Kattobase: The Linguistic Structure of Japanese Baseball Chants

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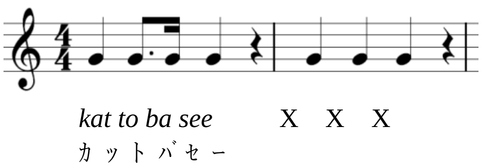
1 Introduction

This paper develops the first constraint-based analysis of Japanese baseball chants, whose intricate organization casts a very revealing sidelight on the prosodic organization of the Japanese language itself. The source of most data and basic generalizations is the last author's dissertation (Tanaka 2008), supplemented by further empirical probing which clarified a number of unclear points.

Since the beginnings of metrical phonology, the analysis of chants has played an important role in the development of the theory. Liberman (1975) uses the English vocative chant (*"Jo-ohn!"*, with a High-Mid tune) to motivate basic properties of what came to be known as the "metrical theory of stress". He shows that, in order to formalize *tune-to-text* alignment, and to define what it means for a tune to be *congruent* with a text and its metrical pattern, a relational understanding of stress is necessary, as instantiated in metrical trees with their "strong-weak" labeling of all nodes.

Japanese baseball chants, an obligatory and quasi-ritual part of virtually every baseball game, are delivered by fans each time their team is at bat. They are accompanied by a variety of musical instruments (drums, trumpets, etc.) and take the form in (1). They consist of two measures of four beats, each composed of three notes plus one pause. 'XXX' is a rhythmically adapted form of the player's name. At issue here is the form of the rhythmic adaptation, which is tightly regulated and grounded, as we will show, in the rhythmic structure of the language itself.

(1)

Morphological structure:
kat- tob - as – e
INTENSIFIER-fly-CAUS-IMP
'send it flying, hit a homerun'

The examples in (2) illustrate the phenomenon.[1]

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[1] Our transcription is approximately phonemic and largely follows the Hepburn style of Romanization used by the leading dictionaries (Kenkyusha, among others), with some minor modifications: Vowel length is denoted by doubling; chi=[t͡ʃi], tsu=[t͡su], shi=[ʃi], ji=[d͡ʒi], hi=[ɕi], fu=[ɸu]; and n stands for the moraic nasal of Japanese, realized as a nasal glide (assimilating in place to following stop consonants).

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(2)			Source name		Team[2]
a.	*kat toba see*	*kaa kee fuu*	kakefu	掛布	Hanshin Tigers
b.	…	*oo ota nii*	ootani	大谷	LA Angels
c.	…	*baa aa suu, *baa su uu*	baasu	Bass	Hanshin Tigers
d.	…	*ee too oo, *ee ee too*	etoo	江藤	Chunichi Dragons
e.	…	*shii pii nn, *shii ii pin*	shipin	Sipin	Yomiuri Giants

By way of introduction, we first summarize Tanaka's (2008) analysis, and at the same time present relevant examples. There are three separate rules, depending on the length of the input name, measured in moras (μ). Each CV- or V-unit is one mora, so *ichiroo*= *i-chi-ro-o* is a 4μ name. Syllable-final consonants (mostly nasals) are also one mora (*son* = *so-n* = 2μ).

Rule 1 in (3) deals with names up to 3μ. The simplest case is names of exactly 3μ, which fit the $X_1X_2X_3$ template exactly, as seen in (4) (we write "L" for "light syllable", "H" for "heavy syllable", and "S" for "superheavy syllable").

(3) Rule 1a 3-mora names: Align the initial mora to the initial beat (X_1), the final mora to the final beat (X_3), the medial mora to the medial beat (X_2).

(4) Moras	Profile		Input		Output
3	LLL	a.	ka-ke-fu	掛布	kaa-kee-fuu
	HL	b.	ba-a-su	Bass	baa-aa-suu
		c.	ge-n-da	源田	gee-nn-daa
		d.	sa-i-ki	才木	saa-ii-kii
	LH	e.	e-to-o	江藤	ee-too-oo

It is important that the final mora goes to X_3, not the final syllable: This is why LH [*e*$_1$]-[*to*$_2$-*o*$_3$] → [*e*$_1$-*e*]-[*to*$_2$-*o*]-[*o*$_3$-*o*] and not *[*e*$_1$-*e*]-[*e-e*]-[*to*$_2$*o*$_3$]. By the same rule, HL [*ba*$_1$-*a*$_2$]-[*su*$_3$] → [*ba*$_1$-*a*]-[*a*$_2$-*a*]-[*su*$_3$-*u*], not *[*ba*$_1$-*a*$_2$]-[*su*$_3$-*u*]-[*u-u*].

Rule 1b in (5) deals with shorter names. The crucial point is that the first mora fills X_1 and X_2 (*ta*$_1$-*ni*$_2$→*ta*$_1$*a-aa-ni*$_2$*i*), not the second mora X_2 and X_3 (**ta*$_1$*a-ni*$_2$*i-ii*).

(5) Rule 1b In 2μ names, there is no medial mora. Spread from the left to fill X_2. In 1μ names, there is only an initial mora. Spread from the left to fill X_2 and X_3.

Illustrative examples appear in (6).

