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Kattobase: The linguistic structure of Japanese baseball chants

Acknowledgements

The research reported on here was done in collaboration with

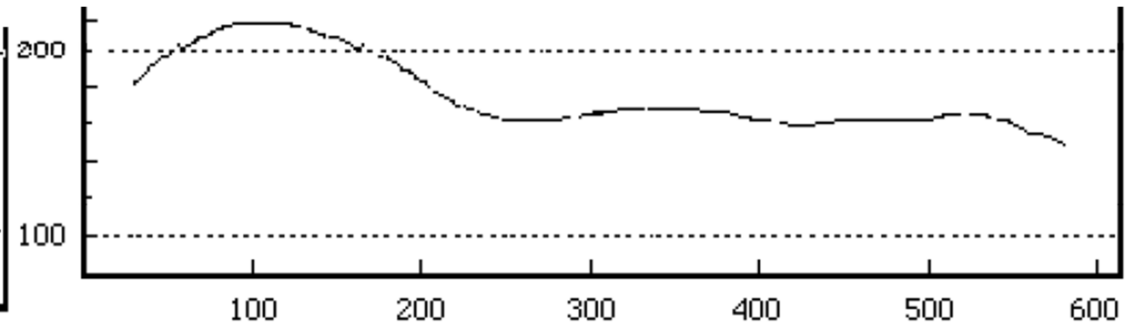
- Haruo Kubozono (NINJAL, Tokyo, Japan)
- Shinʾichi Tanaka (Kobe University, Japan)

Data and basic generalizations are due to Tanaka (2008).

Background: the English vocative chant (Liberman 1975)

Call (unstylized) vs. Chant (stylized)

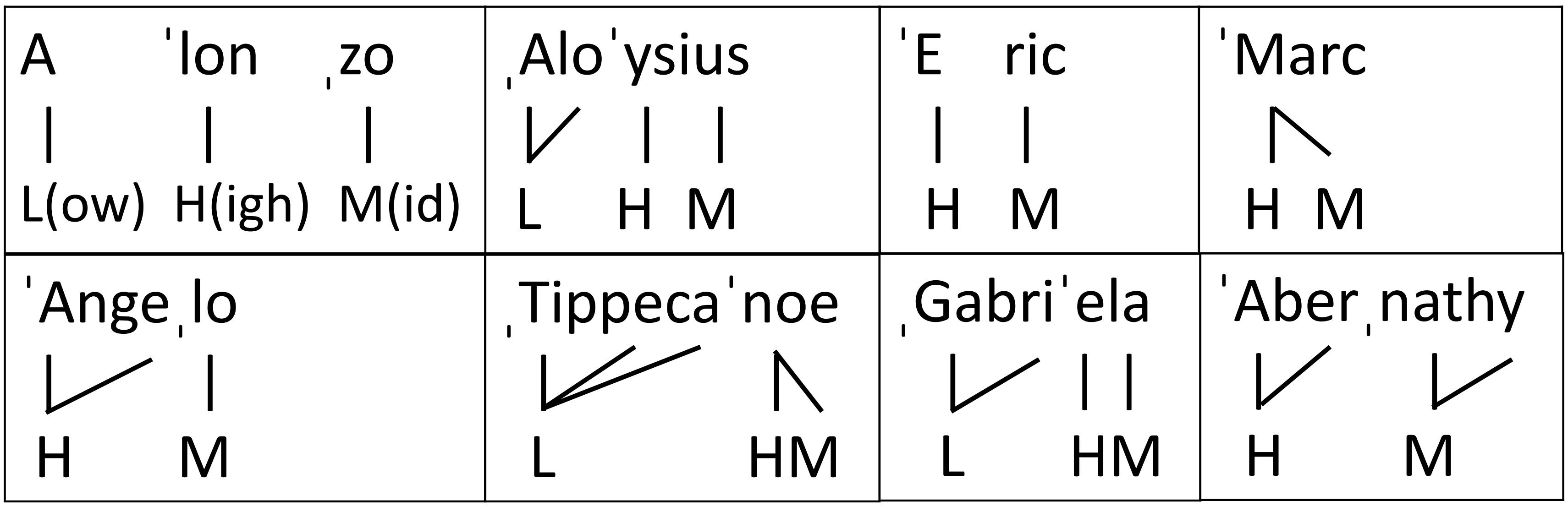
John!



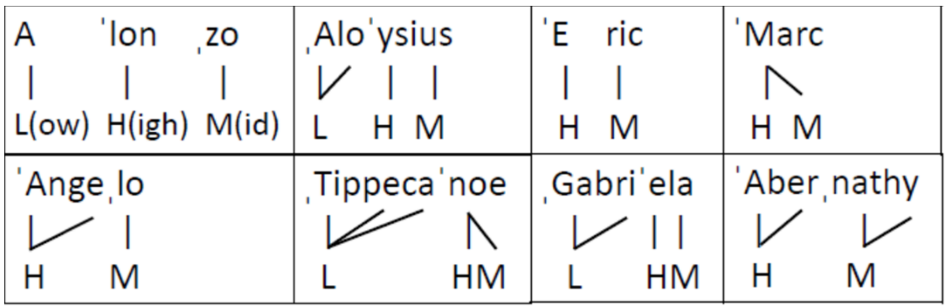
Jo – ohn!

