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Stress and Pitch Accent in Japanese Word Prosody

Hisao Tokizaki
Sapporo University

ABSTRACT. This paper argues that the accent system of Tokyo Japanese needs to be reconsidered in relation to the word-prosodic typology of the world's languages. I propose a new model for Japanese word accent, the stress and pitch accent model (S&P), which assumes the stress on the initial mora of every content word as the primary accent and an optional pitch fall on a mora as the secondary accent. It is argued that S&P solves the problems of obligatoriness and culminativity of metrical prominence in Japanese content words.*

Keywords: prominence, obligatoriness, culminativity, typology, Tokyo Japanese

1. Background: pitch-fall accent

It has been argued that Japanese words have an accent marked with a pitch fall (H to L, represented with an apostrophe between H and L) on a particular syllable (e.g. *atama'-ga* LHH-L 'head-Nom') (McCawley 1968, Kubozono 2011). However, this standard analysis of Japanese accent raises a number of issues in relation to the word-prosodic typology of the world's languages. First, Tokyo Japanese does not satisfy the obligatoriness criterion for stress accent proposed by Hyman (2006: 231) defined as in (1).

(1) OBLIGATORINESS: every lexical word has *at least* one syllable marked for the highest degree of metrical prominence (primary stress).

Tokyo Japanese has quite a large number of 'unaccented words' with no pitch fall (e.g. *sakana-ga* LHH-H 'fish-Nom') (cf. Yokoyama 1979, Kubozono 2011). Second, Tokyo Japanese is also problematic for van der Hulst's (2012) two accent parameters: Select (L/R) and Default (L/R). Although van der Hulst analyzes 'unaccented words' in Japanese as Default (R), 'unaccented words' have no pitch fall (HL) on their right edge (e.g. *sakana-ga* LHH-H 'fish-Nom'). Below I will reconsider the prosodic system of Japanese and propose a new model,

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which solves the problems and gives a better explanation of Japanese word prosody. In section 2, I will briefly illustrate a two-accent model proposed by Duanmu (2008) and point out its problems. In section 3, I will propose an alternative model of Japanese word prosody, i.e. stress and pitch accent, and I will argue that this model solves the problems of the standard analysis and the two-accent model. Section 4 is devoted to arguments for the strength of the first mora in Japanese. Section 5 concludes the discussion.

2. Problems: a two-accent model

2.1 Initial-weak prosody

As an alternative to the standard analysis of Japanese word accent (the one-accent model, which defines an optional pitch fall (HL) as the word accent), Duanmu (2008) proposes a two-accent model, according to which every Japanese content word has either one or two accents.[1]

(2) a. A Japanese (content) word has at least one and at most two accents.
b. When there are two accents, the initial one falls on the first syllable and is associated with L‘H; the second accent can fall on any syllable two or more moras away and is associated with H’L.
c. When there is one accent, either L‘H (initial) or H’L (any syllable) can occur.
d. Foot-Binarity: Two accents cannot fall on adjacent moras.

Duanmu’s two-accent model solves the obligatoriness problem of the one-accent model for Tokyo Japanese: ‘unaccented words’ in the one-accent model (e.g. *sakana-ga* LHH-H ‘fish-Nom’) have an accent on their initial mora (***sa****‘kana-ga*) in the two-accent model.

However, Duanmu’s two-accent model has conceptual and empirical problems. First, admitting two accents in a word does not meet the culminativity criterion for stress accent proposed by Hyman (2006: 231) as defined in (3).

(3) CULMINATIVITY: every lexical word has *at most* one syllable marked for the highest degree of metrical prominence.

An ‘accented word’ in the standard analysis (e.g. *ata**ma**’-ga* LH**H**-L ‘head-Nom’) has two accents (***a****‘ta**ma**’-ga* **L**H**H**-L) in Duanmu’s two-accent model, violating the culminativity.