(6) Moras	Profile		Input		Output
2	LL	a.	tani	谷	taa-aa-nii
		b.	yano	矢野	yaa-aa-noo
	H	c.	son	宣	soo-oo-nn
		d.	chen	陳	chee-ee-nn
		e.	rii	Lee	rii-ii-ii
		f.	kai	甲斐	ka-aa-ii
1	L	g.	ri	李	rii-ii-ii

(6cd) again illustrate the final-mora rule: *n* alone fills X_3, not the final rhyme *on*: [*so*$_1$-*n*$_2$] → [*so*$_1$-*o*]-[*o-o*]-[*n*$_2$-*n*], not *[*so*$_1$-*o*]-[*o-o*]-[*o-n*$_2$].

Things are different with 4μ names, and longer names: Now the whole final syllable goes to X_3, whether light or heavy: [*i*$_1$]-[*chi*$_2$]-[*ro*$_3$-*o*$_4$]→[*i*$_1$*i*]-[*chi*$_2$*i*]-[*ro*$_3$-*o*$_4$] (8e), and not the final mora (*[*i*$_1$*i*]-[*chi*$_2$*ro*$_3$]-[*o*$_4$-*o*]. A new rule is therefore needed, given in (7).

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[2] See the Appendix for an alphabetized list of source names and player affiliation.

(7) Rule 2 4-mora names: Align the initial mora to X_1, the final syllable to X_3, medial moras to X_2.

More examples illustrating the pattern are given in (8).

(8)

Moras	Profile		Input		Output
4	LLLL	a.	kiyohara	清原	kii-yoha-raa
		b.	tatsunami	立浪	taa-tsuna-mii
		c.	rinaresu	Linares	rii-nare-suu
		d.	kuromati	Cromartie	kuu-roma-tii
	LLH	e.	ichiroo	イチロー	ii-chii-roo
		f.	ochiai	落合	oo-chii-ai
		g.	wiruson	Wilson	wii-ruu-son
	HLL	h.	joojima	城島	joo-oji-maa
		i.	ootomo	大友	oo-oto-moo
	HH	j.	hansen	Hansen	haa-nn-sen
		k.	taihoo	大豊	taa-ii-hoo
		l.	shinjoo	新庄	shii-nn-joo
	LHL	m.	furanko	Franco	fuu-ran-koo

Besides the emergence of the final syllable as a mapping target, the mapping of HLL names (8hi) is remarkable: $[jo_1\text{-}o_2]\text{-}[ji_3]\text{-}[ma_4] \rightarrow [jo_1o]\text{-}[o_2\text{-}ji_3]\text{-}[ma_4a]$, not $*[jo_1\text{-}o_2]\text{-}[ji_3i]\text{-}[ma_4a]$. As indicated, we understand the winning output as mapping the two *o*-moras to different beats (with an onset violation). Here we simply note the facts, and will return to their explanation in the next section.

A special case are 4μ names like $[ku_1]\text{-}[ra_2\text{-}i_3\text{-}n_4]$ (*Klein*) (9a), whose profile seems to be LS. If it is the case that the superheavy syllable is actually broken up into L+H $[ku_1]\text{-}[ra_2]\text{-}[i_3\text{-}n_4]$, as argued by several authors, including Vance (2008, 125–127), Kubozono (2015, 13–16), and Ito and Mester (2018, 212–216), the final syllable rule already covers this case. The long vowel in (9b) seems to resist this kind of splitting.

(9)

Moras	Profile		Input		Output
4	LS or LLH	a.	kurain	Klein	kuu-raa-in[3]
		b.	kuruun	Kroon	kuu-ruu-nn
	SL or LHL	c.	baanzu	Barnes	baa-an-zuu
		d.	joonzu	Jones	joo-on-zuu

Names with 5 or more moras follow the same final syllable rule, but we need to distinguish two cases on the basis of the weight of the penultimate syllable. Names with penultimate H map this syllable to X_2, as formulated in (10) and illustrated in (11).

(10) Rule 3a ≥5μ names with H penultimate syllable: Align the final syllable to X_3, the penultimate H syllable to X_2, the remainder (which can be of any length) to X_1.

(11)

Moras	Profile		Input		Output
5	HHL	a.	boochaado	Borchard	boo-chaa-doo
	LLHL	b.	seginooru	Seguignol	segi-noo-ruu
	LHH	c.	deshinsei	DeCinces	dee-shin-sei
6	LLLHL	d.	desutoraade	Destrade	desuto-raa-dee

In (12) we give the corresponding rule for names with L in the penult, as illustrated in (13).

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[3] Another less preferred variant is *kuu-rai-nn*.

(12) Rule 3b ≥5μ names with L penultimate syllable: Align the final syllable to X_3, the penultimate L syllable and the antepenultimate syllable (whether L or H) to X_2, the remainder (which can be of any length) to X_1.

(13)

Moras	Profile		Input		Output
5	HLLL	a.	gonzaresu	González	gon-zare-suu
6	LLLLLL	b.	makudonarudo	Macdonald	makudo-naru-doo
	LHLH	c.	robaatoson	Robertson	roo-baato-son

In (14), we give more examples of ≥5μ names.