Ladd 1978, Hirst 1998

The vocative chant



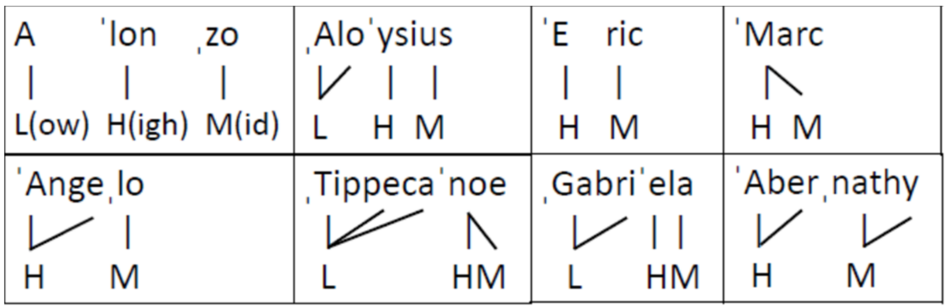
The vocative chant



The tune: (L) H M

- H is associated with the main stress of the text,
- and with any syllables which intervene between the main stress and the point at which M is associated.

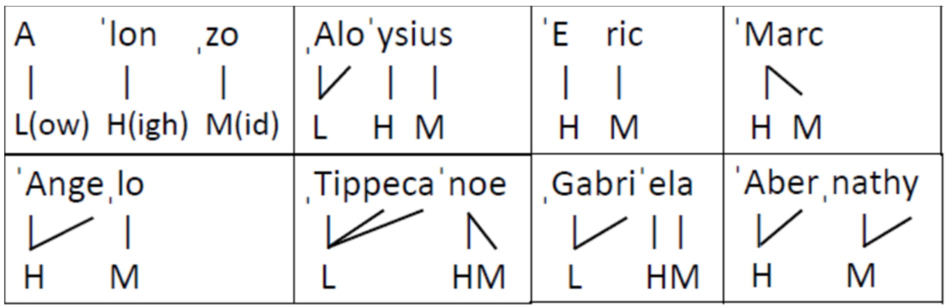
The vocative chant



The tune: (L) H M

- If there are any syllables preceding the main stress H, L is associated with them;
- if no such syllables exist, L does not occur.

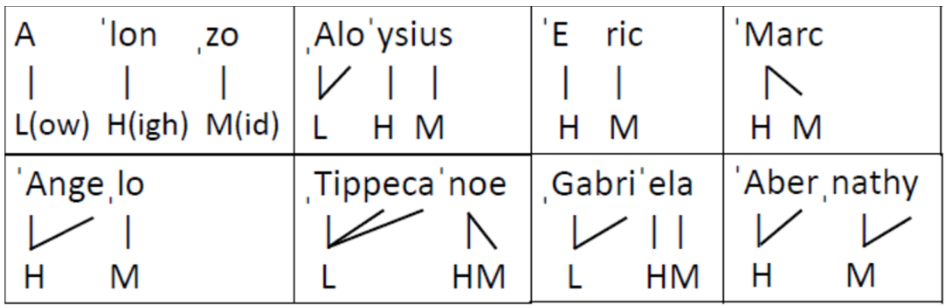
The vocative chant



The tune: (L) H M

- If there is a secondary stress in the portion of the text following the main stress, M is associated with it, as well as with any following syllables.
- If the syllables following the main stress are all unstressed, M is associated with the last of them.

The vocative chant



The tune: (L) H M

- If nothing follows the main stress, then that syllable is "broken" into two distinct parts, the second of which receives the M.

The vocative chant

- Liberman (1975) uses the vocative chant to motivate basic properties of what came to be known as the "metrical theory of stress".
- 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 and their "strong-weak" labeling of all nodes.

Basic form of the Japanese baseball chant (Tanaka 2008)

kat to ba se e X X X

かっ飛(と)ばせー

'send (it) flying, hit a homerun' 'XXX' = name of player

- Four beats, composed of three notes plus one pause
- Morphological structure:

  kat - tob - as - e

  INTENSIFIER - fly - CAUS - IMP

Examples

kat to ba se e

kaa kee fuu	Kakefu (former Hanshin Tigers)
oo taa nii	Ōtani (former Nippon Ham, now LA Angels)
ba aa suu	Randy Bass (former Hanshin Tigers)
ee too oo **ee ee too*	Etō (Seibu Lions)
shii pii nn **shii ii pin*	John Sipin (former Giants)

Tanaka's (2008) analysis

There are three parts, depending on the length of the input name, measured in moras (m).

Each CV- or V-unit is one mora:

ichiroo = *i-chi-ro-o* = 4-m

Syllable-final consonants (mostly nasals) are also one mora:

son = *so-n* = 2-m

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

Moras	Syllable Profile		Input	Output			(former) Team
3	LLL	m-m-m	ka-ke-fu	kaa-kee-fuu	カケフ	掛布	Tigers
	HL	mm-m	ba-a-su	baa-aa-suu	バース	Randy William Bass	Tigers
			ba-n-su	baa-nn-suu	バンス	Vance	
			sa-i-ki	saa-ii-kii	サイキ	才木	Tigers
	LH	m-mm	e-to-o	ee-too-oo	エトー	江藤	Yomiuri Giants

If there is no medial mora, spread from the left.