Second, Duanmu argues that two-accent words have an accent on the initial mora (e.g. ***ya****‘ma**za**’kura* **L**H**H**LL ‘wild cherry’) while one-accent words have an accent either on the initial mora (**L**H) (e.g. ***sa****‘kana-ga* **L**HH-H ‘fish-Nom’) or on any mora (**H**L) (e.g. ***ka****’geboosi*

[1] Duanmu uses L’H instead of L‘H, which I use here in order to distinguish it (rise) from H’L (fall).

HLLLL ‘shadow’; *ta**ma**’go* 0**H**L (0: lack of tone) ‘egg’). Although these descriptions of accent seem to be correct, they do not give us any explanation for why two-accent words and one-accent words are different in accent placement. In other words, the initial mora receives accent in all words except for those with a 0HL pitch pattern (e.g. *ta**ma**’go*). Duanmu’s analysis misses an important generalization of the initial accent in Japanese because of his exceptional analysis of words with a 0HL pitch pattern.

Third, admitting lack of tone 0 for the initial mora of 0**H**L words is problematic. The initial mora in these words, which is in fact pronounced in low pitch, should be described as L instead of 0. The reason for admitting 0 in these words seems to be that if L was assumed for the initial mora, these words would have **LH**L, which causes an accent clash between L and H, and violates Foot-Binarity in (2d). However, assuming lack of tone in this case is ad hoc.

In sum, although Duanmu’s two-accent model for Japanese is preferable in that it observes the obligatoriness criterion of metrical prominence, the model has problems with the culminativity of metrical prominence: it misses the generalization of the initial accent, and makes the unmotivated assumption of lack of tone in the initial mora. In the next section, I will propose a new model of Japanese word prosody, which solves all these problems.

3. Proposal: stress and pitch accent

In this section, I propose that a Japanese content word may have two accents of different types (stress and pitch) rather than two pitch accents: the primary accent is the (obligatory) stress on the initial mora of all content words including words starting with **L**HL (shown in small capitals, e.g. ***ta**ma**’**go* ‘egg’) while the secondary accent (optional) can be realized as the pitch fall (H**’**L) on any mora including the first mora. The initial mora of the second constituent word in a compound word may receive the secondary accent (***a**ka-to**’**mbo* **L**H-H’LL ‘red dragonfly’, cf. ***a**kita**’**-inu* **L**HH’-LL ‘Akita-dog’ where *inu* does not have the secondary accent).

(4)

	word	pitch	S&P	two-accent	one-accent	gloss
a.	makura-ga	HLL-L	**ma’**kura-ga	**ma**’kura-ga	**ma**’kura-ga	‘pillow-Nom’
b.	tamago-ga	LHL-L	**ta**ma**’**go-ga	ta**ma**’go-ga	ta**ma**’go-ga	‘egg-Nom’
c.	atama-ga	LHH-L	**a**tama**’**-ga	**a**‘ta**ma**’-ga	ata**ma**’-ga	‘head-Nom’
d.	sakana-ga	LHH-H	**sa**kana-ga	**sa**‘kana-ga	sakana-ga	‘fish-Nom’

This model of Japanese word prosody (stress and pitch accent model (S&P)) solves the problems of Duanmu’s two-accent model as well as those of the standard one-accent model.

First, S&P keeps the culminativity criterion for stress accent (3), which is violated in Duanmu’s two-accent model ((4c) ***a**‘ta**ma**’-ga*). S&P claims that the stress on the word-initial

mora gives the mora primary prominence in a word while the (optional) pitch fall gives a mora the secondary prominence ((4c) ***a****tama'-ga*). Thus, the S&P model observes the culminativity criterion for stress accent in that every content word has only one syllable (i.e. the initial mora) marked for the highest degree of metrical prominence.

Second, S&P analyzes words starting with the LHL pitch pattern as **L**H**'**L ((4b) ***ta****ma'go-ga*), which has the initial stress and a pitch fall from the second to the third mora: there is no accent clash because the pitch fall accent is different from the stress accent. In Duanmu's two-accent model, these words are exceptions to the initial LH accent and are assumed to be toneless (*ta****ma****'go-ga* 0HL-L). In S&P, these words are not exceptions to the general pattern of the initial stress and a pitch fall (***ta****ma'go-ga* **L**H**'**L-L).

