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PARAMETER SETTING FOR ABSTRACT STRESS IN TOKYO JAPANESE

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ABSTRACT

This paper shows that the principles-and-parameters approach in generative phonology can also be applied to pitch-accent languages such as Tokyo Japanese.

In Halle and Vergnaud (1987), various stress patterns of words and phrases in a number of stress-accent languages have been accounted for by rules and parameters. Likewise, if we define a certain prosodical point in Tokyo Japanese as an abstract stress, its location can be predicted by the rules and parameters.

Moreover, parallels and differences between the parameters of Tokyo Japanese and those of four languages (Latin, Polish, Turkish, ancient Greek) are shown with the proposed Edge Demarcation Convention within the new theoretical framework of metrical phonology formulated by Halle and Idsardi (1992).

0. INTRODUCTION

In their quest for Universal Grammar in Halle and Vergnaud [3], where much energy was devoted to the construction of a formal stress system, an implicit assumption was the following: all the phonological patterns concerning auditory prominence such as stress, pitch, and tone in many languages will be accounted for by the use of parameters and principles employed in that formal system. This is partly observed by their treatment of Latin and Creek (a Muskogean language used by the Creek Indians), whose prominence have been indicated by the tonal accent.

In the case of the Tokyo dialect of Japanese (hereafter Tokyo Japanese), what is auditorily and acoustically recognized is the varying pitch of voice. The pitch contour has been phonologically characterized by the two types of tone: high and low, first described 100 years ago in Yamada [17]. According to Hayata [8], Miyata [14] was the first to mention that the linguistically crucial point for the description of the contour is a position where the high tone falls to low. This view has dominated the study of the Japanese pitch pattern by generative linguists (McCawley [13], Haraguchi [4, 5, 6], and others).

Based on this tradition and Hattori's 'accent kernel' principle [7], Yamada [18,19] applied Halle and Vergnaud's approach to Japanese comprehensively, using the concept of 'abstract stress' (i.e. metrical prominence) that indicates a position on the mora bearing the high tone immediately followed by a sharp fall of pitch to low, by which the Japanese language may have been finally put on the table of discussion seeking for Universal Grammar in metrical phonology (cf. Haraguchi [5, 6], Kubo [11], Tanaka [16], Watanabe [21], and others).

Halle and Vergnaud's theoretical framework, however, has been drastically revised in the recent work by Halle and Idsardi [2]. They introduce the renewed phonological concept of 'projection' in (1a), by which the prominence-bearing elements in the phoneme string as well as boundaries in some cases are projected as marks (x's) and brackets onto the metrical plane. The projected marks are grouped into constituents to construct the metrical grid by the Bracket Matching Convention in (1b) in conjunction with the Edge Marking parameter, the Iterative Constituent Construction parameter, and the Headedness parameter in (1c-e).

(1) a. Projection
b. Bracket Matching Convention (abbreviated to BMC)
c. Edge Marking parameter (abbreviated to Edge)
d. Iterative Constituent Construction parameter (abbreviated to ICC)
e. Headedness parameter (abbreviated to Head)

With the Edge Marking parameter and the Iterative Constituent Construction parameter, the necessity of invoking the ad hoc extrametricality rule has disappeared. Note that they draw a guideline by which we can clearly distinguish the principles of Universal Grammar from the parameters in particular languages, and that they leave us the task of verifying the validity of their claim through the application of their theory to each particular grammar. In this paper, therefore, we will reanalyze Japanese within the theoretical framework of Halle and Idsardi [2], and we will clarify three properties of Japanese from the viewpoint of parameters.

1. LIGHT-PENULTIMATE LATIN TYPE PARAMETERS

Let us begin by looking at the fact about Japanese compound nouns in (2). Note that all the examples in this paper come from the dictionaries listed in references, and that abstract stress (i.e. metrical prominence) and a mora boundary are shown by the diacritic (') and the dot (.) respectively. Words in which the sharp fall of pitch cannot be recognized are described without abstract stress. (Masuya [12] criticizes the current inappropriate use of the term stress for the representation of the metrical prominence in pitch-accent languages; therefore, we use the term abstract stress for Tokyo Japanese in this paper.)