Moras	Syllable Profile		Input	Output			(former) Team
2	LL	m-m	ta-ni	taa-aa-nii	タニ	谷	Yomiuri Giants
			ya-no	yaa-aa-noo	ヤノ	矢野	Hanshin Tigers
	H	mm	so-n	soo-oo-nn	ソン	宣	Chunichi Dragons
			che-n	chee-ee-nn	チェン	陳	Chunichi Dragons
			ri-i	rii-ii-ii	リー	Leon Lee	Lotte Orions
			ka-i	ka-aa-ii	カイ	甲斐	Softbank Hawks
1	L	m	ri	rii-ii-ii	リ	李	Chunichi Dragons

X_2 filled from the left:

Tani → taa-aa-nii, *taa-nii-ii

Final mora (*o*) to X_3, not final syllable (*too*):

Etoo → ee-too-oo, *ee-ee-too

Final mora (*n*) to X_3, not final rhyme (*on*):

Son → soo-oo-nn, *soo-oo-on

2. 4-mora names: Align initial mora to X_1, final syllable to X_3, medial moras to X_2.

Moras	Syllable Profile		Input	Output			(former) Team
4	LLLL	m-m-m-m	ki-yo-ha-ra	kii-yoha-raa	キヨハラ	清原	Tigers
"L"="light			ta-tsu-na-mi	taa-tsuna-mii	タチナミ	立浪	
syllable"			ri-na-re-su	rii-nare-suu	リナレス	Omar Linares Izquierdo	
"H"="heavy	HLL	mm-m-m	jo-o-ji-ma	joo-oji-maa	ジョージマ	城島	Tigers
syllable"			o-o-to-mo	oo-oto-moo	オートモ	大友	Yomiuri Giants
	LLH	m-m-mm	i-chi-ro-o	ii-chii-roo	イチロー	一郎	
			o-chi-a-i	oo-chia-ii	オチアイ	落合	Chunichi Dragons
			wi-ru-so-n	wii-ruson	ウィルソン	Nigel Edward Wilson	Chunichi Dragons
	HH	mm-mm	ha-n-se-n	haa-nn-sen	ハンセン	Robert Joseph Hansen	Lotte Orions
			ta-i-ho-o	taa-ii-hoo	タイホー	大豊 泰昭	Chunichi Dragons
			shi-n-jo-o	shii-nn-joo	シンジョー	新庄	Softbank Hawks
	LHL	m-mm-m	fu-ra-n-ko	fuu-ran-ko	フランコ	Julio Cesar Franco Robles	Chunichi Dragons

2. 4-mora names: Align initial mora to X_1, final syllable to X_3, medial moras to X_2.

Moras	Syllable Profile		Input	Output			(former) Team
"S"="super-heavy syllable"	LS (or LLH)	m-mmm	ku-ra-i-n	kuu-raa-in (kuu-rai-nn)	クライン	Phil William Klein	Yokohama DeNA BayStars
			ku-ru-u-n	kuu-ruu-nn	クルーン	Marc Jason Kroon	Yomiuri Giants
	SL (or LHL)	mmm-m	ba-a-n-zu	baa-an-zuu	バーンズ	Jacob Andrew Barnes	Milwaukee Brewers
			jo-o-n-zu	joo-on-zuu	ジョーンズ	Garrett Thomas Jones	Yomiuri Giants

Final syllable to X_3, not final mora:

Ichiroo → ii-chii-roo, *ii-chiro-oo

Lengthening avoided in X_2, instead lengthening in X_1:

Joojima → *joo-jii-maa, joo-oji-maa

3. a. ≥5-mora names with H penultimate syllable: Align

- final syllable to X_3,
- penultimate H syllable to X_2,
- remainder to X_1 (can be of any length).

Moras	Syllable Profile		Input	Output		
6	LLLHL	m-m-m-mm-m	de-su-to-raa-de	desuto-raa-dee	デストラーデ	Orestes Destrade Cucuas

3. b. ≥5-mora names with L penultimate syllable: Align

- final syllable to X_3,
- penultimate L syllable and antepenultimate syllable (L or H) to X_2,
- remainder to X_1 (can be of any length).

Moras	Syllable Profile		Input	Output		
6	LLLLLL	m-m-m-m-m-m	ma-ku-do-na-ru-do	makudo-naru-doo	マクドナルド	Robert Joseph "Bob" Macdonald
6	LHLH	m-mm-m-mm	ro-ba-a-to-so-n	roo-baato-son	ロバートソン	David Alan Robertson

≥5-mora names: more examples

Moras	Syllable Profile		Input	Output		
5	LLLLL	m-m-m-m-m	o-ga-sa-wa-ra	oga-sawa-raa	オガサワラ	小笠原
	LLLLL	m-m-m-m-m	ko-ba-ya-ka-wa	koba-yaka-waa	コバヤカワ	小早川
	HLLL	mm-m-m-m	go-n-za-re-su	gon-zare-suu	ゴンザレス	Dicky Angel González
	LHLL	m-mm-m-m	a-re-k-ku-su	aa-rekku-suu	アレックス	Alex Ochoa
	LHLL	m-mm-m-m	ma-ho-o-mu-zu	maa-hoomu-zu	マホームズ	Patrick Lavon "Pat" Mahomes
	LLHL	m-m-mm-m	ki-ta-be-p-pu	kita-bep-puu	キタベップ	北別府
	LLHL	m-m-mm-m	seginooru	segi-noo-ruu	セギノール	Fernando Alfredo Seguignol Garcia
	LLLH	m-m-m-mm	ku-ro-ma-ti-i	kuu-roma-tii	クロマティー	Warren Livingston Cromartie
	LLLH	m-m-m-mm	oguripii	oo-guri-pii	オグリピー	Benjamin Ambrosio "Ben" Oglivie Palmar
	HHL	mm-mm-m	infante	in-fan-tee	インファンテ	Omar Rafael Infante
	HHL	mm-mm-m	boochaado	boo-chaa-doo	ボーチャード	Joseph Edward Borchard