(14)

Moras	Profile		Input		Output
5	LLLLL	a.	ogasawara	小笠原	oga-sawa-raa
	LLLLL	b.	kobayakawa	小早川	koba-yaka-waa
	LHLL	c.	arekkusu	Alex	aa-rekku-suu
	LHLL	d.	mahoomuzu	Mahomes	maa-hoomu-zuu
	LLHL	e.	kitabeppu	北別府	kita-bep-puu
	LLLH	f.	oguribii	Oglivie	oo-guri-bii
	HHL	g.	infante	Infante	in-fan-tee
	HHL	h.	boochaado	Borchard	boo-chaa-doo
	LHH	i.	buranboo	Brumbaugh	buu-ran-boo
	HLH	j.	oosutin	Austin	oo-osu-tin
	HLH	k.	doddoson	Dodson	doo-oddo-son
	HLH	l.	bansuroo	Vance Law	baa-nsu-roo
6	HLLLL	m.	kontorerasu	Contreras	konto-rera-suu
	LHLLL	n.	furanshisuko	Francisco	furan-shisu-koo
	LLHLL	o.	ferunandesu	Fernández	feru-nande-suu
	LLLHL	p.	desutefaano	Distefano	desute-faa-noo
	LLLLH	q.	makanarutii	McAnulty	maka-naru-tii
7	HLHLL	r.	gengoroomaru	源五郎丸	gengo-rooma-ruu

2 Analysis

The challenge any analysis must cope with is that we seem to be dealing with three separate patterns, as summarized in (15).

(15)
1. for ≤3-mora names: last mora goes to last beat
2. for 4-mora names: last syllable goes to last beat
3. for ≥5-mora names: last syllable goes to last beat, and special provisos for H and L penults

Ideally we would like to unify everything into a single rule, but the distinction between the three patterns seems very well motivated, having to do with the length of the input. Since the overall goal is to split the input into three parts, which are then mapped to the three beats, it makes sense that what goes into the last beat is different for short names and for longer names. But "making sense" is not yet an explanation—our goal is now to give an analysis in Optimality Theory (OT, Prince and Smolensky 1993), in terms of ranked and violable constraints, and capture the different aspects of the pattern in one single and uniform constraint ranking, instead of having three distinct procedures.

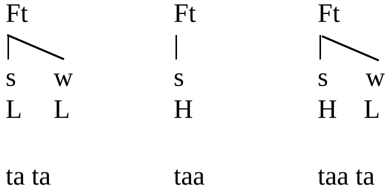
We first lay out our constraints, beginning in (16), where "K" stands for "kattobase form".

(16)

a.	K = $X_1X_2X_3$	A kattobase form consists of 3 beats, $X_1X_2X_3$.
b.	X ≥ Foot	A beat is minimally a foot (Ft).
c.	FootForm(X_2)	X_2 is a quantitative trochee (H, LL, or HL).
d.	Max	Every element of the input is present in K.
e.	Align-Left(X_3,μ])	The left edge of X_3 corresponds to the left edge of (the content of) the last mora of the input. One violation when the edges do not coincide.
f.	Align-Left(X_3,σ])	The left edge of X_3 corresponds to the left edge of (the content of) the last syllable of the input. One violation when the edges do not coincide.

For our purposes, the basic rhythmic structure of Japanese is the trochaic (strong-weak, sw) foot with the three forms in (17), which include the uneven trochee HL, for reasons we will return to.

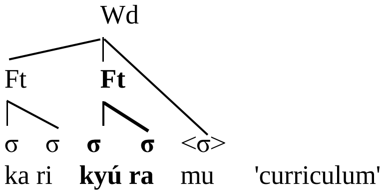
(17)



(16c) raises an immediate question: Why is there a special constraint requiring X_2 to be exactly a trochee? Empirically speaking, the answer is clear: In long names, material exceeding the size of a trochee goes into X_1, not into X_2: *MacDonald →makudo-naru-doo,* not **maku-donaru-doo.* X_3 is in any case restricted to the last syllable of the input because of the Align-Left constraints (σ, μ): *MacDonald →makudo-naru-doo, *maku-dona-rudo.*

But what is the reason X_2 plays this special role, not X_1 or X_3? Our hypothesis is that the reason lies in what X_2 corresponds to in a Japanese word: It corresponds to the last, and most prominent, foot of the word, the foot which receives the default antepenultimate accent, as illustrated in (18).

(18)



If so, FootForm(X_2) is actually FootForm(HeadFoot), a positional markedness constraint, as in (19).

(19) FootForm(HdFt) The headfoot is a quantitative trochee (H, LL, or HL).

In conjunction with (20a), the general Dep-μ constraint militating against any kind of lengthening, there is also another headfoot-specific positional faithfulness constraint (20b) preventing epenthesis in X_2.

(20)

(20)	a.	Dep-μ	Every mora in the output has a correspondent in the input—no epenthesis of a mora (i.e., no lengthening).
	b.	Dep-μ (HdFt)	Every mora in the output's head foot has a correspondent in the input—no epenthesis of a mora (i.e., no lengthening).