(2) a. a.zi.tu.ke'.-no.ri. (< a.zi.tu.ke. + no.ri'.) 'seasoned seaweed'
o.ku.-za'.si.ki. (< o'.ku. + za.si.ki'.) 'innermost Japanese-style drawing room'
kyo.o.so.o.-a'.i.te. (< kyo.o.so.o. + a.i.te'.) 'rival'
a.o.mo.no'.-i.ti. (< a.o'.mo.no. + i'.ti.) 'vegetable market'
a.ku.ta.ga.wa'.-syo.o. (< a.ku.ta'.ga.wa. + syo'.o.) 'Akutagawa prize'
syo.o.hi'.-ze.e. (< syo.o.hi. + ze'.e.) 'consumption tax'
o.n.na.-go'.ko.ro. (< o.n.na'. + ko.ko'.ro.) 'female psychology'
mi.na.mi.-yo.o.ro'.p.pa. (< mi.na.mi. + yo.o.ro'.p.pa.) 'Southern Europe'
b. a.ku.se.n.to.-zi'.te.n. (< a'.ku.se.n.to. + zi.te.n.) 'accent dictionary'
ga.i.to.o.-sya'.si.n. (< ga.i.to.o. + sya.si.n.) 'street photograph'
to.o.yo.o.-ni'.k.ki. (< to.o.yo.o. + ni.k.ki.) 'daily-use diary'
ze.n.si.n.-ma'.su.i. (< ze.n.si.n. + ma.su.i.) 'general anesthesia'
mu.-i.ti'.mo.tu. (< mu. + i.ti.mo.tu.) 'the state of being with practically nothing'
u.su.-ku.re'.na.i. (< u.su. + ku.re.na.i.) 'pale pink'

All the compounds in (2) reveal the antepenultimate abstract stress regardless of their internal structures; i.e. in isolation, abstract stress is placed on the ultimate, penultimate, or antepenultimate mora of the final elements of the compounds in (2a) (see the final elements in brackets), while no abstract stress is assigned to the final elements in (2b).

Next, look at the following table in (3):

(3) a. Frequencies of place names in a sample of 358 cases in NHK [15] (figures in brackets give relative frequencies as percentages)

Words with abstract stress	Words without abstract stress	Total
244 (68)	114 (32)	358 (100)

b. Frequencies of place names in a sample of 244 cases in (3a) (figures in brackets give relative frequencies as percentages)

Antepenultimate/preantepenultimate	Others	Total
230 (94)	14 (6)	244 (100)

In the 358 Japanese place names listed in NHK [15], 244 words (68 percent) are reported to be abstract-stressed; while 114 words (32 percent) are non-abstract-stressed as in (3a). Out of the 244 words with abstract stress in (3b), their stress position is predictable for 230 cases (94 percent); i.e. abstract stress is assigned to the antepenultimate or preantepenultimate mora depending on the status of the antepenultimate mora. In other words, if the antepenultimate mora is not the head of a syllable, stress assigned to the antepenult is shifted one mora to the left by means of another independently motivated rule that is not our concern here. The point here is that abstract stress is overwhelmingly assigned to the antepenult in the case of place names.

Note also that it is generally reported that abstract stress is assigned to the antepenultimate mora in the case of loan words as in (4a) and nonsense sequences of phonemes as in (4b):

(4) a. e.re.ku.to.ro.ni'.ku.su. (< electronics)
bi.zi.ne.su'.ma.n. (< businessman)
i.su.ra'.e.ru. (< Israel)

b. a.i.u'.e.o.
ka.ki.ku'.ke.ko.
sa.si.su'.se.so.

Therefore, it is plausible to conclude that the basic stress position of Tokyo Japanese for the abstract-stressed class is the antepenult.

Now, if this is the case, what parameter values are set for Tokyo Japanese? Recall here a language with a very common stress pattern such as Latin. In Latin, stress (i.e. metrical prominence) is assigned to the penultimate syllable if it is heavy, otherwise to the antepenultimate. Therefore, parameter settings for Latin are given in Halle and Idsardi [2] as follows:

(5) Latin stress [2: 23]

Line 0:	Project: L	Edge: RLR	ICC: 2R	Head: L
Line 1:		Edge: RRR		Head: R
Conflation				

Notice here that Latin needs to project the left boundary of the heavy syllable onto line 0, as shown by [Project: L]. In the case of Tokyo Japanese, however, we need not specify the (left, right) parameter of the projection (6a), as exemplified in (7), which will support their statement that "some languages fail to invoke any form of (6a) so that differences in syllable structure have no effect on stress."

(6) Line 0 interface projection

a. Project the (left / right) boundary of certain syllables onto line 0

b. Project a line 0 element for each syllable head

(7) a. (a.)(zi.)(tu.)(ke'.)-(no.)(ri.)
(o.)(ku.)-(za'.)(si.)(ki.)
b. (a.)(ku.)(ta.)(ga.)(wa'.)-(syo.o.)
(syo.o.)(hi'.)-(ze.e.)

