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Pitch accents as tonal complexes: Evidence from superheavies

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Representation of the pitch accent

- The Japanese pitch accent in its underlying representation has often been understood as a linked H tone (Poser 1984, Pulleyblank 1986):

H H
hási 箸 'chopstick' hasí 橋 'bridge'

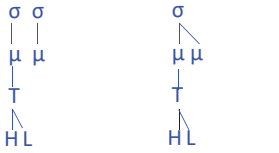
Tonal complexes

- Pierrehumbert and Beckman (1988:121–134) argue for a richer representation which literally glues the H of the accent together with the immediately following L into a tonal HL complex.

T
H L

Tonal complexes

- In P&B's conception, not just the accentual H, but the whole HL complex attaches as a linked unit to the TBU:



á me 'rain' hóN 'book'

P&B's main motivation:

- The two tones never behave independent of each other–they are always adjacent, do not spread, etc.
- The timing of the L relative to the H is left to the phonetic implementation algorithm.
- The tonal complex idea is an important insight, and we will provide new evidence for it.

Main motivation

- At the same time, we will argue that a simpler representation is needed where each tone of the tonal HL complex is able to associate independently to a mora:

kúu ki 'air' hó N 'book'

The argument

- The properties encoded by the special linked representation are instead captured by the interaction of appropriate tonal constraints:
- one-to-one association and edge alignment, see Goldsmith 1976, Akinlabi & Liberman 2001, Yip 2002, Gussenhoven 2004, etc., and
- a constraint against splitting tonal complexes (TONALINTEGRITY): The tones of a tonal complex must not associate to different syllables.

The argument

- Besides Occam's razor, there is empirical evidence for the direct association of tones to moras in the phonology of superheavy syllables in Japanese.

The argument

- Their accentual behavior follows if each of the tones in the tonal complex associates independently, observing the ranked OT tonal constraints

- but finds no explanation in the linked representation:

The argument

- Even so, for 1μ syllables the resulting constraint system selects as the winner a representation where both tones are phonologically associated to the same mora/syllable, thus vindicating P&B's tonal unit idea:

One question in syllable theory

- Are there only two syllable types?

light	heavy
σ μ	σ μ μ

The question of superheavies

- Or do superheavy (trimoraic, or even heavier) syllables have to be admitted, as a marked option?

light	heavy	superheavy
σ μ	σ μ μ	σ μ μ μ

The question of superheavies

- In many languages a binary quantity opposition is undoubtedly valid:
- Syllables of the form CVVC or CVCC are either excluded altogether (as in Yawelmani Yokuts),
- or they are admitted (English, Latin), but behave just like bona fide bimoraic syllables of the form CVX (X=V,C).

The question of superheavies

- In still another type of language, including Cairene Arabic (Broselow 1992), syllables of the forms CVVC and CVCC behave differently from bimoraic CVX syllables.
- They are still an epiphenomenon, since they demonstrably arise out of the combination of a heavy CVX syllable with an extrasyllabic word-final consonant. Limited in their occurrence to the end of the word, they do not form a single constituent.

The question of superheavies

- There are also languages, such as Hindi (Hayes 1995; Broselow, Chen & Huffman 1997) where CVVC and CVVC can occur throughout the word, and behave as heavier than bimoraic syllables, which seems to require recognition as $_{\omega}$[μμμ] constituents.

Where does Japanese fit in?

- The overwhelming majority of words are composed of maximally bimoraic syllables.

Superheavy syllables

- Restricted in the core vocabulary:

  Native (Yamato) items: only in morphologically derived forms

  e.g., hait-te 'enter-GERUNDIVE', toot-ta 'pass-PAST'

  – Sino-Japanese items: none (bimoraic maximum)
- Abundant in the peripheral vocabulary:

  recent Western loans with a long vowel or diphthong followed by a moraic nasal

  e.g., .toon. 'tone', .pa.taan. 'pattern', .sain. 'sign', .to.ron.boon. 'trombone'

Many words with superheavy syllables

- The abundance of trimoraic syllables in, e.g., the Sanseido on-line dictionary shows that there is no reluctance in adopting such loanwords.

  …CV一ン 'moraic length + moraic nasal'
  e.g. .toːn.