≥5-mora names: more examples

Moras	Syllable Profile		Input	Output		
5	LHH	m-mm-mm	de-shi-n-se-e	dee-shin-see	デシンセー	Douglas Vernon DeCinces
	LHH		bu-ra-n-bo-o	buu-ran-boo	ブランボー	Clifford Michael "Cliff" Brumbaugh
	HLH	mm-m-mm	o-o-su-ti-n	oo-osu-tin	オースティン	Christopher Tyler Austin
	HLH		do-d-do-so-n	do-oddo-son	ドッドソン	Patrick Neal Dodson
	HLH		ba-n-su-ro-o	baa-nsu-roo	バンスロー	Vance Aaron Law
6	HLLLL	mm-m-m-m-m	ko-n-to-re-ra-su	konto-rera-suu	コントレラス	José Ariel Contreras Camejo
	LHLLL	m-mm-m-m-m	fu-ra-n-shi-su-ko	furan-shisu-koo	フランシスコ	Juan Ramón Francisco González
	LLHLL	m-m-mm-m-m	fe-ru-nan-de-su	feru-nande-suu	フェルナンデス	José Fernández
	LLLHL	m-m-m-mm-m	de-su-te-faa-no	desute-faa-noo	デステファーノ	Benito James Distefano
	LLLLH	m-m-m-m-mm	ma-ka-na-ru-ti-i	maka-naru-tii	マカナルティー	Paul McAnulty

≥5-mora names: more examples

Moras	Syllable Profile		Input	Output		
6	HHLL	mm-mm-m-m	ba-a-fi-i-ru-do	baa-fiiru-doo	バーフィールド	Jesse Lee Barfield
	HLHL	mm-m-mm-m	a-i-ru-ra-n-do	airu-ran-doo	アイルランド	Timothy Neal Christopher Ireland
	HLLH	mm-m-m-mm	je-e-ko-bu-se-n	jee-kobu-sen	ジェーコブセン	Larry William "Bucky" Jacobsen
	LHHL	m-mm-mm-m	be-ta-n-ko-o-to	betan-koo-too	ベタンコート	Yuniesky Betancourt Pérez
	LHHL	m-mm-mm-m	bu-ra-i-a-n-to	burai-an-to	ブライアント	Ralph Wendell Bryant
	LLHH	m-m-mm-mm	de-ru-ka-a-me-n	deru-kaa-men	デルカーメン	Manuel "Manny" Delcarmen
	HHH	mm-mm-mm	a-n-da-a-so-n	an-daa-son	アンダーソン	Leslie Anderson Stephes
	HHH	mm-mm-mm	pe-n-ba-a-to-n	pen-baa-ton	ペンバートン	Rudy Héctor Pemberton Pérez
7	HLHH	mm-m-mm-mm	ma-k-ku-fa-a-de-n	makku-faa-den	マックファーデン	Leon McFadden
	HLHLL	mm-m-mm-m-m	ge-n-go-ro-o-ma-ru	gengo-rooma-ruu	ゲンゴローマル	源五郎丸

The challenge

The analysis has three separate rules, and for good reasons:

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 — special rules for H and L penults

If we recast it in terms of ranked and violable constraints, as in Optimality Theory (OT, Prince & Smolensky 1993), is it possible to have one single and uniform constraint ranking, instead of three distinct ones?

The constraints

"K" = "*kattobase form*"	
$K = X_1X_2X_3$	A kattobase form consists of 3 beats.
$X \geq$ FOOT	A beat is minimally a foot (Ft).

The trochaic foot

- For our purposes today, the basic rhythmic structure of Japanese is the trochaic (strong-weak, sw) foot with the forms

Ft s w L L	Ft s H	Ft s w H L
ta ta	taa	taa ta

The constraints

FOOTFORM(X_2)	X_2 is a trochee (H, LL, or HL).
MAX	Every element of the input is present in K.
ALIGN-LEFT(X_3, m])	The left edge of X_3 corresponds to the left edge of the last mora of the input.
ALIGN-LEFT(X_3, s])	The left edge of X_3 corresponds to the left edge of the last syllable of the input.

FOOTFORM(X_2)

FOOTFORM(X_2)	X_2 is a trochee (H, LL, or HL).

Why is there a special constraint requiring X_2 to be exactly a trochee?

- In long names, material exceeding the size of a trochee goes into X_1, not into X_2:

  *MacDonald → makudo-naru-doo, *maku-donaru-doo*

- X_3 is in any case restricted to the last syllable of the input because of ALIGN-LEFT (X_3, s]):

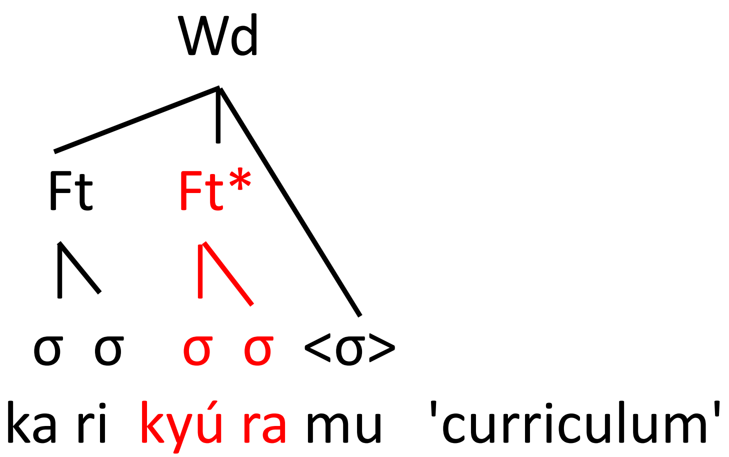
*MacDonald → makudo-naru-doo, *maku-dona-rudo*

Why does X_2 play this special role?