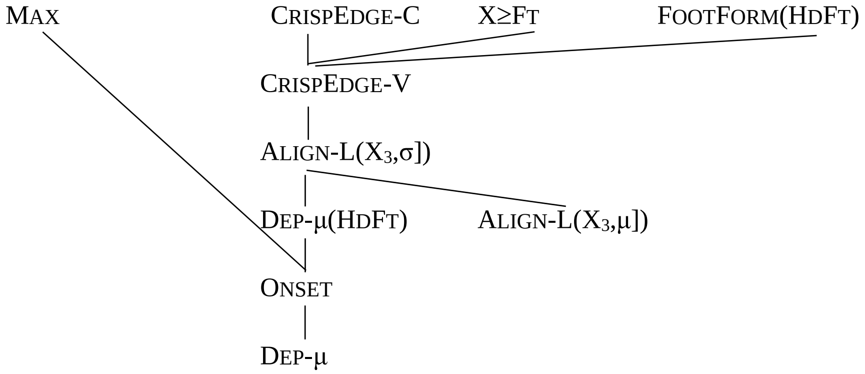
The remaining constraints cover familiar territory: There are two crisp edge constraints (Ito and Mester 1999) militating against spreading consonants or vowels across X-boundaries (21ab), and the familiar onset constraint (21c).

(21)

a.	CrispEdge-C	The edges of X are crisp: no spreading of consonants across. One violation for every consonant linked to two different Xs.
b.	CrispEdge-V	The edges of X are crisp: no spreading of vowels across. One violation for every vowel linked to two different Xs.
c.	Onset	A syllable has an onset.

The overall ranking of the constraints is as in (22). We will gradually justify all dominance relations.

(22)



The simplest case is 3μ names (23) such as ka_1-ke_2-fu_3→ka_1a-ke_2e-fu_3u. Comparing the winning candidate (23a) with (23d) *ka_1a-ke_2fu_3-uu, we see the constraint Dep-μ(HdFt), violated by the winner, must be dominated by either CrispEdge-V or Align-L(X_3,σ), which are both violated by the loser.[4]

(23)

Input		Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X_3, σ])	Dep-μ (HdFt)	Al-L (X_3,μ])	Onset	Dep-μ
kakefu 掛布	a. ►	kaa-kee-fuu							1			3
	b.	kaa-ake-fuu					1		1		1	3
	c.	kake-ee-fuu					1		2		1	3
	d.	kaa-kefu-uu					1	1		1	1	3
	e.	kake-fuu-uu					1	1	1	1	1	3
	f.	kaa-aa-kefu					1	1	2	1	1	3
	g.	ka-ke-fu			3	1						

The winning candidate *kaa-kee-fuu* also shows three instances of mora epenthesis, and thus violates general Dep-μ three times. Since this constraint is bottom-ranked and does not contribute to the explanation in interesting ways, we will in general not include it in our tableaux.

Turning next to short names, we give tableaux for 1μ- and 2μ-names in (24) and (25).

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[4] Technically, Onset or Al-L(X_3,μ]) could also dominate Dep-μ(HdFt) with the same effect, but we will soon see that these must be ranked lower.

(24)

Input		Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X_3, σ])	Dep-μ (HdFt)	Al-L (X_3,μ])	Onset
ri	a.	►rii-ii-ii					2	1	2	1	2
李	b.	ii-ii-ii	1				2	1	2	1	3
	c.	rii-X-ii			1		1	1		1	1
	d.	X-X-rii			2						
	e.	ri-X-X			3						
	f.	X-X-ri			3						
	g.	ri-i-i			3	1	2	1	1	1	2

The fact that (24a) wins over (24def) shows that X≥Ft dominates all of CrispE-V, Al-L(X_3,σ]), Dep-μ(HdFt), Al-L(X_3,μ]), and Onset. In (25), (25a) *ta$_1$a-aa-ni$_2$i*, with its two violations of Dep-μ(HdFt), wins over (25b) *ta$_1$a-ni$_2$i-ii* (with only one violation). This teaches us that Al-L(X_3, σ])>>Dep-μ(HdFt) (the loser does not align the last syllable with X_3).[5]Another possibility would be Al-L(X_3, μ])>>Dep-μ(HdFt), but we will see below in (32) that there is independent evidence for Al-L(X_3, σ])>>Dep-μ(HdFt).

(25)

Input		Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X_3, σ])	Dep-μ (HdFt)	Al-L (X_3,μ])	Onset
tani	a.	►taa-aa-nii					1		2		1
谷	b.	taa-nii-ii					1	1	1	1	1
	c.	tani-ii-ii					2	1	2	1	2
	d.	nii-ii-ii	2				2	1	2	1	1

(26a) *so$_1$o-oo-n$_2$n* beats, and harmonically bounds, (26b) *so$_1$o-oo-on$_2$* because it does better on CrispE-V and Al-L(X_3, μ).

(26)

Input		Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X_3, σ])	Dep-μ (HdFt)	Al-L (X_3,μ])	Onset
son	a.	►soo-oo-nn					1	1	2		2
宣	b.	soo-oo-on					2	1	2	1	2
	c.	soo-nn-nn		1				1	1	1	2
	d.	son-nn-nn		2				1	2	1	2

A similar point holds for *ba$_1$a$_2$su$_3$*→*ba$_1$a-a$_2$a-su$_3$u* and *ge$_1$n$_2$da$_3$*→*ge$_1$e-n$_2$n-da$_3$a* in (27). Note that the winning candidate *ba$_1$a-a$_2$a-su$_3$u* assigns the two *a*-moras to different syllables—the candidate *ba$_1$a$_2$-aa-su$_3$u* does worse both on CrispE-V, Al-L(X3,σ) and Dep-μ(HdFt) and is harmonically bounded by the winner.