  …CVイン ' /i/ + moraic nasal'
  e.g. .sain.

ーン forms

アイターン	3	Iターン］(日)I turn
アウトバーン	4	(ドイツ)Autobahn
アドバルーン	4	(日)ad balloon
アフタヌーン	4	afternoon
インターン	3	intern
エレクトーン	4	Electone
キャンペーン	3	campaign
クイーン	2	queen
クリーン	2	clean
グリーン	2	green
クレーン	2	crane
グレーン		grain
クローン	2	clone
コーン	1	cone
コーン	1	corn
コミューン	2	(フランス)commune
サターン	2	Saturn
サルーン	2	saloon

シーレーン	3	sea lane
シーン	1	scene
シリコーン	1	silicone
スーザホーン	3	sousaphone
スクリーン	3	screen
ストーン		stone
スプーン	2	spoon
ゾーン	1	zone
ターン	1	turn
タイフーン	3	typhoon
チェーン	1	chain
ティースプーン	4	teaspoon
ティーン	1	teen
ドアチェーン	3	door chain
トーン	1	tone
ドレーン	2	drain
トロンボーン	4	trombone
ネプチューン	3	Neptune
ノクターン	3	nocturne

ーン forms continued

ハイティーン	3	(日)high teen
バスーン	2	bassoon
バスレーン	3	bus lane
パターン	2	pattern
ハネムーン	3	honeymoon
ハリケーン	3	hurricane
バルーン	2	balloon
ハロウィーン	1	Halloween
フィフティーン	3	fifteen
フェーン		(ドイツ)Föhn
プルーン	2	prune
ブレーン	2	brain
プレーン	2	plain
ヘリンボーン	4	herringbone
ホーン	1	horn
ボーン		bone
マシーン	2	machine
マリーン		marine
ムーン		moon
メークイーン	4	May queen

メーン		
モスグリーン	4	moss green
モダーン		
モノトーン	3	monotone
モンスーン	3	monsoon
ヤーン	1	yarn
ユーターン	3	［U―］ U-turn
ユニコーン	3	unicorn
ラブシーン	3	love scene
リターン	2	return
レーン	1	lane
ローティーン	3	(日)low teens
ローン	1	lawn
ローン	1	lawn
ローン	1	loan
ロゼッタストーン	6	Rosetta stone
ワンパターン	4	(日)one pattern

イン forms

アイライン	3	eyeline
アゲイン	2	again
アサイン	2	assign
インクライン	4	incline
エアライン	3	airline
オフライン	3	off-line
オンライン	3	on-line
カーマイン	3	carmine
カフェイン	2	(ドイツ)Kaffein
コイン	1	coin
ゴーサイン	3	(日)go sign
コカイン	2	cocaine
コサイン	2	cosine
コンバイン	3	combine
サーロイン	3	sirloin
サイン	1	sign
サイン	1	sine
ザイン	1	(ドイツ)Sein
ダイン		dyne

ツイン	2	twin
デザイン	2	design
テンダーロイン	5	tenderloin
テンナイン	3	ten nines
ドメイン	2	domain
トレイン	2	train
ナイン	1	nine
ネオン	1	neon
パイン	1	pine
ファイン		fine
ブイサイン	3	［V―］
ホルスタイン	4	(ドイツ)Holstein
メイン	1	main
ライン	1	line
リファイン	2	refine
リフレイン	3	refrain
レイン		lane
レイン		rain
ワイン	1	wine

Superheavies in native words

- No superheavy syllables in underived forms.
- Superheavy syllables as a result of morpheme concatenation and derivation.
- Examples:
  - verbal inflection with /CVVC/ roots
  - denominal adjective forming *-ppoi*
  - noun (demonym) forming *-kko*

Superheavies in verbal derivation

	'pass'	'take'	'enter'	'paste'
root	/toor/	cf. /tor/	/hair/	cf. /har/
GERUND	**toot**.te	tot.te	**hait**.te	hat.te
PAST	toot.ta	tot.ta	hait.ta	hat.ta
PRESENT	too.ru	to.ru	hai.ru	ha.ru

No general tendency to shorten the vowels of superheavies like *tootte*, which remains distinct from *totte* in most styles of speech.