What is special about X_2?

- Our hypothesis: Because X_2 corresponds to the last, and most prominent, foot of a Japanese word,
- which receives the default antepenultimate accent.

What is special about X_2?



What is special about X_2?

- If so, FtFm(X_2) is actually FtFm(HEADFOOT), a positional markedness constraint:

FOOTFORM(HDFT)	The headfoot is a trochee (H, LL, or HL).

- There is another headfoot-specific constraint preventing epenthesis in X_2 (positional faithfulness):

DEP-MORA(HDFT)	No epenthesis of a mora in the head foot (i.e., no lengthening).

The other constraints

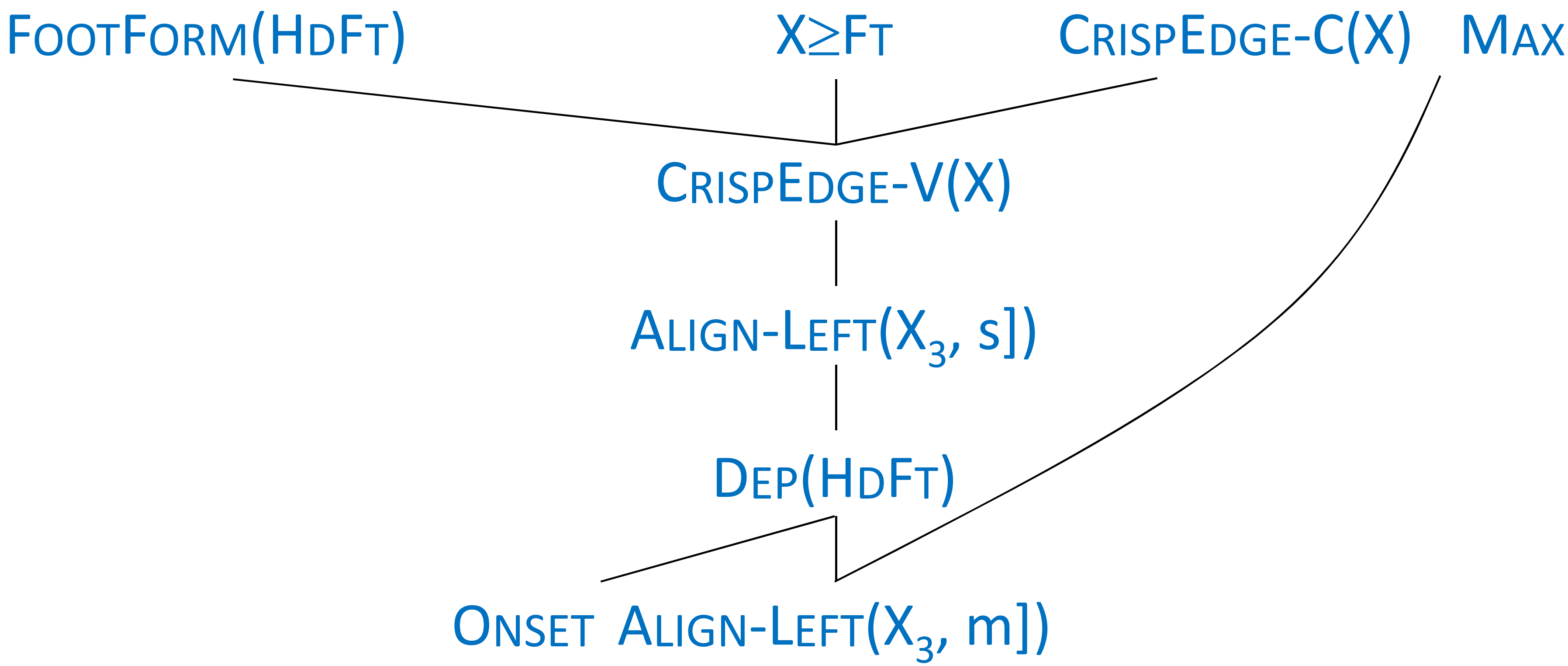
CRISPEDGE(X)	The edges of X are crisp: no spreading across.

Two subconstraints:

CRISPEDGE-C(X)	The edges of X are crisp: no spreading of consonants across.
CRISPEDGE-V(X)	The edges of X are crisp: no spreading of vowels across.

ONSET	A syllable has an onset (also hold for syllabic C).

Constraint ranking



The simplest case: 3-mora names. Lengthening in X_2 is better than spreading from X_1 to X_2

INPUT	OUTPUT	OPTIMUM	MAX	CRSPE-C(X)	X≥FT	FTFRM (HDFT)	CRSPE-V(X)	AL-L (X_3, s])	DEP (HDFT)	AL-L (X_3,m])	ONS
kakefu	kaa-kee-fuu	WINS							1		
	kaa-ake-fuu						1		1		1
	kake-ee-fuu						1		2		1
	kaa-kefu-uu						1	1		1	1
	kake-fuu-uu						1	1	1	1	1
	kaa-aa-kefu						1	1	2	1	1
	ka-ke-fu				3	2					

CRISPEDGE-V(X)>>DEP(HDFT)

The winning candidate *kaa-kee-fuu* shows three instances of mora epenthesis and thus violates low-ranking general DEP three times—we do not include this in our tableaux for reasons of space.