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[5] Another possibility would be Al-L(X_3, μ])>>Dep-μ(HdFt), but we will see below in (32) that there is independent evidence for Al-L(X_3, σ])>>Dep-μ(HdFt).

(27)

INPUT	OUTPUT		MAX	CRISPE-C	X≥FT	FTFRM (HDFT)	CRISPE-V	AL-L (X$_3$, σ])	DEP-μ (HDFT)	AL-L (X$_3$,μ])	ONSET
ba$_1$a$_2$su$_3$	a.	►ba$_1$a-a$_2$a-su$_3$u							1		1
Bass	b.	ba$_1$a$_2$-su$_3$u-uu					1	1	1	1	1
	c.	ba$_1$a$_2$-aa-su$_3$u					1		2	1	1
	d.	ba$_1$a-a$_2$su$_3$-uu					1	1		1	2
	e.	X-ba$_1$a$_2$-su$_3$u			1						
ge$_1$n$_2$da$_3$	f.	►ge$_1$e-n$_2$n-da$_3$a							1		1
源田	g.	ge$_1$n$_2$-daa-a$_3$a					1	1	1	1	1
	h.	ge$_1$n$_2$-nn-da$_3$a		1					1		1

An interesting contrast to the HL-word $ba_1a_2su_3 \rightarrow ba_1a\text{-}a_2a\text{-}su_3u$ is the LH word $e_1to_2o_3 \rightarrow e_1e\text{-}to_2o\text{-}o_3o$ in (28): Even though ALIGN-LEFT(X$_3$, σ]), which ranks higher than ALIGN-LEFT(X$_3$, μ]), favors (28b), CRISPEDGE-V, which ranks even higher, selects (28a).

(28)

INPUT	OUTPUT		MAX	CRISPE-C	X≥FT	FTFRM (HDFT)	CRISPE-V	AL-L (X$_3$, σ])	DEP-μ (HDFT)	AL-L (X$_3$,μ])	ONSET
e$_1$to$_2$o$_3$	a.	►e$_1$e-to$_2$o-o$_3$o[6]						1	1		2
江藤	b.	e$_1$e-ee-to$_2$o$_3$					1		2	1	2
	c.	e$_1$to$_2$-o$_3$o-oo					1	1	1		2

To recapitulate the crucial constraint interactions, we compare the derivations for *tani*, *baasu*, and *etoo* in (29).

(29)

INPUT		OUTPUT		CRISPE-V	AL-L (X$_3$, σ])	DEP-μ (HDFT)
LL	ta$_1$ni$_2$	a.	►ta$_1$a-aa-ni$_2$i	1		2
	谷	b.	ta$_1$a-ni$_2$i-ii	1	1	1
HL	ba$_1$a$_2$su$_3$	c.	►ba$_1$a-a$_2$a-su$_3$u			1
	Bass	d.	ba$_1$a-a$_2$su$_3$-uu	1	1	
LH	e$_2$to$_2$o$_3$	e.	e$_1$e-ee-to$_2$o$_3$	1		2
	江藤	f.	►e$_1$e-to$_2$o-o$_3$o		1	1

While in 3μ-words ending in H the last mora, not the last syllable, is assigned to X$_3$ (because of CrispE-V, see (29ef)), this is not the case in 4μ-words ending in H, as shown in (30). Here (30a) and (30e) do not violate CrispE-V, so AL-L(X$_3$, σ]) decided in favor of the candidates assigning the final syllable to X$_3$.

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[6] Note that the two parts of the long vowel are evaluated separately by CRISPE-V, that is why the winner $e_1e\text{-}to_2o\text{-}o_3o$ does not violate this constraint.

(30)

Input		Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X$_3$, σ])	Dep-μ (HdFt)	Al-L (X$_3$,μ])	Onset
shi$_1$n$_2$jo$_3$o$_4$ 新庄	a.	►shi$_1$i-n$_2$n-jo$_3$o$_4$							1	1	1
	b.	shi$_1$n$_2$-jo$_3$o-o$_4$o						1			1
	c.	shi$_1$i-n$_2$jo$_3$-o$_4$o						1			2
	d.	shi$_1$i-in$_2$-jo$_3$o$_4$					1		1	1	1
ta$_1$i$_2$ho$_3$o$_4$ 大豊	e.	►ta$_1$a-i$_2$i-ho$_3$o$_4$							1	1	1
	f.	ta$_1$i$_2$-ho$_3$o-o$_4$o						1			1
	g.	ta$_1$a-i$_2$ho$_3$-o$_4$o						1			2
	h.	ta$_1$i$_2$-ii-ho$_3$o$_4$					1		1	1	1

A LLLL-name like *kiyohara* assigns only the first mora to X$_1$ and applies lengthening here, not in X$_2$ because of Dep-μ(HdFt) (31a) vs. (31b).

