'banana';
        zi.KAn 'time', po.PAi 'Popeye', ke.da.MOn 'wild animal'
    b. ha.NA 'flower', o.to.KO 'man', a.sa.ga.O 'morning glory (flower)'

However, the H tone spreads to the entire syllable if it happens to fall on a non-head mora. This H tone spreading, which is illustrated in (38) and exemplified in (39), is a second way to avoid the marked structure where the word prominence, or H tone, is assigned to the non-head mora of a syllable. In Japanese dialects this process does not seem as popular as H tone shift in (18) although it is widely observed in African languages (Hyman 2007).

(38)

$$\overset{*\sigma}{\overset{\displaystyle \bigwedge}{\underset{\mu \quad \mu}{\quad}}} \quad \Rightarrow \quad \overset{\sigma}{\overset{\displaystyle \bigwedge}{\underset{\mu \quad \mu}{\quad}}}$$

             | /
            H   H

(39) High tone spreading in the Taira dialect
    a. Type A
       puU.ru → PUU.ru 'swimming pool'
       paN.tu → PAN.tu 'pants'
       raI.to → RAI.to 'light, right'

b. Type B
  mi.kaN → mi.KAN 'orange (fruit)'
  sen.seI → sen.SEI 'teacher'
  syoo.tyuU → syoo.TYUU '*shochu*, distilled liquor'

Finally, the Teuchi dialect of Koshikijima Japanese has a more interesting hybrid system where the mora and the syllable interact with each other in an intricate way. This dialect displays two H tones in three-mora or longer words, as noted in section 3.5 above. The primary H tone appears on the penultimate mora (Type A) or the final mora (Type B), which means that the position of the primary tone is determined by a mora-counting procedure. The secondary H tone, in contrast, is assigned to the word-initial stretch of syllable(s), usually separated from the following primary H tone by one L-toned syllable. Since there is usually one L-toned *syllable* (not mora) between the two H tones, as exemplified in (40), the secondary H tone is assigned by a syllable-counting procedure.

(40) a. Type A
  NI.GI.ri-ME.si 'rice ball'
  NI.gii-ME.si 'rice ball (colloquial)'
  KA.ZA.ri-MOn 'ornament'
  KA.zai-MOn 'ornament (colloquial)'
  WA.sin.TOn 'Washington'
  KYOO.TOO-sen.SEi 'vice principal'
  A.KA-sin.GOo 'red signal'
 b. SEN.seI 'teacher'
  KOO.TYOO-SEN.seI 'school principal'
  A.O-SIN.goO 'green signal'

Note that the secondary H tone is also computed from the right edge of the word since its domain is correlated with the position of the primary H tone. This domain is affected by the H tone shift rule described in (29a), which shifts the position of the primary H tone one mora to the left.

(41) TYO.KO.reE.to → TYO.ko.REe.to 'chocolate'
  SUI.MIN.GU-puU.ru → SUI.MIN.gu-PUu.ru 'swimming pool'
  A.KA-paN.tu → A.ka-PAn.tu 'red pants'

Note, furthermore, that the secondary H tone at the beginning of the word is not a boundary tone to be defined at the post-lexical level. As analyzed by Kubozono (2010, 2012c/d), the primary H tones in the words in (40) and (41) disappear if they are followed by another word in the sentence. Yet, the lexical tonal distinction between Type A and Type B is nevertheless preserved in such cases in terms of the domain of the secondary H tone at the beginning of the words: e.g. /A.KA-sin.goo…/ 'red signal' vs. /A.O-SIN.goo…/ 'green signal'. Seen in this light, both types of H tones are lexical tones rather than post-lexical ones and are computed from the end of the word. The primary H tone appears at or near

the end of the word by a mora-counting procedure, while the secondary H tone is linked to all other syllables except one by a syllable-counting procedure. This is another type of 'hybrid' system where the syllable and the mora are intricately integrated.