1-mora names

INPUT	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM (HDFT)	CRSPE-V(X)	AL-L (X_3,s])	DEP (HDFT)	AL-L (X_3,m])	ONS
ri	rii-ii-ii	WINS					2	1	2	1	2
	ii-ii-ii		1				2	1	2	1	3
	rii-X-ii				1			1		1	1
	X-X-rii				2						
	ri-X-X				3						
	X-X-ri				2	1					
	ri-i-i				3	2	2	1	1	1	2

2-mora names

Input	Output	Opt	Max	CrspE-C(X)	X≥Ft	FtFrm (HdFt)	CrspE-V(X)	Al-L (X_3,s])	Dep (HdFt)	Al-L (X_3,m])	Ons
tani	taa-aa-nii	WINS					1		2		1
	taa-nii-ii						1	1	1	1	1
	tani-ii-ii						2	2	2	1	2
	nii-ii-ii		2				2	1	1	1	1

X_2 filled from the left

INPUT	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM(HDFT)	CRSPE-V(X)	AL-L(X_3,s])	DEP(HDFT)	AL-L(X_3,m])	ONS
kai	kaa-aa-ii	WINS					1	1	1		2
i cannot spread out of X_3	kaa-ii-ii						1	1	1	1	2
	kaa-aa-ai						2	1	2	1	2
	kai-ii-ii						2	1	2	1	2

Spreading from X to X (non-crisp edges) avoided

	INPUT	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM(HDFT)	CRSPE-V(X)	AL-L(X_3,s])	DEP(HDFT)	AL-L(X_3,m])	ONS
Bass	baasu	baa-aa-suu	WINS									1
		baa-suu-uu						1	1	1	1	1
		baa-asu-uu							1		1	2
		X-baa-suu				1						
Vance	bansu	baa-nn-suu	WINS							1		1
		ban-suu-uu						1	1	1	1	1
		ban-nn-suu			1					1		1

CRISPEDGE-V(X)>>DEP(HDFT)

In 3-mora names the last mora links to X_3, not the last syllable

CRISPEDGE-V(X)>>AL-L(X_3, s])

INPUT	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM (HDFT)	CRSPE-V(X)	AL-L (X_3,s])	DEP (HDFT)	AL-L (X_3,m])	ONS
etoo	ee-too-oo	WINS						1	1		2
	ee-ee-too						1		2	1	2
	eto-oo-oo						2	1	1		2

Even though ALIGN-LEFT(X_3, s]) *ranks higher than* ALIGN-LEFT (X_3, m])*!*

Reason: CRISPEDGE-V(X)*, violated by *ee-ee-too, ranks even higher.*

Recap – compare /tani/, /baasu/, /etoo/

	INPUT	OUTPUT	OPT	CRSPE-V(X)	AL-L (X_3,s])	DEP (HDFT)
/LL/	tani	**taa-aa-nii**	WINS	1		2
		taa-nii-ii		1	1	1
/HL/	baasu	**baa-aa-suu**	WINS			1
		baa-suu-uu		1	1	1
/LH/	etoo	ee-ee-too		1		2
		ee-too-oo	WINS		1	1

4-mora names: First mora to X_1, last syllable (not last mora) to X_3, the rest to X_2

INPUT	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM (HDFT)	CRSPE-V(X)	AL-L (X_3, s])	DEP (HDFT)	AL-L (X_3, m])	ONS	DEP
kiyohara	kii-yoha-raa	WINS										2
	kiyo-haa-raa								1			2
	kii-yoo-hara							1	1	1		2
	kiyo-hara-aa						1	1		1	1	2
	kiyoha-raa-aa						1	1	1	1	1	3

4-mora names: First mora to X_1, last syllable (not last mora) to X_3, the rest to X_2

INPUT	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM (HDFT)	CRSPE-V(X)	AL-L (X_3, s])	DEP (HDFT)	AL-L (X_3, m])	ONS
ichiroo	ii-chii-roo	WINS							1	1	1
	ichi-ii-roo						1		2	1	2
	ii-chiro-oo							1			2
	ichi-iro-oo						2	1	1		3

Last syllable, not last mora, to X_3: Because ALIGN-LEFT(X_3, s]) *outranks both* DEP(HDFT) *and* ALIGN-LEFT (X_3, m]).

Last syllable to X_3 >> Dep(HdFt)

Input *Klein*	Output	Opt	Max	CrspE-C(X)	X≥Ft	FtFrm (HdFt)	CrspE-V(X)	Al-L (X_3,s])	Dep (HdFt)	Al-L (X_3,m])	Ons
.ku.ra.in.	kuu-raa-in	**WINS**							1	1	1
	kuu-rai-nn							1			1
	kura-ii-nn							1	1		2
	kura-in-nn						1	1		1	2
	kura-ii-in						1	1	1	1	2
	kuu-uu-rain					1	1		2	1	1

But kuu-rai-nn is another possible (if less preferred) output, so the ranking is probably variable.

