Underlying Tonal Representation of Kagoshima Japanese Accentual Contrast

Author

Shunichi Ishihara
The Japan Centre, Faculty of Asian Studies
The Australian National University
Canberra, ACT 0200

Shunichi.Ishihara@anu.edu.au

http://www.anu.edu.au/~u9504440

Abstract

Kagoshima Japanese (KJ) is a so-called two-pattern Japanese dialect which exhibits a two-way accentual contrast. This two-way accentual contrast is [$L^{(n)}HL$] (i.e. *sakura* LHL 'cherry blossom', *kagaribi* LLHL 'watch fire') and [$L^{(n)}H$] (i.e. *usagi* LLH 'rabbit', *kakimono* LLLH 'document'), where *n* = zero or a positive integer. Although the details of the KJ accentual contrast can be easily expressed, as seen from the above examples, different phonological approaches have produced different analyses of KJ's accentual contrast. Some treat KJ as a pitch-accent dialect like Standard Japanese (SJ), whereas others treat KJ as a tone dialect (McCawley, 1970; Haraguchi, 1977; Shibatani, 1979; Hayata, 1987; Smith, 1997).

Based on the acoustic-phonetic descriptions of KJ's tonality using the z-score normalisation technique, Ishihara (2004) discussed the surface tonal representations of KJ's accentual contrast using the Autosegmental-Metrical (AM) model of intonation (Pierrehumbert and Beckman, 1988).

In the current study, I use the AM model to discuss the underlying tonal representations of KJ's accentual contrast with particular focus on the derivational process leading to the surface tonal representations and the fundamental frequency (F0) differences of KJ's accentual contrast. Using the lexical tonal representations of KJ's accentual contrast as evidence, I demonstrate that in a comparison of SJ and KJ, KJ is closer to proto-typical tone languages. Finally, I argue that the F0 realisation differences of KJ's accentual contrast can be phonetically explained by the proposed underlying representations.

Keywords

Intonation, Japanese dialect, Kagoshima Japanese, tone

Underlying Tonal Representation of Kagoshima Japanese Accentual Contrast*

Introduction

The aim of this study is to investigate Kagoshima Japanese (KJ)1 with respect to the following: 1) the underlying tonal representation of the KJ accentual contrast; 2) the typological nature of KJ, judging from the proposed underlying representation; and 3) an account of the fundamental frequency (F0) realisation differences of KJ's accentual contrast from the proposed underlying tonal representation.

In this study, I present the underlying tonal representations of KJ's accentual contrast using the Autosegmental-Metrical (AM) model of intonation (Pierrehumbert and Beckman, 1988). I support these representations from the view point of the derivational process, the F0 realisation and the accentuation of extended and compound words. Judging from the proposed underlying representations, I indicate that KJ has some characteristics that put it slightly typologically closer to proto-typical tone languages than Standard Japanese (SJ), which is considered to be a proto-typical pitch-accent language (McCawley, 1978). I also argue that the F0 realisation differences of KJ's accentual contrast can be phonetically accounted for on the basis of the proposed underlying representations.

The Accentual Nature of Kagoshima Japanese

KJ is a so-called two-pattern Japanese dialect which exhibits a two-way accentual contrast. This two-way accentual contrast is [L^nHL] and [L^nH] where n = zero or a positive integer (cf. Hirayama, 1960). In the former pattern, only the penultimate syllable of a word has a high pitch, while every other syllable has a low pitch. In the latter pattern, only the last syllable of a word has a high pitch, while every syllable before it has a low pitch.

Some Japanese linguists refer to the [L^nHL] type as the 'accented type' and the [L^nH] type as the 'unaccented type' in the same sense as the accentual contrast of SJ (Shibatani, 1990). This is simply because a pitch fall is observed in the former, and no such pitch fall is observed in the latter. In this study I adopt Hirayama's (1960)

* I thank two anonymous reviewers for their valuable comments.

1 The Japanese dialect called Kagoshima Japanese in this study is the dialect spoken in Kagoshima City. Kagoshima City is the capital of Kagoshima Prefecture. Kagoshima prefecture is located on the southern tip of Kyushu island, which is the southern-most major island of Japan.

terminology and refer to the [L^nHL] type as Type A and the [L^nH] type as Type B. This accentual contrast is shown in Table 1.

Syllables	Type A		Type B	
2	hana [HL]	"nose"	hana [LH]	"flower"
3	sakura [LHL]	"cherry blossom"	usagi [LLH]	"rabbit"
4	kagaribi [LLHL]	"watch fire"	kakimono [LLLH]	"document"

Table 1: The accentual contrast of KJ.

Previous Studies on Kagoshima Japanese Accentual Phonology

As shown above, the details of KJ's accentual contrast can be easily expressed. However, many scholars have analysed the accentuation of KJ using different approaches and various frameworks (McCawley, 1970; Haraguchi, 1977; Shibatani, 1979; Smith, 1997; Hayata, 1999; Lawrence, 1999). Table 2 summarises these previous studies with particular focus on 1) the status of accent; 2) basic tone melody/melodies (BTM); and 3) the status of BTM.