4.3. Directionality

Japanese dialects also show differences in the directionality in which the position of word-level prominences is computed. This can be demonstrated by the comparison between Nagasaki Japanese and its sister dialects like Kagoshima and Koshikijima Japanese. As mentioned in (34) above, Nagasaki Japanese assigns an H tone on the second mora in Type A words, which means that phonological prominences are measured from the left edge of the word. Type B words in the same dialect are not directly relevant to this directionality issue since they are pronounced with a rather flat pitch.

On the other hand, Kagoshima Japanese looks at the right edge of the word both in Type A and Type B words, assigning an H tone to the penultimate and final syllables, respectively, as we saw in section 3.4 above. Most dialects of Koshikijima Japanese also employ the right-to-left procedure, assigning the primary H tone basically to the penultimate mora (Type A) and the final mora (Type B): see (28) and (40) for the Teuchi dialect and (37) for the Taira dialect. It is highly interesting to find that word prominences are thus computed in different directions in these historically related dialects: from left to right in Nagasaki and from right to left in Kagoshima and Koshikijima Japanese.

Two types of hybrid systems can be found in Japanese dialects. The first type is found in the Kokonogi dialect spoken in Echizen-cho, Fukui Prefecture (Nitta 2012) and also in the Yuwan dialect on Amami Island in the south (Niinaga and Ogawa 2011). Both dialects have a three-pattern prosodic system, i.e. a system with three tonal classes at the word level. In the Kokonogi dialect, one accent class, which Nitta (2012) calls 'Type A', has a pitch fall between the final two moras, while another accent class (Type C) has a pitch fall between the second and third moras counted from the beginning of the word. A third type (Type B) has a rather flat pitch pattern with a pitch rise at the beginning of the word.[21,22] These three patterns are illustrated in (42).

(42)   Kokonogi dialect in Echizen-cho, Fukui
    a.   'Type A' (from right to left)
       ku.RU.ma 'car', ku.RU.MA-ga 'car-NOM'
       ka.NE.MO.ti 'the rich', ka.NE.MO.TI-ga 'the rich-NOM'

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[21] Types A–C in Nitta's (2012) terminology are not directly related to the binary distinction (Type A vs. Type B) in Nagasaki, Kagoshima and Koshikijima Japanese.
[22] These accent patterns are all defined within the basic phrase known as *bunsetsu*, and not within the word itself (see the discussion in the next section for more details). /ku.RU.ma/ 'car' in (42a) and /hi.DA.ri/ 'left' in (42c) exhibit different patterns if they are followed by a grammatical particle: e.g. /ku.RU.MA-ga/ 'car-NOM' vs. /hi.DA.ri-ga/ 'left-NOM'.

b. 'Type B'
ma.KU.RA 'pillow', ma.KU.RA.GA 'pillow-NOM'
a.SA.GA.O 'morning glory (flower)', a.SA.GA.O-GA 'morning glory-NOM'
c. 'Type C' (from left to right)
hi.DA.ri 'left', hi.DA.ri-ga 'left-NOM'
no.KO.gi.ri 'saw, handsaw', no.KO.gi.ri-ga 'saw-NOM'

The Yuwan dialect of Amami Japanese has a similar hybrid system where one pattern is clearly defined from the right edge of the word, while another pattern is computed from the left edge of the word. More specifically, what Niinaga and Ogawa (2011) call 'Type I' has a pitch fall in the penultimate position, while 'Type II' involves a pitch fall basically between the initial two moras.[23] 'Type III' exhibits a pitch rise between the final two moras. In this system, too, the directionality of accent computation varies depending on the accent class in the same lexicon.

The situation becomes even more complicated if we look at the Kuwanoura dialect of Koshikijima Japanese. This dialect represents a second type of hybrid system where phonological prominences are computed both from the left edge and the right edge *within* one and the same word. Like the Teuchi dialect (and unlike the Taira dialect), this Koshikijima dialect exhibits two H tones in three-mora or longer words. Like Teuchi (and Taira), moreover, the primary H tone appears on the penultimate mora in Type A and on the final mora in Type B. It is this H tone that appears in the three-mora or shorter words showing only pitch peak. Unlike Teuchi, however, this dialect does not show a correlation between the two H tones: the secondary H tone that appears at the beginning of relatively long words cannot spread to the third or subsequent moras, with the result that two or more syllables can intervene between the two H tones. Some examples are given in (43).