Spreading from X to X (non-crisp edges) avoided

INPUT	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM (HDFT)	CRSPE-V(X)	AL-L (X_3,s])	DEP (HDFT)	AL-L (X_3,m])	ONS
shinjoo	shii-nn-joo	WINS							1	1	1
	shii-in-joo						1		1	1	1
	shin-joo-oo						1	1			1
	shii-njo-oo						1	1			2
taihoo	taa-ii-hoo	WINS							1	1	1
	tai-ii-hoo						1		1	1	1
	tai-hoo-oo						1	1			1
	taa-iho-oo						1	1			2

No lengthening (mora epenthesis) in X_2—instead lengthening in X_1 and Onset violation in X2

INPUT	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM (HDFT)	CRSPE-V(X)	AL-L (X_3,s])	DEP (HDFT)	AL-L (X_3,m])	ONS
joojima	joo-oji-maa	WINS									1
	joo-jii-maa								1		
	joo-oji-ma						1		1		1
	jooji-ii-maa								2		1
	joo-jima-aa						1	1		1	1
	jooji-maa-aa						1	1	1	1	1
	X-jooji-maa				1						

This candidate, with spreading from X_1 to X_2, is different from the winner, and it loses because it violates CRISPEDGE-V(X) *and* DEP(HDFT).

Recap: compare /i.chi.roo/ and /joo.ji.ma/

L L H H L L

	INPUT	OUTPUT	OPT	CRSPE-V(X)	DEP (HDFT)	ONS
/LLH/	i.chi.roo	**ii-chii-roo**	WINS		1	1
		ii-ichi-roo		1		2
/HLL/	joo.ji.ma	joo-jii-maa			1	
		joo-oji-maa	WINS			1

The same in 5-mora names: No lengthening in X_2

INPUT *Austin*	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM (HDFT)	CRSPE-V(X)	AL-L (X_3,s])	DEP (HDFT)	AL-L (X_3,m])	ONS
oosutin	oo-osu-tin	**WINS**								1	2
	oo-suu-tin								1	1	1
	oo-suti-nn							1			2

5-mora names: Spreading V beats spreading C, CrispEdge-C(X) >> CrispEdge-V(X)

Input *Dodson*	Output	Opt	Max	CrspE-C(X)	X≥Ft	FtFrm (HdFt)	CrspE-V(X)	Al-L $(X_3,s])$	Dep(HdFt)	Al-L $(X_3,m])$	Ons
doddoson	doo-oddo-son	**WINS**					1		1	1	1
	dod-doo-son			1					1	1	
	dod-doso-nn			1			1	1			1
	doo-ddo-son					1				1	

6-mora names and longer: X_1 is the place for extra syllables, not X_2 or X_3

INPUT *Macdonald*	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM(HDFT)	CRSPE-V(X)	AL-L(X_3,s])	DEP(HDFT)	AL-L(X_3,m])	ONS	DEP
makudonarudo	makudo-naru-doo	**WINS**										1
	makudona-ruu-doo								1			2
	maku-dona-rudo							1		1		
	maku-donaru-doo					1						2
	mado-naru-doo		2									1

6-mora names and longer: a heavy penult fills X_2 by itself

INPUT *Destrade*	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM(HDFT)	CRSPE-V(X)	AL-L(X_3,s])	DEP(HDFT)	AL-L(X_3,m])	ONS	DEP
desutoraade	desuto-raa-dee	**WINS**										1
	desu-tora-ade							1		1	1	1
	desutora-aa-dee						1		1		1	3
	desu-toraa-dee					1						1
	desu-tora-dee		1									1

6-mora names and longer: a light penult fills X_2 together with a preceding light

INPUT *Macdonald*	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM(HDFT)	CRSPE-V(X)	AL-L(X_3,s])	DEP(HDFT)	AL-L(X_3,m])	ONS	DEP
makudonarudo	makudo-naru-doo	**WINS**										1
	makudona-ruu-doo								1			2
	maku-dona-rudo							1		1		
	maku-donaru-doo					1						2
	mado-naru-doo		2									1

6-mora names and longer: a light penult fills X_2 together with a preceding heavy