Approaches	Status of Accent	BTM	Status of BTM
McCawley (1970)	no use of accent	LHL, LH	not lexical property
Haraguchi (1977)	no use of accent	LHL	not lexical property
Shibatani (1979)	post-lexical use of accent	L	not lexical property
Smith (1997)	a medium for pitch realisation	?	not lexical property
Hayata (1999)	no use of accent	final falling, level	lexical property
Lawrence (1999)	no use of accent	LH	lexical property

Table 2: A summary of the previous research on KJ in terms of the status of accent in derivation, basic tone melodies (BTM) and the status of BTM.

As it was prior to the emergence of Autosegmental Phonology (Goldsmith, 1976), McCawley's (1970) generative approach to KJ tonality is less formalised. However, it is worthwhile mentioning that McCawley noticed the similarities between KJ's system and the tone-system, and treated KJ accordingly by assuming two basic melodies.

Also adopting a generative approach to KJ, Shibatani's study (1979) differs from McCawley's in that he analysed KJ using the concept of accent. This is evident from the 'post-lexical' accent insertion rule he posits for the accentual derivation of KJ.

Haraguchi's (1977) analysis of KJ is the most comprehensive. His treatment of KJ is similar to McCawley's in that the derivational process of the KJ accentuation is accounted for without the concept of accent. However, his treatment of KJ accentuation differs in that he posits only one basic melody whereas McCawley posits two.

Smith (1997) analyses the KJ accentuation using Optimality Theory (OT). As this conceptual framework significantly varies from other frameworks, her analysis appears to be unique. However, her analysis of KJ is similar to that of other Japanese dialects as she uses the concept of accent. In this sense, her analysis is quite similar to that of Shibatani's (1979).

Hayata (1999) and Lawrence (1999) both treat KJ as a tone dialect, but their approaches differ. In line with other Japanese dialects, Lawrence attempts to account for the accentuation of Type A words by introducing right-edge extrametricality.

It is unclear what tone melodies and derivational processes Hayata considers for KJ, but he does posit two lexical tones (/final falling/ and /level/).

Shibatani/Smith's and Hayata/Lawrence's analyses occupy rather different positions in the spectrum of analyses of KJ's tonality. Although accent is not a lexical property in Shitabani/Smith's analyses, they both treat KJ as a dialect having a pitch-accent system. This is evident from the fact that the association of a basic tone melody with a tone bearing unit is performed by linking the basic tone melody to an accented syllable for Type A words. At the other end of the spectrum, Hayata and Lawrence demonstrate that KJ can be analysed as a dialect having a tonal system. The analyses presented by McCawley and Haraguchi situate somewhere between the pitch-accent analysis and the tonal analysis.

Pitch-Accent and Tone Languages

Traditionally, stress-accent, pitch-accent and tone languages have been considered as three typologically different language groups (Pike, 1948; Cruttenden, 1986; Clark and Yallop, 1999). However, some linguists argue that the boundary between pitch-accent and tone languages is unclear (Yip, 2002; Hyman, 2001). Yip (2002: 257) states that '[t]here is no absolute division between accent languages and tone languages, just a continuum from 'accent' to 'tone' as the number and denseness of tones increases, and they become freer to move around'. Although Yip does not clearly distinguish between pitch-accent and tone languages, it can be interpreted from her argument that if one language has more lexically specified tones than another, that language is more tonal than the other.

In order to discuss the typological classification of a language or a variety, various linguistic phenomenon need to be investigated (Odden, 1999; Chen, 2000; Hyman, 2001; Kubozono, 2001). With this in mind, I will investigate KJ in terms of the derivational process and the F0 realisation of the KJ accentuation to determine if there is any evidence to suggest that KJ has more tonal characteristics than SJ.

Autosegmental-Metrical Model of Intonation

Pierrehumbert and Beckman (1988) argue that the surface pitch contour is produced by phonetic interpolation between tone targets, including not only the lexically stipulated tones but also tones associated with higher levels of prosodic structures. On the basis of this idea, they introduced an entirely new model for describing Japanese pitch accent that used a few tones per phrase with interpolation between them.

The tones assigned to an accentual phrase are: low boundary tone (L%) at the onset of an utterance, high phrasal tone (H) that links the second sonorant mora, and boundary tone (L%) that links the last mora. At the word level, a lexical pitch-accent tone (H*L) is attached to the designated mora. Following their model, Figure 1 shows the word *omawarisan* 'police officer' represented at the surface level together with a representation using the traditional full-specification model.

Figure 1: The surface tonal representation of *omawarisan* 'police officer' in the Autosegmental-Metrical model and the traditional full-specification model.

In this study, the Autosegmental-Metrical (AM) model of Intonation is used to present underlying tonal representations of KJ's accentual contrast.

Terminology

In this study, the high pitched syllable of a word is referred to as a peak-syllable (i.e. the **H** of LL**H**(L)), and the low pitched syllables coming before the high pitched syllable (i.e. the **LL** of **LL**H(L)) are called pre-peak syllables.

F0 Realisation and Surface Tonal Representation of Kagoshima Japanese Accentual Contrast

Like the accented words of SJ, recent instrumental approaches to KJ prosody have revealed that Type A initiates not only global rises but also drops in F0 (Kubozono and Matsui, 1996; Ishihara, 2004). Using polysyllabic words and phrases, Ishihara (2004) quantified and demonstrated the F0 paradigmatic realisation differences between Type A and Type B words and their syntagmatic effect on the following word. The

paradigmatic differences of Type A and Type B and their syntagmatic effects are presented schematically in Figure 2.