Denominal adjective-forming suffix *-ppoi* '-ish'

	-ppoi	'-ish, -like'
kodomo	ko.do.mop.poi	'childish, childlike'
onna	on.nap.poi	'womanly'
tihoo	ti.**hoop**.poi	'country-like'
sutaa	su.**taap**.poi	'(pop-)star-like'
doraemon	do.ra.e.**monp**.poi	'like Doraemon'
ebisen	e.bi.**senp**.poi	'like shrimp-flavored rice cracker'

suffix *-kko* (lit. 'child/person')

	-kko	'person from' *(demonym)*
Edo	e.dok.ko	'Edo-ite'
Pari	pa.rik.ko	'Parisian'
Oslo	o.su.rok.ko	Oslo-ite
Sendai	sen.**daik**.ko	'Sendai-ite'
Rondon	ron.**donk**.ko	'Londoner'
Berurin	be.ru.**rink**.ko	'Berliner'
Uiin	u.**iink**.ko	'Wiener, Viennese'

Controversial status of trimoraic syllables

- Several researchers (Kubozono 1999:50–55, Vance 2008: 132) have argued that some (or all?) of the purportedly trimoraic syllables should be analyzed as split into two syllables (monomoraic + bimoraic):

.CVVC. → .CV.VC.

Controversial status of trimoraic syllables

The split syllable analysis always results in an onsetless second syllable.

Schematically (for the example *Rhine*):

Superheavy analysis:	Split syllable analysis:
σ(.rain.) σ(.cvvc.) σ(μμμ)	σ(.ra.) σ(.in.) σ(.cv.)σ(.vc.) σ(μ) σ(μμ)

Evidence for split syllabification

- native intuitions about syllable boundaries
- possibility of vowel rearticulation
- patterns of accentuation
- for other evidence, see Prof. Kubozono's paper later today

Patterns of accentuation

- Usual assumption: Accent always falls on the first (head) mora of a syllable.
- E.g., the loanword antepenultimate accent rule (Martin 1952:33, McCawley 1968:134, etc.):
- Accent appears on the antepenultimate mora: asuparágasu 'asparagus', kurisúmasu.
- but on the first mora of a heavy syllable: ere.bée.taa 'elevator' (shifting one mora to the left from strictly antepenultimate position).

Patterns of accentuation

- In inflected verbal forms, accent falls on
  - the first mora of a heavy syllable:
    .**k**ái.te. 'write-GERUNDIVE'
  - or of a superheavy syllable:
    .**hái**t.te. 'enter-GERUNDIVE'.

The split syllable argument

- Premise: Pitch accent always falls on the first mora of a syllable.
- Observation: In some superheavy syllables,
- accent does not fall on the first mora: .CV́VC.
- but on the second mora: .CVV́C.
- Conclusion: .CVV́C. is not a single syllable but two syllables–a monomoraic .CV. syllable plus an accented bimoraic (and onsetless) .V́C. syllable: .CV.V́C.

Accentual argument for splitting superheavies

raíɴ-gawa 'Rhine-river, the River Rhine'

supeíɴ-zin 'Spain-person, Spaniard'

(cf. ráiɴ, supéiɴ with antepeult accent in isolation)

- Split syllable analysis predicts accent on the second vowel /i/: .ra.íɴ.ga.wa., su.pe.íɴ.zin
- Superheavy analysis wrongly predicts accent on the first vowel: *.ráiɴ.ga.wa., *.su.péiɴ.zin.

Conflicting evidence for *-kko*

- Accent appears immediately before *-kko*:

Edo	e.dók.ko	'Edo-ite'
Pari	pa.rík.ko	'Parisian'
Osuro	o.su.rók.ko	'Osloite'
Sendai	sen.daík.ko	'Sendai-ite'
Rondon	ron.doɴ́k.ko	'Londoner'
Berurin	beru.riɴ́k.ko	'Berliner'

Conflicting evidence for *-kko*

- sendaíkko (*sendáikko)
  - Suggests a split syllable analysis [.sen.da.ík.ko]

However:

- beruriɴ́kko (*beruríɴkko)
  - Does this mean the syllabification [.be.ru.ri.**ɴ́k**.ko.]???