(The syllable boundaries are shown by brackets here. Notice that abstract stress is placed on the antepenultimate syllable in (7a), while it is placed on the penultimate in (7b), despite the fact that the penultimate syllable in each case is light.)

As regards (6b), moreover, it is not the syllable head but the mora that is projected onto line 0 in Tokyo Japanese, so that we will need the following line 0 interface projection for Tokyo Japanese:

(8) Japanese line 0 interface projection
a. Project the zero boundary of syllables onto line 0
b. Project a line 0 element for each mora

Therefore, by virtue of (8), Japanese projection parameter settings are something like [Project: (a) zero, (b) M] (M = mora) in (9), interpreted as "project the zero boundary onto line 0, and project a line 0 element for each mora," in contrast with the Latin projection parameter setting [Project: L], interpreted as "project the left boundary of the heavy syllable onto line 0, and project a line 0 element for each syllable head." (We will not discuss here a variation of (6b) suggested by Halle and Idsardi [2] to the effect that some languages project more than one grid mark for some syllables.)

(9) [Project: (a) zero, (b) M] (M = mora)

The point here is that for Tokyo Japanese we need different parameter settings rather than [Project: L]. In other words, what is projected onto line 0 is only the mora; and the line 0 consists of marks without boundaries.

Interestingly, however, the sequence of marks in line 0 of Japanese parallels that of Latin light-penultimate words; namely, the rest of the parameter settings on lines 0 and 1 are the same as those in Latin, as shown in (10). Thus, we can call this type of Japanese words the light-penultimate Latin type.

(10) Japanese abstract stress

Line 0:	Project: (a) zero, (b) M	Edge: RLR	ICC: ZR	Head: L
Line 1:		Edge: RRR		Head: R

2. POLISH TYPE: TWO KINDS OF THE EDGE PARAMETERS

Let us turn to the following compounds, which are of a different type from those treated in section 1.

(11) a. Mi.to'.-si. (< Mi.to. + si'.) 'Mito city'
Ku.ru.me'.-si. (< Ku'.ru.me. + si'.) 'Kurume city'
Ka.go.si.ma'.-si. (< Ka.go.si.ma. + si'.) 'Kagosima city'
b. ka.to'.-ki. (< ka'.to. + ki'.) 'transition period'
de.ma.wa.ri'.-ki. (< de.ma.wa.ri. + ki'.) 'supply season'
nyu.u.zi'.-ki. (< nyu'.u.zi. + ki'.) 'suckling period'

Final words (or morphemes) of this type of compound, such as -si 'city' and -ki 'period', are well known for their pre-accenting (i.e. pre-stressing) property; that is, whenever they form compounds as their final element, abstract stress is assigned to the penultimate mora regardless of the stress facts of their internal constituents. How can we deal with them? First approximation will be to assume that they are subject to the Edge parameter in their underlying representations as postulated for Polish by Halle and Idsardi [2]. Since abstract stress is placed on the second mora from the right end in the examples in (11), there will be four possibilities for the lexical parameter setting for them as shown in (12):

(12) a. [Edge: RRR] i.e. < x)* > (* = word boundary)
b. [Edge: RLR] i.e. <)x* >
c. [Edge: LRR] i.e. < x(* >
d. [Edge: LLR] i.e. < (x* >

By applying each of (12) to abstract examples composed of five moras in (13), however, we cannot obtain the desired result, because the general Edge parameter for Tokyo Japanese in (10), i.e. [Edge: RLR] <)x* >, is assumed to place a RIGHT boundary to the LEFT of the RIGHT-most element in the string as shown in (13a-d). None of the derivations here produce the penultimate abstract stress. (Note that hereafter we use square brackets for the lexical Edge brackets in derivations, if necessary for ease of exposition).

(13) *a. Line 0 Edge: RRR x x x x x]
(lexical) ----------
Edge: RLR x x x x) x]
(general) ----------
Line 1 x
(x x x)
(x x)(x x)(x]

*b. Edge: RLR x x x x]x
(lexical) ----------
Edge: RLR x x x x]x
(general) ----------
x
(x x)
(x x)(x x]x

*c. Line 0 Edge: LRR x x x x x[
(lexical) ----------
Edge: RLR x x x x) x[
(general) ----------
Line 1 x
(x x)
(x x)(x x) x[

*d. Edge: LLR x x x x [x
(lexical) ----------
Edge: RLR x x x x)[x
(general) ----------
x
(x x x)
(x x)(x x)[x

In order to solve this problem, we propose the following convention for the Edge Marking.

(14) Edge Demarcation Convention
Once the Edge is projected onto the sequence of marks, it makes the outside marks of the Edge invisible to the subsequent bracket-marking operation, except for the ICC starting from the farmost element outside the Edge in the cycle.