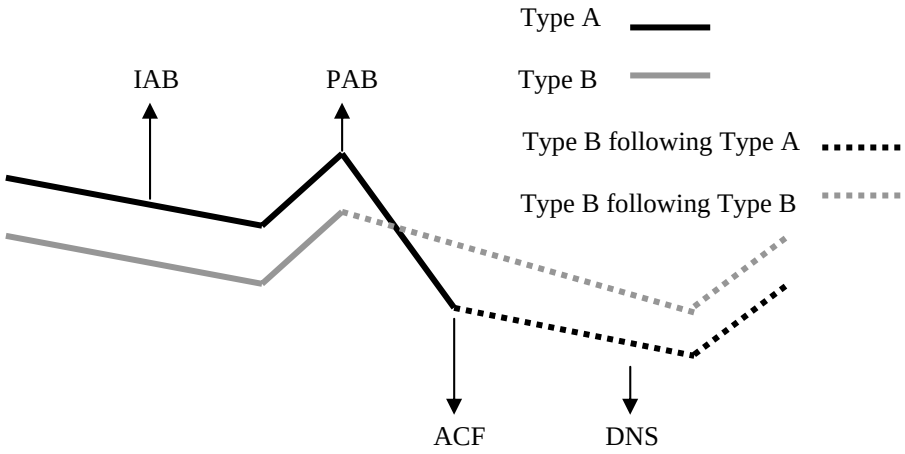


Figure 2: Schematic F0 realisation differences between Type A and Type B words (IAB = initial accentual boost, PAB = peak accentual boost, ACF = accentual fall, DNS = downstep)

As seen in Figure 2, in which the schematic F0 contours of a Type A + Type B phrase and a Type B + Type B phrase are given, 1) Type A is realised higher in F0 than Type B not only at its peak syllable; 2) but also at its pre-peak syllables; 3) after its peak syllable, Type A shows a drastic F0 drop compared to Type B; and 4) the F0 realisation of the second word is suppressed more when preceded by a Type A word than a Type B word. In this study the four F0 realisation differences caused by KJ's accentual contrast are referred to as 'peak accentual boost (PAB)' for 1); 'initial accentual boost (IAB)' for 2); 'accentual fall (ACF)' for 3) and 'downstep (DNS)' for 4).

On the basis of the acoustic-phonetic descriptive results, Ishihara (2004) proposed the surface tonal representations of KJ's accentual contrast given in Figure 3. Please refer to Ishihara (2004) for detailed arguments and justifications of the locations and the values of these target tones.

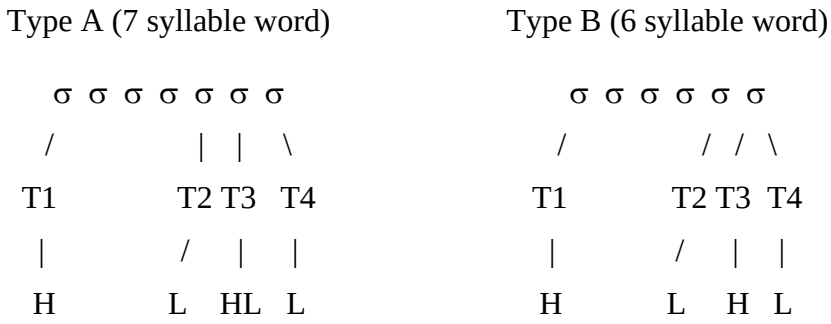


Figure 3: Surface tonal representations of Type A and Type B words using Type A 7 syllable and Type B 6 syllable words as examples.

A **H** tone and a **L** tone are associated with the onset (T1) and the offset (T2) of the pre-peak syllables of KJ words. A tone also needs to be specified at the T2 position because a descending F0 contour can be observed from T1 to T2 before F0 starts rising from T2 to T3. T3 (peak syllable) is assigned with either a **HL** tone or a **H** tone depending on the accentual type. On the basis of the F0 contour of long utterances in which F0 falls significantly lower before a pause, it appears plausible to posit a **L** tone (probably a boundary tone) at the final syllable of a word (T4).

On the basis of the target tones given in Figure 3, I will discuss the underlying tonal representations of KJ's accentual contrast in the following section.

Underlying Tonal Representation of Kagoshima Japanese Accentual Contrast

I will argue that, from a derivational point of view, it is more appropriate to posit two lexical tones for KJ (one each for Type A and Type B). Furthermore, the F0 realisation behaviour of Type A and Type B is more easily understood if we consider that both Type A and Type B have a lexical tone.

Having argued that KJ has two lexical tones, I will discuss how KJ's accentual contrast should be represented in the lexicon by referring to the accentual behaviour of extended words and compounds in KJ.

Lexical Tones

As shown in Figure 3, the difference between Type A and Type B words is whether a word has a HL tone or a H tone at T3. That is, the other tones that are shared by both Type A and Type B (T1, T2 and T4) are likely to be non-lexical tones (i.e. boundary or phrasal tone). My aim is to clarify how we should treat the HL and H tones linked to the peak syllable of a word.

There are two possible treatments for the HL and H tones. One is to treat both of them as lexical tones (/HL/ vs. /H/). The alternative is, like SJ, to treat the HL tone as a

lexical tone and the H tone as a non-lexical tone. That is, Type B has a privative tone (∅) in the lexicon. I will argue that the former treatment (two tone analysis) is superior to the latter treatment (privative tone analysis).