(31)

Input		Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X$_3$, σ])	Dep-μ (HdFt)	Al-L (X$_3$,μ])	Onset	Dep-μ
kiyohara 清原	a.	►kii-yoha-raa										2
	b.	kiyo-haa-raa							1			2
	c.	kii-yoo-hara						1	1	1		2
	d.	kiyo-hara-aa					1	1		1	1	2
	e.	kiyoha-raa-aa					1	1	1	1	1	3

But lengthening in X$_2$ is not absolutely ruled out and indeed found when a higher-ranking constraint is at stake. This is shown by a 4μ-name like *kurain*, whose syllabification we take to be *ku.ra.in* (see (9) above): (32a) *kuu-raa-in* beats (32b) *kuu-rai-nn* because of Align-Left(X$_3$,σ]), which crucially dominates Dep-μ(HdFt) and Al-L(X$_3$,μ]).[7]

(32)

Input		Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X$_3$, σ])	Dep-μ (HdFt)	Al-L (X$_3$,μ])	Onset
kurain *Klein*	a.	►kuu-raa-in							1	1	1
	b.	kuu-rai-nn						1			1
	c.	kura-ii-nn						1	1		2
	d.	kura-in-nn		1				1		1	2
	e.	kura-ii-in					1	1	1	1	2
	f.	kuu-uu-rain					1		2	1	1

In (33) the winner (33a) *joo-oji-maa* beats (33b) *joo-jii-maa* because it avoids lengthening within the head foot X$_2$, at the cost of lengthening in X$_1$ and an onset violation.[8]

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[7] But *kuu-rai-nn* is another possible (if less preferred) output, so there might be some variability in the ranking between Al-L(X$_3$, σ] and one or both of its dominated constraints.

[8] The winner is (33a), which distributes the two *o*-moras over X$_1$ and X$_2$, and not the homonymous (33c), which keeps both *o*-moras within X$_1$ but has gratuitous violations of CrispE-V and Dep-μ(HdFt).

(33)

Input	Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X$_3$, σ])	Dep-μ (HdFt)	Al-L (X$_3$,μ])	Onset
jo$_1$o$_2$ji$_3$ma$_4$ 城島	a. ►jo$_1$o-o$_2$ji$_3$-ma$_4$a									1
	b. jo$_1$o$_2$-ji$_3$i-ma$_4$a							1		
	c. jo$_1$o$_2$-oji$_3$-ma$_4$a					1		1		1
	d. jo$_1$o$_2$ji$_3$-ii-ma$_4$a							2		1
	e. jo$_1$o$_2$-ji$_3$ma$_4$-aa					1	1		1	1
	f. jo$_1$o$_2$ji$_3$-ma$_4$a-aa					1	1	1	1	1
	g. X-jo$_1$o$_2$ji$_3$-ma$_4$a			1						

Recapitulating the crucial interactions, we compare the derivations for *ichiroo* and *joojima* in (34).

(34)

	Input	Output	CrispE-V	Dep-μ (HdFt)	Onset
LLH	i$_1$chi$_2$ro$_3$o$_4$	a. ►i$_1$i-chi$_2$i-ro$_3$o$_4$		1	1
	イチロー	b. i$_1$i-ichi$_2$-ro$_3$o$_4$	1		2
HLL	jo$_1$o$_2$ji$_3$ma$_4$	c. jo$_1$o$_2$-ji$_3$i-ma$_4$a		1	
	城島	d. ►jo$_1$o-o$_2$ji$_3$-ma$_4$a			1

The candidate *ii-chii-roo* bests *ii-ichi-roo* because CrispE-V >>Dep-μ(HdFt). But, as we just saw in (33), *joo-oji-maa* bests *joo-jii-maa* because CrispE-V is not involved, and Dep-μ(HdFt) >>Onset. The same kind of same interaction is found in the derivation of the 5μ-name *oosutin*→*oo-osu-tin* in (35).

(35)

Input	Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X$_3$, σ])	Dep-μ (HdFt)	Al-L (X$_3$,μ])	Onset
o$_1$o$_2$su$_3$ti$_4$n$_5$ *Austin*	a. ►o$_1$o-o$_2$su$_3$-ti$_4$n								1	2
	b. o$_1$o$_2$-su$_3$u-ti$_4$n							1	1	1
	c. o$_1$o$_2$-su$_3$ti-n$_4$n						1			2

The 5μ-name *doddoson* in (36), whose *kattobase*-form is (36a) *doo-oddo-son* and not (36c) *dod-doo-son*, shows that spreading a consonant across X-boundaries is worse than spreading a vowel: CrispEdge-C>>CrispEdge-V.

(36)

Input	Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X$_3$, σ])	Dep-μ (HdFt)	Al-L (X$_3$,μ])	Onset
doddoson *Dodson*	a. ►doo-oddo-son					1		1	1	1
	d. doo-ddo-son				1				1	
	b. dod-doo-son		1					1	1	
	c. dod-doso-nn		1			1	1			1

5μ-names (and longer names) clarify some issues that have so far not come up. First, there is the question of where "extra" material goes: moras that are not needed to fill each X with one foot. This issue is settled by (37): X_1 is the place for extra material (*makudo-naru-doo*), not X_2 (**maku-donaru-doo*) or X_3 (**maku-dona-rudo*). This is ensured by the dominance of AL-L(X3,σ]) and/or AL-L(X3,μ]) over Dep-μ, as shown by (37a) vs. (37c).