The problem with *Berliners*

- The split syllable analysis .be.ru.ri.ɴ́k.ko. raises problems and further questions.
- Problem: Necessary to admit strange syllable types like **.ɴ́k.**, with no vowel and a syllable-initial moraic nasal.
  - This is especially odd given that the nasal is otherwise always postvocalic.

Further questions

- If such moraic-nasal initial syllables are indeed admitted, then why are other moraic nasals not accent-bearers?
  - For a.ma.zóɴ.-gawa, why not *a.ma.zo.ɴ́.-gawa
- Why are trimoraic syllables never analyzed as bimoraic plus monomoraic syllable, with the accent on the final mora?
  - For ra.íɴ.-gawa, why not *rai.ɴ́.-gawa?

Further questions

- This necessitates another stipulation for superheavies:
- They always split into a light+heavy sequence, not into a heavy+light sequence.
- A better explanation is needed.

Evidence from initial L

Takashi Morita (2013, and p.c.) points out an independent piece of evidence against a split syllable analysis:

- The word-initial mora in a word like

  koonsúupu 'corn soup'

does not carry the boundary L found in

kokóro 'heart'

whose first syllable *ko* is fully L-toned.

Evidence from initial L

- It rather behaves tonally like the first mora of an unquestionable heavy syllable such as

  .**ko**o.híi. 'coffee'
- This indicates that the syllabification is

  .kooN.súu.pu., not *.ko.oN.súu.pu.
- Similar examples: baaN-áuto 'burnout', miiN-gáaruzu 'mean girls', muuN-ráito 'moonlight', reeN-kíipiNgu-asisuto-sísutemu 'Lane Keeping Assist System'.

Evidence from initial L

- This contrasts with

  .**i**.aN.sóo.pu. 'Ian Thorpe'

  whose initial mora is fully L-toned because /ia/ cannot be a diphthong and must be heterosyllabic.

Reassessing the argument

"If an accent does not fall on the first mora of a syllable, syllabification should be modified so that it **does** fall on the first mora of a syllable."

.CVVC. → .CV.VC.

- Premise taken for granted here:
  - Pitch accent always falls on the first mora of a syllable.

"Pitch accent always falls on the first mora of a syllable"

- What is the status of this assumption?
  - An inviolable constraint?
  - A high-ranking constraint?
  - A single constraint or several interacting constraints?
- If violable, pitch accent on non-syllable-initial moras is in certain situations expected to arise, and there is no need to admit segmentally questionable syllable types like **.Nk.**

Compound accent

- Productive accent assignment patterns that have been the focus of intense investigation in Japanese accentology,
- with well-established generalizations (see Poser 1984, Kubozono, Ito and Mester 1997, and Ito and Mester 2007).

Other productive accent assignments

- verbal/adjectival inflection
- default antepenultimate accent (in loanwords and elsewhere)

Compound accent

- Difference between word compounds and phrasal compounds
- Focus here: word compounds with junctural accent

Junctural accent

- Assigned at the juncture between compound members, schematically:

[[ω1…] [ω2…]]

- Realized as close to the juncture as possible, either at the *end* of ω1 or the *beginning* of ω2:

[[ω1…] [ω2…]]

Junctural accent

- Short ω2 (≤ 1 foot): accent on the last syllable of ω1:

ω1[… ó] ω2[(ft)] foot=moraic trochee

- Otherwise, if ω2 > 1 foot: accent on the initial syllable of ω2:

ω1[…] ω2[ó μ μ …]

(McCawley 1968, Poser 1990, Kubozono 1995)

Examples of junctural accent

- With short ω2 (≤ 1 foot): on last syllable of ω1
  temuzú-gawa (témuzu 'Thames' + kawá 'river')
  kamerá-maɴ (kámera 'camera' + mán 'man')

- Otherwise, (ω2 > 1 foot): on initial syllable of ω2
  nama-támago (náma 'raw' + tamágo 'egg')
  deɴki-kámisori (déɴki 'electric' +kamisóri 'razor')

Additional factors for short ω2 (Kubozono 1995)

- If lexical accent on ω2 is initial, it is kept:
  íto 'thread' momeɴ + íto 'cotton thread'
  kísu 'kiss' faasuto + kísu 'first kiss'