The primary reason for this stems from limitations of the privative tone analysis. If we assume that the H tone associated with the peak syllable of Type B words is a non-lexical tone (i.e. phrasal or boundary tone), it allows the H tone of Type B words in question to occur together with Type A words. However, as shown in Figure 3, the HL tone of Type A and the H tone of Type B at the peak syllable never occur together. Therefore, if we assume that the H tone of Type B at the peak syllable is a non-lexical tone, the H tone always needs to be deleted by a rule in the derivational process of Type A words. Obviously this is not an economical process. Such global alternation should be treated at a higher level (i.e. in the lexicon).

Also supporting the use of the two tone analysis is that the tonal pattern of KJ is well preserved in long utterances (Ishihara, 2004). This is better understood if the accentual phrasing of SJ is explained as a contrastive example to KJ.

Words in SJ can be accented or unaccented. If a word is accented, any syllable in the word can have an accent, and the accent is realised by a pitch fall. It is well known that in SJ words may lose their accentual independence and merge into one tonal unit in a larger prosodic context (McCawley, 1968; Poser, 1984; Selkirk and Tateishi, 1988; Maekawa, 1994; etc). Takubo *et al.* (1997: 43) say that in SJ, 'an unaccented word + an unaccented word and an unaccented word + an accented word tend to merge into an accentual phrase.' An example of this is shown in Figure 4. Figure 4 contains the F0 contours of the two sentences given in 1) (after Takubo *et al.*, 1997: 44).

The sentences given in 1) have an identical syntactic structure. The only difference is that 1)a starts with a sequence of two accented words (*ao'i* 'blue' [accented] and *yanega'wara* 'roof tile' [accented]'; period = accent location), whereas 1)b starts with a combination of an unaccented and an accented word (*akai* 'red' [unaccented] and *yanega'wara* 'roof tile' [accented]). The phonetic realisations of these noun phrases (*ao'i yanega'wara* and *akai yanega'wara*) are of concern here.

1) a aoi yanegawara-no ie-ga mi-eru
blue roof tile-POSS house-SUB see-POTEN
I can see a house with blue roof tiles

b akai yanegawara-no ie-ga mi-eru
red roof tile-POSS house-SUB see-POTEN
I can see a house with red roof tiles

POSS = possessive particle, SUB = subject marker and POTEN = potential inflectional ending

Based solely on the lexical information, the underlying pitch configurations of the noun phrases (adjective + noun) in question are LHL.LHHLL (*ao'i yanega'wara*) and LHH.LHHLL (*akai yanega'wara*) respectively, where a period stands for a word boundary. Since the two words comprising the noun phrase *ao'i yanega'wara* (1)a) both retain their accent, based on the lexical information (accented + accented), they are realised as a LHL.LHHLL configuration without fusing into one accentual phrase. On the other hand, the two words of the noun phrase *akai yanega'wara* (1)b) fuse into one accentual unit with an accent on the antepenultimate syllable, resulting in a LHH.HHHLL configuration.

The post-lexical realisation difference between these two noun phrases can be clearly seen in Figure 4. As shown in Figure 4a, the F0 contour of 1)a, an F0 valley—which is the reflex of L.L (an F0 fall and F0 rise indicated by an arrow)—is evident between *ao'i* 'blue' [accented] and *yanega'wara* 'roof tile' [accented]. However, in Figure 4b, the F0 contour of 1)b, there is no F0 valley between the first two words because they fuse into one accentual unit with an accent on the antepenultimate syllable (LHH.HHHLL).

The accentual phrasing observed in Figure 4 indicates that unaccented words tend to merge into a larger prosodic unit by losing their original accentual nature, whereas accented words are more resistant to this kind of merger. This point makes sense if we know the lexical status of accented and unaccented words in SJ. Since unaccented words do not carry a lexical tone (= pitch-accent tone), their pitch realisations are influenced (or determined) by the prosodic environment in which they occur. On the other hand, since accented words carry a lexical tone, they are more resistant to influence from the prosodic environment in which they appear.