(37)

Input	Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	AL-L $(X_3, \sigma])$	Dep-μ (HdFt)	AL-L $(X_3,\mu])$	Onset	Dep-μ
makudonarudo	a. ►makudo-naru-doo										1
Macdonald	b. makudona-ruu-doo							1			2
	c. maku-dona-rudo						1		1		
	d. maku-donaru-doo				1						1
	e. mado-naru-doo	2									1

Next, there is the issue of assigning antepenult-penult sequences of different quantitative profiles (LH, HH, LL, HL) to X_1 and X_2 (see (10)-(13) above). (38) shows that a heavy penult fills X_2 by itself.

(38)

Input	Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	AL-L $(X_3, \sigma])$	Dep-μ (HdFt)	AL-L $(X_3,\mu])$	Onset	Dep-μ
desutoraade	a. ►desuto-raa-dee										1
…LH…	b. desu-tora-ade						1		1	1	
Destrade	c. desutora-aa-dee					1		1		1	2
	d. desu-toraa-dee				1						1
	e. desu-tora-dee	1									1
buraianto	f. ►burai-an-too										1
…HH…	g. buu-raian-too				1					1	2
Bryant	h. burai-anto-oo					1	1		1	1	2

In (39), we see that a light penult is assigned to X_2 together with the antepenult, whether the antepenult is light or heavy.[9]

(39)

Input	Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	AL-L $(X_3, \sigma])$	Dep-μ (HdFt)	AL-L $(X_3,\mu])$	Onset	Dep-μ
makudonarudo	a. ►makudo-naru-doo										1
Macdonald	b. makudona-ruu-doo							1			2
	c. maku-dona-rudo						1		1		
	d. maku-donaru-doo				1						2
	e. mado-naru-doo	2									1

---

[9] The fact that the HL sequence *baato* is assigned to X_2 is the motivation for admitting the uneven trochee HL as a quantitative trochee in Japanese. It remains to be seen whether it is possible to find an alternative analysis which conforms to the standard view going back to Poser (1984; 1990) that admits only the bimoraic trochee.

Input	Output	Max	CrispE-C	X≥Ft	FtFrm (HdFt)	CrispE-V	Al-L (X_3, σ])	Dep-μ (HdFt)	Al-L (X_3,μ])	Onset	Dep-μ
robaatoson	f. ►roo-baato-son								1		1
Robertson	g. roba-ato-son								1	1	
	h. robaa-toso-nn						1			1	1
	i. roo-bato-son	1							1		
	j. robaa-too-son							1			1

Recapitulating, we juxtapose the derivations for *makudonarudo, boochaado, robaatoson, and desutoraade* in (40), showing only the crucial constraint interactions.

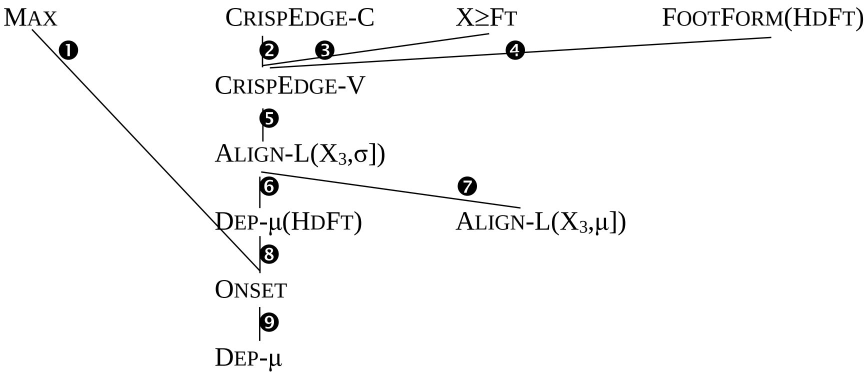
(40)

	Input		Output	FtFrm (HdFt)	Dep-μ (HdFt)	Al-L (X_3,μ])	Onset	Dep-μ
...LH...	desutoraade	a.	►desuto-raa-dee					1
	Destrade	b.	desu-toraa-dee	1				1
…HH…	buraianto	c.	►burai-an-too					1
	Bryant	d.	buu-raian-too	1				2
...LL…	makudonarudo	e.	►makudo-naru-doo					1
	Macdonald	f.	makudona-ruu-doo		1			2
...HL...	robaatoson	g.	►roo-baato-son			1		1
	Robertson	h.	robaa-too-son		1			1

3 Summary and conclusion

We summarize by first assembling the evidence for all constraint rankings. The overall system is repeated in (41).

(41)



In (42), we present the evidence for each of the labeled ranking relation (produced with the help of OTWorkplace (Prince et al. 2015)). Crucial W(inner)~L(oser) pairs justifying a particular ranking are given in bold. "W" in a constraint column means that the constraint prefers the winner; "L" means that the constraint prefers the loser. What is important here is the core of OT ranking logic: In order for the winner to defeat a given loser, it must do better on the highest-ranking constraint that distinguishes the two.