- But not if ω2 is a Sino-Japanese morpheme:
  éki 'station' syuutyakú + eki 'terminal station'
  séki 'seat' yoyakú + seki 'reserved seat'
  séi 'living' itinéɴ + sei 'first-grader'

"As close to the juncture as possible" means:

- Leftmost in ω2:
  invariably, initial syllable and initial mora:
  nama + .tá.ma.go. 'raw egg'
  tookyoo + .déɴ.ryo.ku. 'TEPCO'
  kaigai + .ryúu.ga.ku. 'overseas study'

"As close to the juncture as possible" means:

- Rightmost in ω1:
  always last syllable, but not necessarily last mora:
  .ku.wa.ga.tá.+ musi 'stag beetle'
  .too.kyóo. + to 'Tokyo prefecture'
  .o.re.gón. + syuu 'Oregon state'

Example: -州 -*syúu* 'state, province'

- Monomoraic (light) final syllable in ω1:
  Accent on **final syllable/final mora**

yu.tá-syuu	yúta	'Utah'
neba.dá-syuu	nébada	'Nevada'
arizo.ná-syuu	arizona	'Arizona'
okuraho.má-syuu	okuráhoma	'Oklahoma'
nyuuyoo.kú–syuu	nyuuyóoku	'New York'
kariforuni.á–syuu	kariforunia	'California'
aio.wá-syuu	áiowa	'Iowa'

-州 -*syúu* 'state, province'

- Bimoraic (heavy) final syllable in ω1:
  Accent on **final syllable, penultimate mora** (=syllable-initial)

.keɴ.tak.kíi.-syuu	.keɴ.ták.kii. 'Kentucky'
.wa.siɴ.tóɴ.-syuu	.wa.síɴ.toɴ. 'Washington'
.ha.wái.-syuu	.há.wai. 'Hawaii'
.o.re.góɴ.-syuu	.ó.re.goɴ 'Oregon'

-州 -*syúu* 'state, province'

- Trimoraic (superheavy) final syllable in ω1:
  Accent on **final syllable, penultimate mora** (i.e., not on syllable initial mora)

.meéɴ.-syuu	méeɴ 'Maine'
.i.su.fa.haáɴ.-syuu	'Isfahan province' (Iran)
.pu.rei.beéɴ.-syuu	'Prey Veng prov.' (Cambodia)
.bad.doɴ.booóɴ.-syuu	'Battambang prov.'(Cambodia)

Other examples

- Other superheavy finals, with other one-foot second members, behave similarly (see Morita 2013):

burisubeéɴ-gawa 'Brisbane river' (Australia)
guriíɴ-sya 'green (first-class) carriage'
yuutaáɴ-ritsu 'U-turn percentage'
makuriíɴ-kaɴ 'McLean Building'
burunfonteéɴ-si 'Bloemfontein city' (So. Africa)
kameruúɴ-ziɴ 'Cameroon person'

Accent on rightmost syllable in ω1

- Within the rightmost syllable, accent appears:
  - on the first mora of a 1μ syllable:
    … σ(μ́)]ω1 + [f]ω2 ne.ba.dá.-syuu
  - on the first mora of a 2μ syllable:
    … σ(μ́ μ)]ω1 + [f]ω2 ha.wái.-syuu
  - on the second mora of a 3μ syllable:
    … σ(μ μ́ μ)]ω1 + [f]ω2 .meéɴ.-syuu

Question

- Why this mixed pattern?

first mora
… σ(μ́)]ω1 +
… σ(μ́ μ)]ω1 +
… σ(μ μ́ μ)]ω1 +
penultimate mora

The usual question

- Why are not all accents syllable-initial, if accent is supposed to go on the head mora?
  - ✓ … σ(μ́)]ω1 + [f]ω2 ne.ba.dá.-syuu
  - ✓ … σ(μ́ μ)]ω1 + [f]ω2 ha.wái.-syuu
  - ✗ … σ(μ́ μ μ)]ω1 + [f]ω2 *.méeɴ.-syuu
  - The usual answer consists in denying that the rightmost syllable is ever trimoraic.
  - But as discussed earlier, this means admitting strange vowel-less syllable types like **.ɴk.**