a

b

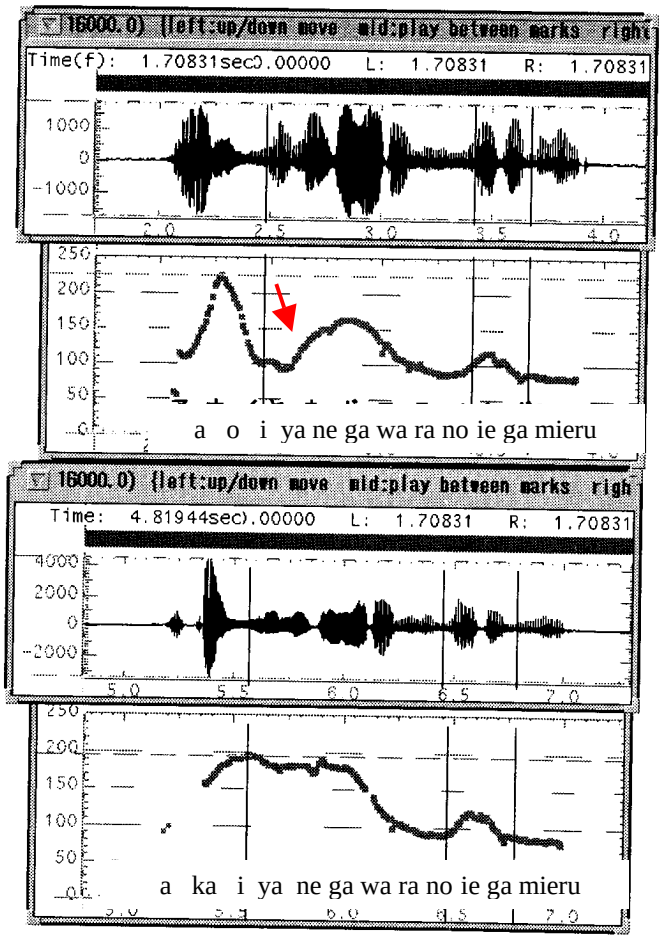
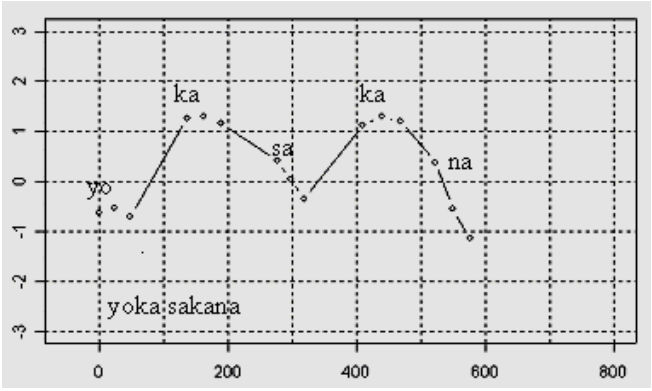


Figure 4: Speech waveform and F0 contour of each sentence given in 1) showing the formation of an accentual phrase (after Takubo *et al.*, 1997: 44).

Unlike SJ, the lexically specified accentual nature of KJ is preserved in larger phonological units, such as accentual phrases. That is, the fusion of two accentual units that is observed in SJ under certain conditions does not occur in KJ (Ishihara, 2004). This resistance to fusion is clearly observed in the examples given in Figure 5. In Figure 5, the mean normalised F0 contours of two noun phrases (an adjective + a noun) are plotted against the mean absolute duration. To obtain the mean normalised F0 contours, F0 values were sampled from each syllable-rhyme of the two phrases at the onset, the 50% and the offset points using four informants. Following this the sampled raw F0 values were log z-score normalised. Please refer to Ishihara (2004) for details of the log z-score normalisation procedure. In Figure 5, 0 in the Y-axis denotes the speaker's average F0. For example, 1 indicates one standard deviation away from the average of all sampled F0 values. Figure 5a contains the mean normalised F0 contour of *yoka sakana* 'good fish', which is a combination of Type B (LH) and Type A (LHL). Figure 5b contains that of *yoka kudamono* 'good fruit', which consists of Type B (LH) and Type B (LLLH). In these kinds of noun phrases, an accentual merger is observed in SJ,

as shown in Figure 4. However, seen in Figure 5, each word in the noun phrase is realised as lexically specified without fusing into a larger accentual phrase.

a



b

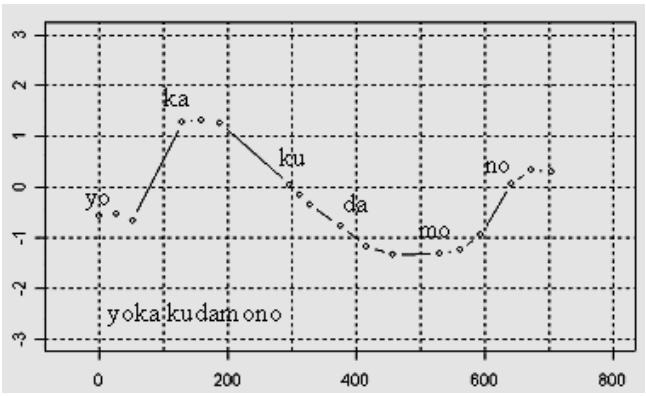


Figure 5: Representative mean normalised F0 shapes of two adjective phrases (a: *yoka sakana* 'good fish' [Type B + Type A] and b: *yoka kudamono* 'good fruit' [Type B + Type B]) plotted against absolute mean duration (msec). X-axis and Y-axis are time (msec) and z-score respectively.

KJ's resistance to the kind of accentual merger present in SJ is understandable if both Type A and Type B have a lexical tone. Like the accented words of SJ, Type A and Type B try to maintain their original accentual information in their F0 realisations, even in prosodically larger units, because they have a lexical tone.

The previous discussion has shown that, from the perspective of derivation and F0 realisation, it is more appropriate to posit a lexical tone for not only Type A (/HL/) but also Type B (/H/) in KJ. As mentioned previously, Yip's (2002: 257) remarks regarding accent and tone languages imply that if one language has more lexically specified tones than another, that language is more tonal. With this in mind we can see that compared to SJ, KJ is closer to proto-typical tone languages in that it has two lexical tones whereas SJ has only one.

The following subsection considers KJ's accentual behaviour in extended and compound words to investigate how these /HL/ and /H/ tones should be represented in the lexicon using the AM model of intonation.

The Accentuation of Extended Words and Compounds in Kagoshima Japanese

I argued above that the /HL/ tone of Type A and the /H/ tone of Type B are both lexical tones. Observing the pitch realisation of KJ's Type A and Type B in extended word structures and compound words provides further insight into how these tones should be represented in the lexicon. Examples given in Table 3 demonstrate how the attachment of a particle and the inflection of a verb affect the pitch realisation of a word (from Haraguchi, 1977).