By virtue of (14), we can finally get the desired output in (15b).

(15) *a. Line 0 Edge: RRR x x x x x]
(lexical) ----------
Edge: RLR x x x x) x]
(general) ----------
Line 1
x
(x x x)
(x x)(x x)(x]

b. Edge: RLR x x x x]x
(lexical) ----------
Edge: RLR x x x) x]x
(general) ----------
x
(x x)
x (x x) (x]x

*c. Line 0 Edge: LRR x x x x x[
(lexical) ----------
Edge: RLR x x x x x[
(general) ----------
Line 1 inapplicable

*d. Edge: LLR x x x x[x
(lexical) ----------
Edge: RLR x x x x[)x
(general) ----------
inapplicable (?)

In (15b), when the general Edge parameter is invoked, the last element in the string is invisible because of the lexical Edge parameter setting [Edge: RLR] with the Edge Demarcation Convention (14). Therefore, a RIGHT boundary is placed to the LEFT of the now RIGHT-most element in the string, which assures the desired output. In other words, the following Edge Marking parameter (16) can expand its coverage in conjunction with the proposed Edge Demarcation Convention (14).

(16) Edge Marking Parameter [2: 8]
Place a (left, right) boundary to the (left, right) of the (left, right)-most element in the string.

Our next task is to check the function of the Edge Demarcation Convention with data other than Tokyo Japanese, and its compatibility with other parts of the system of rules. The languages to be checked are those requiring the lexical Edge treatment; Polish, Turkish, and ancient Greek are available at present.

Of the Polish exceptional stem types listed by Halle and Idsardi [2] in (17), the only one relevant here is the F type.

(17) Polish exceptional stem types [2: 26]

P/A = RRR	A/P = RLR	F = LLR
x)	)x	(x
republik	uniwersytet	rezim

Notice that because of the assumed ordering of the the lexical Edge parameter for F stems [Edge: LLR] before the general Edge parameter [Edge: LLL] (N.B., Polish stress parameters: Line 0: [Edge: LLL, ICC: 2R, Head: L], Line 1: [Edge: RRR, Head: R]) in conjunction with invisibility of the mark(s) by the lexical Edge, (14), and (16), we get the correct pre-final outputs in (18) to which conflation applies.

(18)

x	x	x
(x)	(x)	(x x)
x[x)	x[x x)	x[x)(x x)
re zim	re zimu	re zi mami

In the case of the Turkish canonical examples with lexical Edge parameter [Edge: RLR] in (19), likewise, we get no discrepancy under the Edge Demarcation Convention in (14).

(19) másа-lar-a adám-im gít-me-d-im yorgún-dur-lar
x)x x x x x)x x)x)x x x)x x
kenédi-dir-ler
x x)x)x x

Pre-final correct grids are constructed in (20), by means of the Turkish parameter settings in (21) and the UG rules.

(20)

x	x	x	x
(x)	(x)	(x x)	(x)
(x]x—x—x	(x x]x	(x](x]x	(x x]x—x
másа-lar-a	adám-im	gít-me-d-im	yorgún-dur-lar

x
(x x)
(x x](x]x—x
kenédi-dir-ler

(21) Turkish parameter settings [1]
Line 0: Project: Syllable heads
Edge: Lexical RLR, General RRR; Head: R
Line 1: Edge: LLL, Head: L
Conflation

Moreover, in the following canonical examples of ancient Greek, by using the parameter settings in (22), we get the correct pre-final outputs in (23) under the Edge Demarcation Convention in (14).

(22) Ancient Greek parameter settings [1]
Line 0: Project: Syllable heads
Edge: i. Lexical LLR,
ii. General RLR if last element dominates short vowel followed by at most one consonant
iii. RRR otherwise
ICC: 2R, Head: L
Line 1: Edge: RRR, Head: R
Conflation

(23)

x	x	x
(x)	(x)	(x x)
x—x) (x)	x—x (x x) x	x—x (x) (x x)
iskhuu-ro-s	iskhuu-ro-tat-os	iskhuu-ro tat-oon

At least for four languages available at hand, the Edge Demarcation Convention works well.

In sum, we have shown that the four languages, Japanese, Polish, Turkish and ancient Greek, share this similar property: they require the two types of Edge parameters, i.e. lexical and general, in their particular grammar. Therefore, we call them the Polish Type.

3. ANOTHER FUNCTION OF THE EDGE DEMARCATION CONVENTION

So far we have confined our discussion about Tokyo Japanese to the abstract-stressed class of words, as in (24a), which bears a sharp fall of pitch from the high tone to the low tone, indicating the existence of abstract stress, as exemplified in (2). Notice, however, we have another type of words in Tokyo Japanese as shown in (24b), which does not reveal any fall of pitch within the word, indicating no existence of abstract stress.