Third, S&P, as well as Duanmu's two-accent model, meets the obligatoriness criterion for stress accent (1) because all content words including "unaccented words" in the one-accent model are claimed to have the primary stress accent on the initial mora ((4d) ***sa****kana-ga*). The traditional one-accent model does not meet the obligatoriness criterion because of a large number of "unaccented words" ((4d) *sakana-ga*).

Fourth, S&P has a consequence for van der Hulst's (2012) parametric analysis of Japanese accent. Since S&P claims that all content words have the primary accent on their initial mora, the accent parameter of Tokyo Japanese is Select (L). It is not necessary to assume the other accent parameter Default (R) for Tokyo Japanese. "Unaccented words" in the one-accent model, which have no pitch fall (HL) on their right edge ((4d) *sakana-ga* LHH-H), cannot be analyzed as Default (R) but should be analyzed as Select (L) ((4d) ***sa****kana-ga*).

Thus, S&P has some advantages over the previous models of Japanese accent when we consider word-prosodic typology and the universal properties of metrical prominence in words.

4. Arguments for word-initial stress in Japanese

In this section, I present five arguments for word-initial stress in Tokyo Japanese. First, Miyara (1981) observes that phonological change occurs in casual speech as in (5) and (6).

(5) a. wa'k*e-wa* (nai) > wa'k*yaa* (nai)
HL-L HLL
read-Top (no)

b. kot*o'-wa* (nai) > kot*a'a* (nai)
LH-L LHL
thing-Top (no)

c. kor*e-wa* > kor*yaa*
LH-H LHH
this-Top

(6) a. mi'r-*e-ba* > mi'r*yaa*
HL-L HLL
see-if

b. ik-*e'-ba* > ik*ya'a*
LH-L LHL
go-if

Miyara calls this change phonological reduction.[2] Assuming the cross-linguistic tendency that reduction applies to weak syllables (e.g. *police*man [pəlíːsmən] in English), Nespor and Vogel (1986: 183) argue that the reduction in (5) and (6), which applies to a non-initial mora, indicates that the strong position in the phonological phrase is left rather than right in Japanese. This means that stress falls on the initial mora in a word rather than a non-initial mora. Note that in (5b) and (6b), the second mora (H), which is claimed to have a pitch fall accent in the standard one-accent model and Duanmu's two-accent model, is reduced. This fact shows that, as S&P claims, pitch-fall is not the primary accent in Tokyo Japanese.

Second, emphatic lengthening may occur on the initial mora rather than on a non-initial mora in Tokyo Japanese, as shown in (7).

(7) a. ba'ka > baa'ka! (*ba'kaa!)
HL HHL HLL
fool 'Idiot!'

b. dame'-da-yo > daame'-da-yo! (*damee'-da-yo!)
LH-L-L LLH-L-L (or LHH-L-L) LHH-L-L
no-Copula-Particle 'No!'

c. zenzen > zeenzen! (*zenzeen!)
LHHH LHHHH (or LLLHH) LHHHH
totally (not) 'Not at all!'

Assuming that emphatic lengthening occurs on the stressed syllable cross-linguistically (e.g. *néver* > *neeever!*; *complétely* > *compleeetely!* in English (Celce-Murcia et al. 1996: 177)), emphatic lengthening on the word-initial mora in (7) shows that the word-initial mora has stress

[2] This change might be better called coalescence or palatalization plus regressive vowel assimilation.

accent irrespective of its pitch patterns in Tokyo Japanese. Note that in (7b), a word with non-initial pitch-fall (H-L) also has lengthening of the initial mora (*daa*), not on the second mora with H followed by L (*me*) which is claimed to be the locus of accent in the standard one-accent model.