As the examples in Table 3-1 show, if a particle such as *-ga* (nominative marker) is attached to a word, the high pitched syllable shifts to the right in the phrase. Similarly, the examples in Table 3-2 show that if a plain verbal form changes to its polite form, the high pitched syllable again moves to the right.

		Type A		Type B	
		Word	Extended Word	Word	Extended Word
1	a	hana [HL] 'nose'	hana-ga [LHL] 'nose-NOM'	hana [LH] 'flower'	hana-ga [LLH] 'flower-NOM'
	b	sakura [LHL] 'cherry blossom'	sakura-ga [LLHL] 'cherry-NOM'	usagi [LLH] 'rabbit'	usagi-ga [LLLH] 'rabbit-NOM'
2	a	kariru [LHL] 'borrow'	karimasu [LLHL] 'borrow+polite'	nigeru [LLH] 'escape'	nigemasu [LLLH] 'escape+polite'
	b	agaru [LHL] 'rise'	agarimasu [LLLHL] 'rise+polite'	kuru [LH] 'come'	kimasu [LLH] 'come+polite'

Table 3: Extended words and accentuation in KJ.

Although it is possible to explain the above pitch change in terms of a shift of the high pitch, it is much simpler to consider that the extended form—such as *sakura-ga* [LLHL] 'cherry blossom-NOM' and *nigemasu* [LLLH] 'escape+polite'—inherits the same accentual type as the original form. That is, it is not necessary to specify the tonal location in KJ's lexicon.

Further evidence opposing the specification of a tonal location in KJ's lexicon can be drawn from the accentuation in compound formation. Consider the examples given in Table 4 (from Hirayama, 1960: 22).

	Component 1		Component 2		Compound
a	komori (A)	+	uta (A)	—>	komoriuta (A)
	‘baby-sitting’ [LHL]		‘song’ [HL]		‘lullaby’ [LLLHL]
b	kami (A)	+	fukuro (B)	—>	kamibukuro (A)
	‘paper’ [HL]		‘bag’ [LLH]		‘paper bag’ [LLLHL]
c	yama (B)	+	sakura (A)	—>	yamazakura (B)
	‘mountain’ [LH]		‘cherry’ [LHL]		‘wild cherry’ [LLLLH]
d	iro (B)	+	shiro (B)	—>	irojiro (B)
	‘colour’ [LH]		‘white’ [LH]		‘fair-complexioned’ [LLLH]

Table 4: Compound words and accentuation in KJ.

The examples in Table 4 show that the accentual type of the first component is carried over to the resultant compound. If the location of a tone were specified in the lexicon, it would be necessary to posit special rules to account for the tone shift between input components and output compound, which would cause superfluous complexity in KJ tonal phonology. However, given the accentual type of a word in the lexicon (i.e. whether a word belongs to Type A or Type B), the only action required is to extend the accentual information of the first component to the compound. In feature-geometric terms, KJ’s accentuation in compound formation can be simply expressed by associating the TONE node of the compound (W_c) with that of the first component (W_1), as shown in Figure 6.

In Figure 6a, two words are independently represented as a sequence in feature-geometric terms using two feature nodes: TONE and SEGMENT. The TONE node is associated with the information relating to the pitch realisation of the word, and the SEGMENT node is associated with the segmental information of the word. Figure 6b represents a compound consisting of the two words. Apart from some morpho-syntactic sound changes at the segmental level, the compound (W_c) is realised by simply combining the SEGMENT node of the first word (W_1) with that of the second word (W_2). The pitch realisation of the compound word is determined by the TONE information of the first word. The original linkage between the TONE node of W_2 needs to be delinked as the association is not relevant to the pitch realisation of the compound word.

As seen from these examples, in KJ it is unnecessary to specify the location of a lexical tone in the lexicon. That is, the tones posited above are not a property of any given syllables, but a property of a word. Having said that, I posit the representations given in Figure 7 as underlying tonal representations of KJ’s accentual contrast.