(24) a. ho.to.to'.gi.su. (L[HH]LL) 'cuckoo' (x = mark for abstract stress position, H = high tone, L = low tone)
b. ma.n.do.ri.n. (L[HHHH) 'mandolin'

For the (24a) type of words, we have accounted for the abstract-stress assignment by means of the general Edge parameter setting [Edge: RLR] and the subsequent application of the Universal Grammar (UG) rules in conjunction with the other parameter settings for Tokyo Japanese as in (25).

(25) x x x x)x General Edge: RLR
---
x
(x x) Subsequent application of the UG rules in
(x x)(x x)x conjunction with the other parameter settings

For the (24b) type of words, on the other hand, what kind of

technique is to be employed? Recall here that in (15c) with lexical Edge parameter [Edge: LRR] the subsequent application of the UG rules is blocked by the effect of the Edge Demarcation Convention in (14), yielding the abstract-stressless string. Therefore, we can adopt the same lexical Edge parameter setting [Edge: LRR] for this type of words, as shown in (26).

(26) x x x x x(Lexical Edge: LRR
x x x x x(General Edge: RLR (inapplicable)
x x x x x(Subsequent application of the UG rules is blocked

Let us take up the following (27) as practical examples.

(27) a. zi.ka.n.-hyo.o. (< zi.ka.n. + hyo.o.) 'class schedule'
ku.ti.-ma.ne. (< ku.ti. + ma.ne.) 'mimicry'
b. zi.ko.ku.-hyo.o. (< zi'.ko.ku. + hyo.o.) 'timetable'
sa.ru.-ma.ne. (< sa'.ru. + ma.ne.) 'shallow imitation'
c. ha.si.go.-da.n. (< ha.si.go. + da'.n.) 'stairs'
ka.n.sya.ku.-da.ma. (< ka.n.sya.ku. + ta.ma'.) 'fit of rage'
d. o.n.ga.ku.-ta.i. (< o'.n.ga.ku. + ta'.i.) 'musical band'
a.ka.-gu.mi. (< a'.ka. + ku.mi'.) 'red team'

We assume here that the compound formation of Tokyo Japanese is cyclic, which is easily demonstrated by assuming the opposite: if the compound formation is not cyclic, the simplified derivation for the compound noun zikan-kyoo in (27a), for example, will be the following:

(28) x x x(- x x(Lexical Edge: LRR
---
x
(x)
*x x x(- x x)(Incorrect output

Therefore, the compound formation of Tokyo Japanese is cyclic; thus, the abbreviated derivation for zikan-kyoo is shown as follows:

(29) x x x — x x(Lexical Edge: LRR (cyclic)
x x x — x x(General Edge: RLR (inapplicable)
x x x — x x(UG rules is blocked

All the other examples in (27) can be equally accounted for, since their cyclic final-elements erase the previously-assigned brackets and marks except for the line 0 marks, regardless of their internal structures; namely, those in (27b-d) include as their elements the abstract-stressed words. (Note that the Edge parameter setting can be different from the element in isolation and one in the compound final position as in (27c-d). For argument about this and other issues on compounds, see Yamada [18, 19, 20].)

4. CONCLUSION

We have shown that the overall basic parameter settings for Tokyo Japanese parallel those for Latin, except for the line 0 interface projection: in Tokyo Japanese the heavy vs. light distinction of the syllables does not affect the sequence of projected marks of moras in line 0 in the grid. Other parameter settings are the same as Latin. In other words, abstract stress is generally assigned to the antepenultimate, which resembles the Latin antepenultimate stress (i.e. metrical prominence) assigned when the penultimate is light.

In addition to these general parameter settings, Japanese has the lexical Edge parameters assigned to specific lexical items, which makes the Japanese accentuation different from that of Latin. The need for the lexically marked Edge parameters for certain lexical items reminds us of the Polish-type stress system. Thus, we could say that the abstract-stress assignment mechanism in Tokyo Japanese is a combination of the light-penultimate Latin type and the Polish type from the viewpoint of parameter settings.

What makes the Japanese accentuation more incomprehensible is that nearly half of the words and the morphemes serving as the last element of the compounds bear the lexical Edge parameter [Edge: LRR], which gives birth to non-abstract-stressed words (i.e. unaccented words). How to deal with this type of words within the system of rules has been a long lasting concern among linguists who have tackled Japanese. We have shown one solution to this by the proposed Edge Demarcation Convention.

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