(43) a. Type A
o.NA.go 'woman'
A.ma.ZA.ke 'sweet drink made from fermented rice'
na.TU-ya.SU.mi 'summer holiday'
b. Type B
O.to.KO 'man'
a.SA.ga.O 'morning glory'
ha.RU-ya.su.MI 'spring holiday'

That the secondary H tone is computed rather independently of the primary one is a noteworthy fact,[24] but a more interesting fact about this system is that the

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[23] More precisely, Type I has a pitch fall immediately after the syllable containing the penultimate mora, while Type I has a pitch fall immediately after the syllable containing the second mora.

[24] Among the contemporary word-accent systems of Koshikijima Japanese, this system seems to be closest to the system that Kamimura (1941) described on the basis of his fieldwork in 1937.

secondary H tone is computed from the left edge of the word, while the primary H tone is calculated from the right edge. Specifically, the secondary H tone is fixed on the first or second mora counted from the beginning of the word, whether it is Type A or Type B.[25] The primary H tone, in contrast, appears either on the second mora (Type A) or on the final mora (Type B), both counted from the end of the word.[26] It is truly intriguing to find that the two prominences are calculated in opposite directions within one and the same word in this system.

4.4. Word versus *bunsetsu*

As mentioned at the end of section 4.1, pitch accent systems in Japanese dialects fall into two types depending on the domain where pitch accent is computed. In many dialects including Tokyo Japanese, pitch accent is computed within the word, e.g. noun, verb. In contrast, many dialects including Kagoshima Japanese and its sister dialects define pitch accent patterns within *bunsetsu*, or the basic syntactic phrase consisting of a content word plus one or more grammatical particles.

This difference can be illustrated with the word /a.me/ 'rain' in (44). In Tokyo Japanese, this word is 'accented' on the initial syllable and remains accented on the same position whether it is pronounced by itself or with the following grammatical particle(s).[27] In other words, pitch accent is computed within the domain of the content word per se and does not change whether or not grammatical particles are attached to it. In phonetic terms, a sudden pitch fall occurs between the first two syllables as shown in parentheses in (44), irrespective of whether grammatical particles are attached or not.

(44) a'.me 'rain' (A.me)
      a'.me-ga 'rain-NOM' (A.me-ga)
      a'.me-kara 'from (the) rain' (A.me-ka.ra)
      a'.me-kara-mo 'from (the) rain, too' (A.me-ka.ra-mo)

On the other hand, grammatical particles participate in the computation of word accent in the second type of pitch accent systems. This can be illustrated with the accent patterns in Kagoshima Japanese in (45), where the position of phonological prominence, or H tone, moves to the right as the basic phrase becomes longer.

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[25] There are two major exceptions to this generalization. First, the H tone spreads to the initial mora if it is originally linked to the non-head mora of heavy syllables: e.g. /zyoO.ki.SEn/ → /ZYOO.ki.SEn/ 'steamboat' (Type A), /seN.seI/ → /SEN.seI/ 'teacher' (Type B). Second, it spreads to the third mora if the second one is the head mora of heavy syllables: e.g. /ka.ZAi-Mon/ → /ka.ZAI-MOn/ 'ornament (colloquial)' (vs. /ka.ZA.ri-MOn/ 'ornament'). This leads us to generalize that the first H tone is realized on the entire syllable containing the second mora.

[26] Like the Teuchi dialect, this dialect also undergoes H tone shift as described in (29) if the penultimate mora is a non-head mora in Type A words: e.g. /PUu.ru/ 'swimming pool' vs. /ba.NA.na/ 'banana'.

[27] See Akinaga (1985) for the exceptional behavior of some grammatical particles.