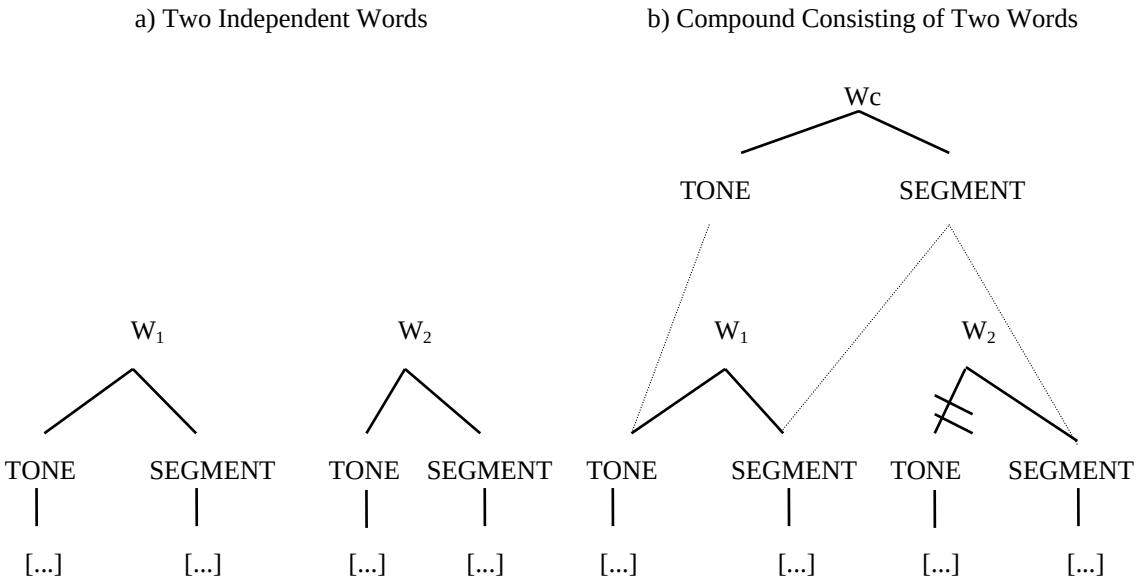


Figure 6: The predominance of first component on the accentual type of the compound explained in feature-geometric terms.

In Figure 7, the lexicon tones of Type A and Type B are /HL/ tone and /H/ tone respectively. These tones are not associated with any particular syllables in the lexicon.

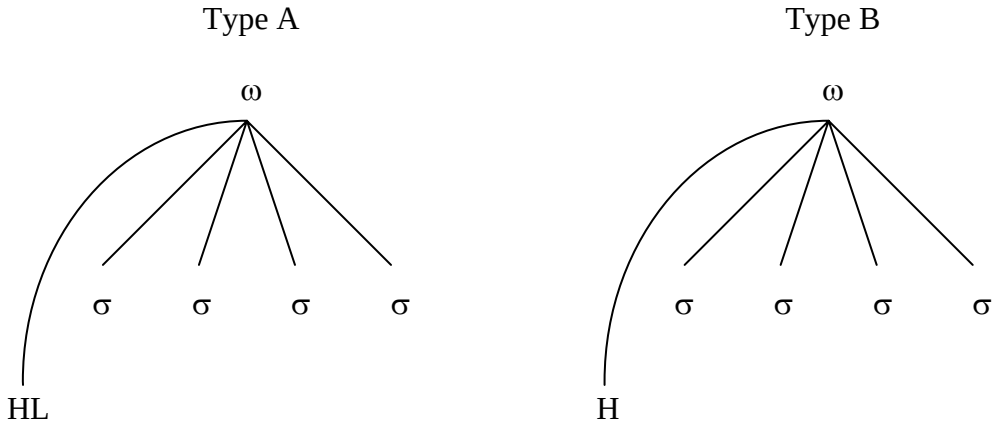


Figure 7: Underlying tonal representations of KJ's accentual contrast in the Autosegmental-Metrical model of intonation.

With the exception of a few discrepancies arising from the different assumptions on which different theories are based, the lexical treatment of KJ accentuation proposed in this paper is essentially the same as that proposed by McCawley (1968) and Hayata (1999). However, in the underlying representations offered here, it is explicit that both of KJ's accentual types need lexically stipulated tones, and that those tones are the property of the word, not the syllable. Moreover, I have provided several new pieces of

empirical evidence to support the assertion that both Type A and Type B have lexical tones.

In the following section, I discuss how the underlying tonal representation given in Figure 7 accounts for the F0 realisation differences observed between Type A and Type B.

F0 Realisation and Underlying Tonal Representation of Kagoshima Japanese Accentual Contrast

As schematically illustrated in Figure 2, the F0 realisation differences between Type A and Type B are: Type A is realised higher in F0 than Type B (IAB and PAB); and Type A induces ACF and DNS. Traditionally, these F0 realisation differences have been phonologically explained by assuming a difference in the lexical nature of Type A and Type B (Haraguchi, 1977). Namely, that Type A has a lexical accent and Type B does not. In AM theoretical terms, the above phonological explanation is akin to saying that the F0 realisation differences between Type A and Type B are caused by the pitch-accent tone that Type A carries lexically (Type B does not carry a pitch-accent tone).

However, since this study posits tones lexically for Type A and Type B, the above phonological explanation cannot be utilised to account for the F0 realisation differences as both Type A and Type B have a lexical tone (although the values of the tones are different). Therefore, it is necessary to seek an alternative explanation for the F0 realisation differences.

I contend that a phonetic explanation is possible. Since the main difference between Type A and Type B is whether or not there is a pitch fall after a pitch peak, it seems logical to assume that the F0 realisation of Type A at the peak syllable is raised (PAB) in order to perceptually enhance the salience of the falling contour of Type A.

If this assumption holds true, it can be argued that the higher F0 realisation of Type A observed at the pre-peak syllables (IAB) is an anticipatory assimilation to the resultant enhanced F0 realisation at the peak syllable of Type A.

Theoretically, the salience of a falling contour can be enhanced not only by starting to fall at a higher F0 (PAB) but also by continuing to fall to a lower F0 (ACF). Therefore, the lower F0 realisation of Type A after its F0 peak (ACF) can also be accounted for in terms of the perceptual salience of the falling contour. The suppression of the F0 realisation of a word when preceded by a Type A word rather than a Type B word (DNS), can also be considered as a realisation difference resulting from the high falling associated with Type A.

Summary

This study I have demonstrated that, from a derivational and F0 realisation perspective, Type A and Type B have /HL/ and /H/ lexical tones respectively. Judging

from the number of tones specified in the lexicon, I indicated that KJ, which has two lexical tones, is closer to proto-typical tone languages than SJ, which has one lexical tone.