A different question

- Why are not all accents syllable-final, given that the juncture as possible?
  - ✓ … σ(μ́)]ω1 + [f]ω2 ne.ba.dá.-syuu
  - ✗ … σ(μ μ́)]ω1 + [f]ω2 *ha.waí.-syuu
  - ✗ … σ(μ μ μ́)]ω1 + [f]ω2 *.meeɴ́.-syuu

A new hypothesis

- Rightmost junctural accent is displaced by one mora leftwards for the bimoraic and trimoraic syllables:

… σ(μ́) ω1]
… σ(μ μ́) ω1]
… σ(μ μ μ́) ω1]

A new hypothesis

Rightmost junctural accent is displaced:

- *not* because of any special circumstances regarding heavy syllables or superheavy syllables, but
- because of the bitonal nature of the Japanese pitch accent (HL),
- together with the universal tonal integrity requirement whereby tonal complexes prefer to have a single host syllable.

A new hypothesis

- Rightmost junctural accent is displaced by one mora for the bimoraic and trimoraic syllables because of TONALINTEGRITY:

… σ(μ́) ω1] [ω2 μ̀ → … σ(μ̂) ω1] [ω2 μ
… σ(μ μ́) ω1] [ω2 μ̀ → … σ(μ́ μ̀) ω1] [ω2 μ
… σ(μ μ μ́) ω1] [ω2 μ̀ → … σ(μ μ́ μ̀) ω1] [ω2 μ

First case of TONALINTEGRITY

The antepenultimate accent rule:

- Shift to pre-antepenult accent when the antepenultimate mora is the second mora of a heavy syllable: ere.bée.taa 'elevator'
- Usual reason given: Accent always falls on the first mora of a syllable.
- Better answer: TONALINTEGRITY

Preantepenult μ accent

/erebeetaa/	TONAL INTEGRITY	NON FINALITY	RIGHTMOST
HL || .e.re.bee.táà.		*!	
H L | | .e.re.beé.tàa.	*!		*
➔ HL || .e.re.béè.taa.			**

Junctural accent: gist of the analysis

- The pitch accent HL is right-aligned with the compound juncture.

H L
| |
… μ μ μ́ μ̀]$_{ω1}$ +
aligned

- **This** is why the H portion of the tonal complex appears on the penultimate mora of bimoraic and trimoraic syllables:

… $_σ$(μ́ μ̀)]$_{ω1}$ … $_σ$(μ μ́ μ̀)]$_{ω1}$

The gist of the analysis

- For monomoraic syllables, the entire bitonal complex appears on the final syllable.

H L
… $_σ$(μ̂)]$_{ω1}$ + $_{ω2}$[μ …

Tonal markedness constraints

- TONALALIGNMENT:
  - Align tones to juncture (ω-edge).
- TONALINTEGRITY:
  - Tonal complexes are hosted by single syllables.
- TONALCROWDING:
  - A mora (TBU) can only host one tone.

Other standard tonal constraints assumed (cf. Yip 2002)

- Tonal Markedness Constraints:
  - NOSKIPPING
  - NOUNLINKEDTONES
  - NOCROSSING
- Tonal Faithfulness Constraints:
  - MAXLINK: Don't delete tonal association lines.
  - DEPLINK: Don't add tonal association lines.
  - MAXTONE: Don't delete tone.
  - DEPTONE: Don't add tone.

Bimoraic syllable

	TONAL INTEGRITY	TONAL CROWDING	TONAL ALIGNMENT
➔ H L | | …$_σ$(μ μ)] + [$_σ$(μ			*
H L |/ …$_σ$(μ μ)] + [$_σ$(μ		*!	
H L | …$_σ$(μ μ)] + [$_σ$(μ	*!		*

Trimoraic syllable

	TONAL INTEGRITY	TONAL CROWDING	TONAL ALIGNMENT
➔ H L | | …$_σ$(μ μ μ)] +			*$_H$
H L | | …$_σ$(μ μ μ)] +			*$_L$ *!*$_H$
H L |/ …$_σ$(μ μ μ] +		*!	