(42)

	Input	Winner	Loser	Max	CrispEdge-C	X≥Foot	FtFrm(HdFt)	CrispEdge-V	Align-L(X_3,σ])	Dep-μ(HdFt)	Align-L(X_3,μ])	Onset	Dep-μ
❶	ogasawara	oga-sawa-raa	gaa-sawa-raa	**W**								**L**	W
❷	son	soo-oo-nn	soo-nn-nn		**W**			**L**		L	W		
❸	ri	rii-ii-ii	rii-X-ii			**W**		**L**		L		L	L
❹	doddoson	doo-oddo-son	doo-ddo-son				**W**	**L**		L		L	L
❺	etoo	ee-too-oo	ee-ee-too					**W**	**L**	W	W		
❻❼	kurain	kuu-raa-in	kuu-rai-nn						**W**	**L**	L		
❽	joojima	joo-oji-maa	joo-jii-maa							**W**		**L**	
❾	robaatoson	roo-baato-son	roba-ato-son									**W**	**L**

In conclusion, the OT-analysis, with its ranked and violable constraints, has succeeded in folding what appeared to be a set of separate rules depending on the length of the input into a single unified constraint system with a single ranking, where the length of the input exerts its influence by resulting in different violation profiles in outputs, and does not require separate rules for inputs of different length. Besides the alignment constraints specific to the baseball chant, the other constraints are uncontroversial faithfulness (Max/Dep) constraints and structural markedness constraints (on foot/syllable structure and their edges). Among the many remaining questions, however, the most important perhaps is why the desired foot form in X_2 is the quantitative trochee that admits also the trimoraic HL-foot, and not the bimoraic trochee otherwise firmly grounded in the phonology of Japanese. It is clear that much work remains to be done—in particular in grounding the constraints better in the prosodic system of the language.

4 Appendix

Romanized transcription	**Original Name**	**Katakana transcription**	**Former/Main Team**
arekkusu	Alex Ochoa	アレックス	Chunichi Dragons
baanzu	Jacob Barnes	バーンズ	Milwaukee Brewers
baasu	Randy Bass	バース	Hanshin Tigers
bansuroo	Vance Law	バンスロー	Chunichi Dragons
boochaado	Joe Borchard	ボーチャード	Chicago White Sox
buraianto	Kris Bryant	ブライアント	Chicago Cubs
buranboo	Cliff Brumbaugh	ブランボー	Orix Buffaloes
chen	陳	チェン	Chunichi Dragons
deshinsei	Doug DeCinces	デシンセイ	Yakult Swallows
desutefaano	Benny Distefano	デステファーノ	Chunichi Dragons
desutoraade	Orestes Destrade	デストラーデ	Seibu Lions
doddoson	Pat Dodson	ドッドソン	Kintetsu Buffaloes
etoo	江藤	エトー	Chunichi Dragons
ferunandesu	José Fernández	フェルナンデス	Florida Marines
furanko	Julio Franco	フランコ	Lotte Marines
furanshisuko	Juan Francisco	フランシスコ	Yomiuri Giants
genda	源田	ゲンダ	Seibu Lions
gengoroomaru	源五郎丸	ゲンゴローマル	Hanshin Tigers
gonzaresu	Dicky González	ゴンザレス	Yakult Swallows

hansen	Bob Hansen	ハンセン	Seibu Lions
ichiroo	イチロー	イチロー	Seattle Mariners
infante	Omar Infante	インファンテ	Detroit Tigers
joojima	城島	ジョージマ	Hanshin Tigers
joonzu	Garrett Jones	ジョーンズ	Yomiuiri Giants.
kai	甲斐	カイ	Softbank Hawks
kakefu	掛布	カケフ	Hanshin Tigers
kitabeppu	北別府	キタベップ	Hiroshima Carp
kiyohara	清原	キヨハラ	Yomiuri Giants
kobayakawa	小早川	コバヤカワ	Yakult Swallows
kontorerasu	José Contreras	コントレラス	Chicago Whitesox
kurain	Phil Klein	クライン	DeNA BayStars
kuromati	Warren Cromartie	クロマティ	Yomiuri Giants
kuruun	Marc Kroon	クルーン	Yomiuri Giants
mahoomuzu	Pat Mahomes	マホームズ	DeNA Baystars
makanarutii	Paul McAnulty	マカナルティー	San Diego Padres
makudonarudo	Bob Macdonald	マクドナルド	Hanshin Tigers
ochiai	落合	オチアイ	Chunichi Dragons
ogasawara	小笠原	オガサワラ	Yomiuri Giants
oguribii	Ben Oglivie	オグリビー	Kintetsu Buffaloes
oosutin	Tyler Austin	オースティン	New York Yankees
ootani	大谷	オータニ	LA Angels
ootomo	大友	オートモ	Yomiuri Giants
ri	李	リ	Chunichi Dragons.
rii	Leon Lee	リー	Lotte Orions
rinaresu	Omar Linares	リナレス	Chunichi Dragons
robaatoson	David Robertson	ロバートソン	New York Yankees
saiki	才木	サイキ	Hanshin Tigers
seginooru	Fernando Seguignol	セギノール	Nippon Ham
shinjoo	新庄	シンジョー	Hanshin Tigers
shipin	Sipin	シピン	Yomiuri Giants
son	宣	ソン	Chunichi Dragons
taihoo	大豊	タイホー	Chunichi Dragons
tani	谷	タニ	Yomiuri Giants
tatsunami	立浪	タツナミ	Chunichi Dragons
wiruson	George Wilson	ウィルソン	Seibu Lions
yano	矢野	ヤノ	Hanshin Tigers

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