On the basis of the accentual behaviour of extended words and compounds, I argued that these lexical tones are not a property of a given syllable, but of a word in the lexicon. I presented the underlying tonal representation of KJ's accentual contrast accordingly using the AM model of intonation.

I also proposed a phonetic explanation based on perceptual salience for the F0 realisation differences between Type A and Type B.

Bibliography

Chen, M. Y. (2000) *Tone Sandhi: Pattern across Chinese Dialects*. Cambridge: Cambridge University Press.

Clark, J. and Yallop, C. (1990) *An Introduction to Phonetics and Phonology*. Oxford: Blackwell Publishers.

Cruttenden, A. (1986) *Intonation*. Cambridge: Cambridge University Press.

Goldsmith, J. (1976) *Autosegmental Phonology*. Ph.D. dissertation, MIT.

Haraguchi, S. (1977) *The Tone Pattern of Japanese: An Autosegmental Theory of Tonology*. Tokyo: Kaitakusha.

Hayata, T. (1987) Akusento bunpu ni miru nihongo no kosoo. *Gekkan gengo 16 (7): Bessatsu soogoo tokushuu— Nihongo no koosoo*. 158-166.

—. (1999b) Answer to comments. In Kaji, S. (ed.), *Proceedings of the Symposium Cross-Linguistic Studies of Tonal Phenomena, Tonogenesis, Typology, and Related Topics*. Tokyo University of Foreign Studies. 237-240.

Hirayama, T. (1960) *Zenkoku akusento jiten*. 1st edition. Tokyo: Tokyoodoo.

Hyman, M. L. (2001) Privative Tone in Bantu. In Kaji, S. (ed.), *Proceedings of the Symposium Cross-Linguistic Studies of Tonal Phenomena: Tonogenesis, Japanese Accentology, and Other Topics*. Institute for the Study of Languages and Cultures of Asia and Africa, Tokyo University of Foreign Studies. 237-257.

Ishihara, S. (2004) *An Acoustic-Phonetic Descriptive Analysis of Kagoshima Japanese Tonal Phenomena*. PhD thesis, the Australian National University.

Kubozono, H. (2001) Comments on "Privative Tone in Bantu" by Larry Hyman. In Kaji, S. (ed.), *Proceedings of the Symposium Cross-Linguistic Studies of Tonal Phenomena: Tonogenesis, Japanese Accentology, and Other Topics*. Institute for the Study of Languages and Cultures of Asia and Africa, Tokyo University of Foreign Studies. 259-265.

Kubozono, H. and Matsui, M. (1996) Nihongo no akusentojakka to intoneeshon. In the Phonetic Society of Japan (ed.), *Proceedings of the 10th General Meeting of the PSJ*. 101-106.

Lawrence, W. P. (1999) Comments on Prof. Hayata's paper "Accent and tone: Towards a general theory of prosody". In Kaji, S. (ed.), *Proceedings of the Symposium: Cross-Linguistic Studies of Tonal Phenomena, Tonogenesis, Typology, and Related Topics*. Institute for the Study of Languages and Cultures of Asia and Africa, Tokyo University of Foreign Studies. 235-236.

Maekawa, K. (1994) Is there 'dephrasing' of the accentual phrase in Japanese? In Venditti, J. (ed.), *Working Papers in Linguistics 44: Papers from Linguistics Laboratory*. The Ohio State University. 146-165.

McCawley, J. D. (1968) *The Phonological Component of a Grammar of Japanese*. The Hague: Mouton.

—. (1970) Some tonal systems that come close to being pitch accent system but don't quite make it. *Papers from the Sixth Regional Meeting, Chicago Linguistic Society*. 526-531.

—. (1978) What is tone language? In Fromkin, V. A. (ed.), *Tone: A Linguistic Survey*. New York: Academic Press. 113-131.

Odden, D. (1999) Typological issues in tone and stress in Bantu. In Kaji, S. (ed.) *Proceedings of the Symposium Cross-Linguistic Studies of Tonal Phenomena: Tonogenesis, Typology, and Related Topics.* Institute for the Study of Languages and Cultures of Asia and Africa, Tokyo University of Foreign Studies. 187-215.

Pierrehumbert, J. and Beckman, M. (1988) *Japanese Tone Structure*. Cambridge, Massachusetts, London, England: MIT Press.

Pike, K. L. (1948) *Tone Languages*. Ann Arbor: University of Michigan Press.

Poser, W. J. (1984) *The Phonetics and Phonology of Tone and Intonation in Japanese*. Ph.D. dissertation, MIT.

Selkirk, E. and Tateishi, K. (1988) Constraints on minor phrase formation in Japanese. In, *Proceedings of the Chicago Linguistic Society 24*. 316-336.

Shibatani, M. (1979) Review of Haraguchi 1977. Language 55. 928-936.

—. (1990) The languages of Japan. Cambridge: Cambridge University Press.

Smith, J. (1997) Noun faithfulness: Evidence from accent in Japanese dialects. *Japanese/Korean Linguistics 7*. Stanford: CSLI Publications. 611-627.

Takubo, Y., Maekawa, K., Kubozono, H., Honda, K., Shirai, K. and Nakagawa, S. (1998) *Iwanami kooza gengo no kagaku 2: Onsei*. Tokyo: Iwanami shoten.

Yip, M. (2002) *Tone*. Cambridge: Cambridge University Press.