(45) a.ME 'rain'
      a.me-GA 'rain-NOM'
      a.me-ka.RA 'from (the) rain'
      a.me-ka.ra-MO 'from (the) rain, too'

The uniformity of the patterns in (45) can be understood if one looks at them within the *bunsetsu*: the H tone is invariably on the final syllable in this domain.

As suggested at the end of section 4.1, this domain parameter is linked to the dichotomy based on the number of pitch patterns in the system, i.e. multiple-pattern vs. N-pattern systems. In multiple-pattern systems, a certain syllable in a word is marked as the position of phonological prominence in the lexicon. This explains on the one hand why the number of distinctive pitch patterns increases in proportion to the phonological length of the word in this type of pitch accent system, and why the position of the prominence is not affected by the presence or absence of the following grammatical particles, on the other (Hayata 1999, Kubozono 2012b). These features naturally follow from the fact that a certain syllable is marked in the lexicon (or unmarked in the case of unaccented words).

On the other hand, words (or morphemes) are specified in the lexicon with respect to their prominence patterns or shapes, and not with respect to the position of the prominence. In this type of pitch accent system, the number of distinctive patterns should be independent of the length of the words, while grammatical particles are allowed to be part of the domain where the pitch patterns are defined. Many dialects of Japanese belong to this group, including the two-pattern systems of Kagoshima Japanese and its sister dialects (Nagasaki and Koshikijima) as well as the three-pattern systems discussed in section 4.3, namely, the Kokonogi dialect spoken in Echizen-cho in Fukui Prefecture and the Yuwan dialect of Amami Japanese.

Having characterized the two types of pitch accent systems in this way, one must hasten to emphasize that some dialects exhibit a hybrid system of the two. This has actually been pointed out by Uwano (2000, 2002) for the Wan and Nakasato dialects of Kikaijima Japanese spoken in the south of Kagoshima Prefecture. Like Kagoshima Japanese, these dialects have two accent classes, each of which has its own pitch pattern. These two patterns—Pattern α and Pattern β in Uwano's terminology—use different domains for pitch assignment: Pattern α assigns pitch within each *bunsetsu*, whereas Pattern β is defined within each word. Specifically, the former pitch pattern involves an L tone on the penultimate mora within the *bunsetsu*, while the latter assigns an L tone to the antepenultimate mora within the word. These two patterns are illustrated in (46a) and (46b), respectively.

(46) Wan and Nakasato dialects of Kikaijima Japanese
      a. Pattern α
          pa.NA 'flower', PA.na-GA 'flower-NOM', PA.NA-ka.RA 'from (the) flower'
          HA.sa.MI 'scissors', HA.SA.mi-GA 'scissors-NOM', HA.SA.MI-ka.RA 'from (the) scissors'

KAN.na.RI 'thunder', KAN.NA.ri-GA 'thunder-NOM', KAN.NA.RI-ka.RA 'from (the) thunder'

b. Pattern β
NA.BI 'pan', NA.BI-GA 'pan-NOM', NA.BI-KA.RA 'from (the) pan'
ha.TA.NA 'sword', ha.TA.NA-GA 'sword-NOM', ha.TA.NA-KA.RA 'from (the) sword'
KA.ma.KI.RI 'mantis', KA.ma.KI.RI-GA 'mantis-NOM', KA.ma.KI.RI-KA.RA 'from (the) mantis'

As can be seen clearly from these examples, both patterns are calculated from the right edge of the domain. What is invariant in Pattern α is the ((H..H)LH) pattern assigned at the *bunsetsu* level,[28] whereas what is invariant in Pattern β is the ((H..L)HH) pattern defined at the word level. It is highly interesting to find that the two domains can coexist within a single pitch accent system.