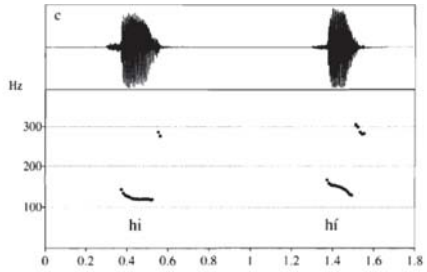
Monomoraic syllable

	TONAL INTEGRITY	TONAL CROWDING	TONAL ALIGNMENT
➔ H L |/ …$_σ$(μ)] + [$_σ$(μ		*	
HL | …$_σ$(μ)] + [$_σ$(μ	*!		*$_L$
HL / | μ $_σ$(μ)] + [$_σ$(μ	*!		*$_H$

Unaccented final $_σ$[μ] vs. accented final $_σ$[μ̂]

This predicts that an accented final light syllable will in general remain distinct from an unaccented final light syllable, as borne out by the facts.

^{0}hi 日 'sun' vs. ^{1}hî 火 'fire'

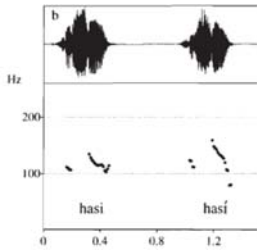


(Gussenhoven 2004:191)

%LH
[σ(μ)]

%L H L
[σ(μ)]

^{0}hasi 端 'edge' vs. ^{1}hasî 橋 'bridge'



%L H
[σ(μ) σ(μ)]

%L H L
[σ(μ) σ(μ)]

Constraint ranking

TONALINTEGRITY
|
TONALCROWDING
|
TONALALIGNMENT

Tonal complexes are not linked as units

- Tonal complexes as linked units do not explain leftwards displacement:

* H L
T
|
… σ(μ μ)

* H L
T
|
… σ(μ μ μ)

Tonal complexes are not linked as units

- Instead:

H L
| |
… σ(μ μ)

H L
| |
… σ(μ μ μ)

Tonal complexes are not linked as units

- The tonal constraints (for alignment, integrity, and crowding) only make sense when the individual tones in the tonal complex are individually linked:

H L
| |

The linking behavior of superheavies

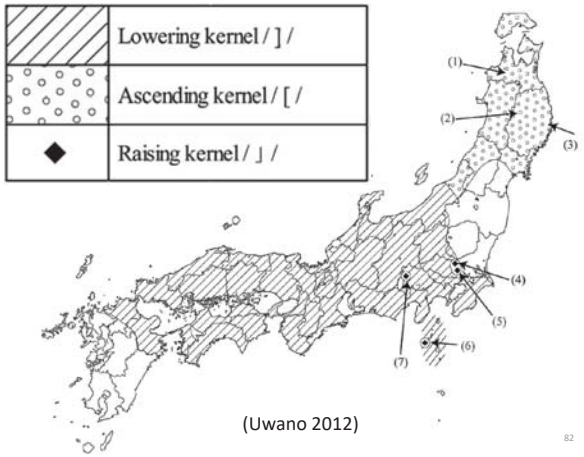
- The tonal complex analysis (tonal alignment, tonal integrity, and tonal crowding) thus explains the special linking behavior of superheavy syllables without having to try to analyze them as two syllables.
- It straightforwardly answers the question why trimoraic syllables never appear with the accent on the final mora: ra.íɴ.-gawa, not *rai.ɴ́.-gawa.

The linking behavior of superheavies

- No split syllable analysis is necessary.
- No syllable types like **.ɴk.** are necessary, with a syllable-initial moraic nasal unattested outside of the putative split syllable context.
- No need to explain why trimoraic syllables always appear to 'split' into σ[μ]+σ[μ́μ], never into σ[μμ]+σ[μ́]: We are actually dealing with σ[μμ́μ̀].

The broader picture: Prosodic typology of Japanese accent systems

- Lowering accent kernel: H*L
  sagari-kaku; e.g., Tokyo and Kansai dialects
- Ascending kernel: LH*
  nobori-kaku; e.g., Shizukuishi (Iwate), Hirosaki (Aomori)
- Raising kernel: L*H
  age-kaku; e.g., Narada (Yamanashi), Hasuda (Saitama)



(Uwano 2012)

Conclusion

- Instead of trying to analyze superheavy μμμ-syllables away,
- it is profitable to focus on the underlying constraints governing their behavior.
- Tonal complexes, such as H*L, are an important ingredient of phonological structure.

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