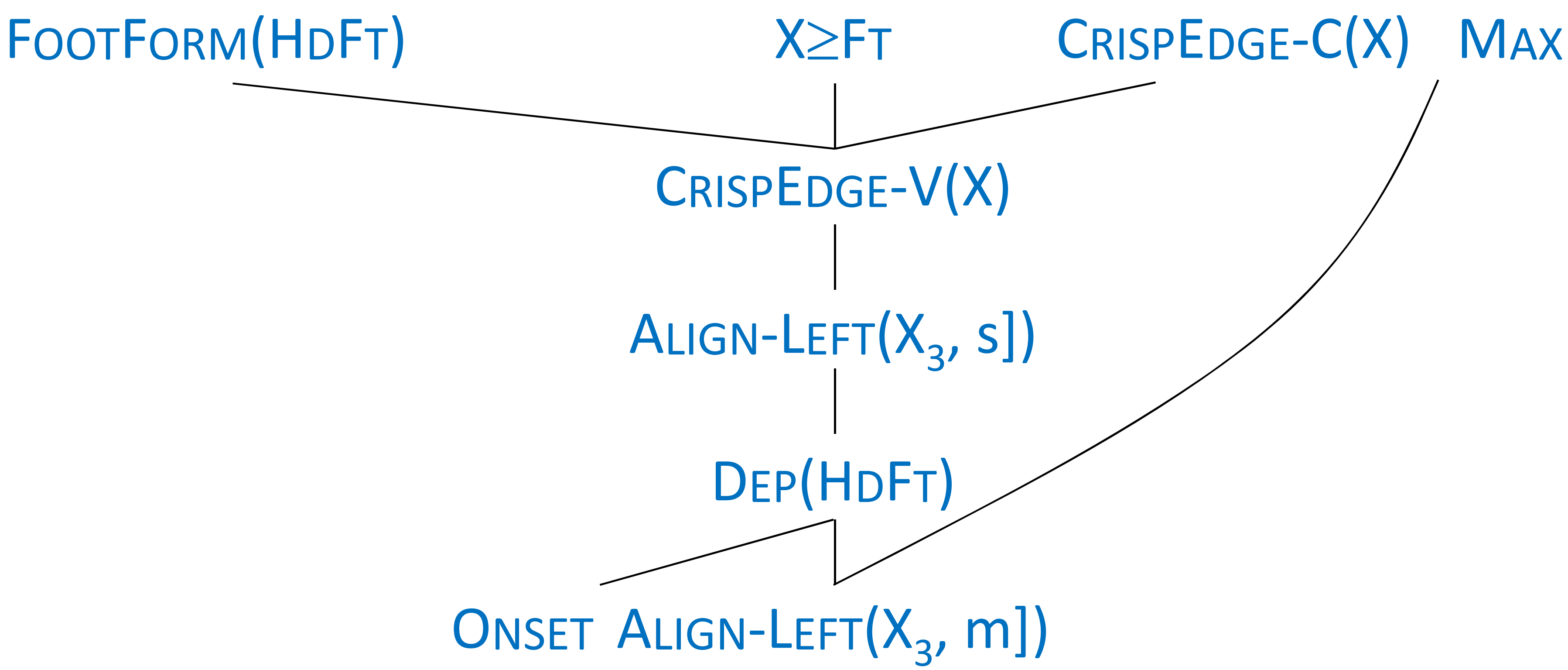
INPUT *Robertson*	OUTPUT	OPT	MAX	CRSPE-C(X)	X≥FT	FTFRM(HDFT)	CRSPE-V(X)	AL-L(X_3,s])	DEP(HDFT)	AL-L(X_3,m])	ONS
robaatoson	roo-baato-son	**WINS**								1	
	roba-ato-son									1	1
	robaa-toso-nn							1			1
	roo-bato-son		1							1	
	robaa-too-son								**1**		

Recap: Compare /.ma.ku.do.naru.do/, /.ro.baa.to.son/, /.de.su.to.raa.de/

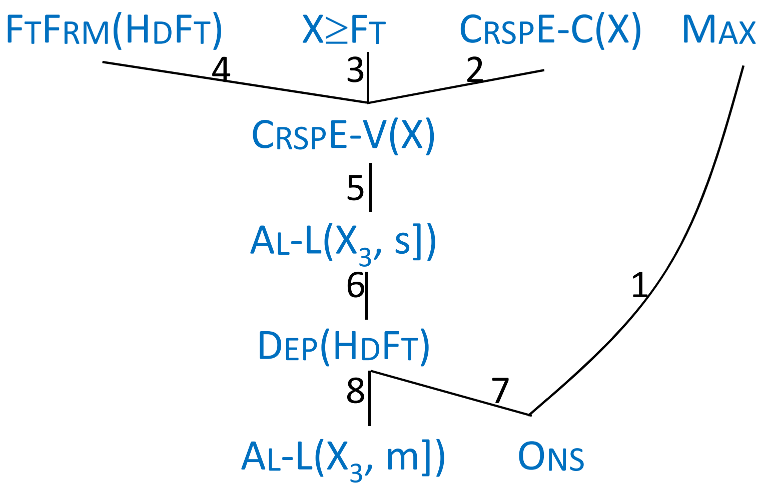
L L H L L H

	INPUT	OUTPUT	OPT	FTFRM (HDFT)	DEP (HDFT)	AL-L (X_3,m])	ONS	DEP
...LL..	makudonarudo	makudo-naru-doo	**WINS**					1
		makudona-ruu-doo			1			2
...HL...	robaatoson	roo-baato-son	**WINS**			1		1
		robaa-too-son			1			1
...LH...	desutoraade	desuto-raa-dee	**WINS**					1
		desu-toraa-dee		1				1

The overall constraint ranking again



Justifying all rankings



W: constraint prefers winner

L: constraint prefers loser

In order for the winner to defeat some loser, it must do better on the highest-ranking constraint that distinguishes the two.

	Input	Winner	Loser	Max	CrispEdge-C(X)	X≥Foot	FootForm(HdFt)	CrispEdge-V(X)	Align-Left(X_3,s])	Dep(HdFt)	Align-Left(X_3,m])	Onset
1	ogasawara	oga-sawa-raa	gaa-sawa-raa	W								L
2	son	soo-oo-nn	soo-nn-nn		W			L		L	W	
3	ri	rii-ii-ii	rii-X-ii			W		L		L		L
4	doddoson	doo-oddo-son	doo-ddo-son				W	L		L		L
5	etoo	ee-too-oo	ee-ee-too					W	L	W	W	
6	tani	taa-aa-nii	taa-nii-ii						W	L	W	
7	joojima	joo-oji-maa	joo-jii-maa							W		L
8	robaatoson	roo-baato-son	robaa-too-son							W	L	

Produced with OTWorkplace (Prince, Tesar, and Merchant 2014)

Conclusion

- Much work remains to be done—
- in particular in grounding the constraints better in the phonology of Japanese.
- The OT-analysis with 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.

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