Third, if gemination cross-linguistically occurs on the consonant immediately after the stressed vowel (Thurgood 1993: 2, cf. Dmitrieva 2012, e.g. *tútto* 'all', *fulíggine* 'spot, soot' in Italian (Anderson 1984: 304, Borrelli 2002: 21)), emphatic gemination in Tokyo Japanese supports the idea that Tokyo Japanese has word-initial stress. Nasu (1999) reports that in Japanese mimetic words such as (8), emphatic gemination occurs on the consonant immediately after the first mora as in (9a) rather than after the second mora as in (9b) and (9c).

(8)		pika-pika	LH-HH	'glittering'
(9)	a.	pi*kk*a-pika	LHH-HH (or LLH-HH)	'very glittering'
	b. ?	pika*p*-*p*ika	LHH-HH	'very glittering'
	c. *	pika-pi*kk*a	LH-HLL	'very glittering'

The acceptability difference of (9a-c) is explained straightforwardly if we assume that gemination occurs on the post-stress mora/syllable universally and that, as S&P claims, Tokyo Japanese has stress on the initial mora rather than on a non-initial mora ((9a) pi*kk*a-pika).

Fourth, it has been argued that Japanese may have had vowel harmony, which can be seen in some native words such as *atama* 'head' and *karada* 'body'. Hyman (2002: 14) argues that "a canonical trigger V [of vowel harmony (HT)] occurs in a prominent syllable (e.g. root, stressed) with a contrastively specified feature" while "a canonical target V occurs in a non-prominent syllable (e.g. affix, unstressed) with a non-contrasting unspecified feature." If this generalization holds, we can argue that Japanese has word-initial stress, which spreads the vowel of the initial mora to the following moras.

Fifth, Donegan and Stampe (1983) argue that languages with word-initial stress have alliteration while languages with word-final stress have rhyme in their poetry (cf. Meid 1971: 105-106, Plank 1998: 218). Japanese traditional poetry including *waka* (short poetry with 5 7 5 7 7 mora) uses alliteration rather than rhyme, as shown in (10) where *ta* and *na* are alliterated.

(10) taki-no oto-wa / taete hisashiku / narinuredo / nakoso nagarete / naokikoekere
'This waterfall's melodious voice was famed both far and near; although it long has ceased to flow, yet still with memory's ear. Its gentle splash I hear.' (Dainagon Kinto)

If the correlation between stress location and alliteration/rhyme holds, we can argue that Japanese has word-initial stress.

In sum, these five points show that Japanese has word-initial stress, as is claimed by S&P. These phenomena are not explained by the standard analysis, which defines pitch-fall as the accent of a word.

5. Conclusion

So far, I have argued for the stress and pitch accent (S&P) model for Tokyo Japanese, which claims that a content word has stress on the initial mora as the primary accent and an optional pitch-fall (HL) on a mora as the secondary accent. This model solves the problems with the standard one-accent model and Duanmu's (2008) two-accent model, which involve the obligatoriness and the culminativity of prosodic prominence. I have given reduction in casual speech, emphatic lengthening, gemination, vowel harmony and alliteration as evidence that a content word in Tokyo Japanese has stress on the initial mora.

If these arguments are on the right track, the analysis presented here has interesting consequences for word-prosodic typology and linguistic typology in general. First, the dichotomy between stress languages and tone (or pitch) languages should be reconsidered if Japanese has stress as well as pitch accent. Languages can use both stress and tone (or pitch) for prominence.

Second, as argued in section 3, van der Hulst's (2012) accent parameters, Select (L/R) and Default (L/R), should be reconsidered if Japanese has stress accent on the initial mora of all content words. Either Select (L) or Default (L) is enough for Japanese primary accent. It is an empirical problem whether all languages have these two accent parameters and what their values are.

Third, the accentual system of Japanese may shed light on the problem of the origin of the Japanese language. It has been controversial whether Japanese has Altaic features or not. The word-prosody of Altaic languages has also been controversial: some researchers argue that Altaic languages have stress on the initial mora while others argue that Altaic words have a pitch accent on the right (cf. Tokizaki 2018). Then, we can try to pursue the idea that Japanese has the same word prosody as Altaic languages, which may give support to the idea that Japanese has Altaic features.

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