4.5. Summary

The discussions in the foregoing subsections have shown the diversity of pitch accent systems in Japanese. However, the parameters that we saw above are not exhaustive, as was discussed by Kubozono (2012b). Other parameters include the left-dominant versus right-dominant nature of compound accent: Tokyo Japanese generally preserves the lexical accent of the rightmost member in compounds, whereas Kagoshima, Nagasaki and Koshikijima Japanese respect the lexical accent of the leftmost element by spreading its pitch pattern to the overall compound expressions (Uwano 1997, Hayata 1999).[29] This parameter, too, permits a hybrid system where the compound accent rule preserves the pitch features of both the initial and final members of compounds. This hybrid system is found in Kyoto and Osaka Japanese (Wada 1942, Uwano 1997; see Kubozono 2012b for more details). Japanese dialects display a tremendous degree of variability in other respects of lexical pitch accent, too, as discussed by Kubozono (2012a/b) and Uwano (2012).

Looking beyond word prosody, Japanese dialects also show diversity in the way sentence-level prosody is manifested. As for question intonation, for example, Tokyo Japanese as well as Kyoto/Osaka Japanese raises pitch at the end of interrogative sentences, whereas many southern dialects including Kagoshima, Koshikijima and Kikaijima Japanese lower pitch in the same position (Kibe 2010, Kubozono 2011b). Question intonation is thus manifested in two entirely different pitch features in different dialects: pitch rise and pitch fall. Vocative intonation—perhaps better known as 'calling contour' (Ladd 1996) or 'vocative chant' (Gussenhoven 2004)—is another sentence-level prosodic process that seems to exhibit regional differences. Kagoshima Japanese lowers pitch when its speakers call somebody's name in an attempt to attract his/her attention. Tokyo Japanese, in contrast, mainly uses pitch boost to differentiate vocative intonation from a

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[28] Pattern α resembles Type B in the Teuchi dialect of Koshikijima Japanese described in (28b).
[29] Chinese dialects show a similar diversity (Zhang 2007, 2014).

non-vocative one. These post-lexical pitch features interact with the pitch patterns defined at the lexical level, often triggering post-lexical tonal neutralizations (see Kubozono, forthcoming/a).

5. Conclusions

This paper discussed various phenomena in Japanese phonology with a main focus on how Japanese phonology can contribute to the development of phonology and phonological theory in general, and also, how phonological studies in general linguistics can shed new light on the phonological structure of Japanese. One remarkable fact about Japanese phonology that is relevant to all the issues discussed in this paper concerns the diversity of pitch accent systems in the language. To take the syllable-mora issue, for instance, Japanese dialects are strikingly different from each other in how these two phonological units interact with each other in a single prosodic system. This gives an insight into many phonological questions including the one concerning the wide range of options that languages can take to avoid the marked superheavy syllables. On the other hand, many notions employed in general linguistics help us to generalize and explain various phonological phenomena in Japanese. The notion of syllable weight, for example, allows us to understand the nature of various phenomena in Japanese that would otherwise seem unrelated to each other. This includes the crucial similarities between Latin and Japanese accent, the nature of ongoing accent changes, and the conspiracy of many seemingly unrelated processes to avoid creating trimoraic syllables.

In sum, the diversity of phonological systems in Japanese, if studied in more depth, will further contribute to our better understanding of how and how much languages can be diverse, while Japanese phonology will continue to benefit greatly from general considerations in phonology and phonological analyses of individual languages in the world.

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【要　旨】

日本語の方言研究と一般言語学

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　この論文では，日本語の音声データ，とりわけ語アクセントに関連するデータをもとに，一般言語学が日本語（方言）の研究にどのような新しい知見をもたらすか，逆に日本語方言の実証的，理論的研究が一般言語学や他の言語の研究にどのような洞察を与えるか考察する。具体的な例として「音節量」の現象を取り上げ，この概念を日本語の分析に導入することにより，さまざまな日本語の諸言語が一般化できること，また，そのようにして得られた日本語の分析が一般言語学，音韻理論の研究に大きく寄与できる可能性を秘めていることを指摘する。論文の後半では日本語諸方言のアクセント体系・現象を取り上げ，この言語が「アクセントの宝庫」と言えるほど多様なアクセント体系を有していること，そしてその分析が言語の多様性について重要な示唆を与えることを指摘する。