TONAL RECONSTRUCTION OF BENA-YUNGUR: DEPRESSOR CONSONANTS AND DIRECTIONALITY OF TONAL INTERACTIONS

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SEGMENTAL PHONOLOGY: CONSONANTS

- 26 consonants: /b, p, d, t, ʧ, g, k, gb, kp, ʔ, ɓ, ɗ, f, z, s, ʃ, h, m, n, ɲ, ŋ, l, ⱱ, r, y, w/
  - laryngeal settings: **voiced** vs. **voiceless** vs. (labial and coronal stops) **implosive**
  - The difference in laryngeal settings is neutralized in coda stops, which normally lack audible release
  - **(N)C$_{[+\text{voice}]}$ clusters** in word-initial onsets: /(m)b, (n)d, (ŋ)g/
  - Word-internal NC$_{[+\text{voice}]}$ clusters tend to simplify to C$_{[+\text{voice}]}$

    bìndō ~ *bìdō* 'granary', *gòmbō* ~ *gòbō* 'vagina'

  - Word-final NC$_{[+\text{voice}]}$ clusters (in construct forms) simplify to N

    bìndō > *bìn* 'granary', *gòm* ~ *gòm* 'vagina'

SEGMENTAL PHONOLOGY: VOWELS

- 6 vowel qualities: /i, e, a, ə, o, u/
  - + length
  - + nasalization

TONE SYSTEM: OVERVIEW

- Tone system (Idiatov & Van de Velde 2018)
  - TBU = σ
  - 3 tone levels: L M H
  - 1 TBU can be linked with all 6 logically possible combinations of 2 tones (HM, HL, LH, LM, MH and ML) and 1 combination of 3 tones (HLH)
  - no downstep
  - tones of all three levels can float, viz. ^{H}, ^{M} and ^{L}.
  - two tone rules that apply to linked tones:
    - tone spread
    - tone absorption

- Tone spread: Every tone can (and normally does) spread one position to the right across word boundaries, provided the tone occupying this position to the right is followed by a pause or by an identical tone.

(1)	a.	sí6má # bù:	→	síɓmə́ bû:	'ten herbalists'
	b.	ŋmgbété # fətə	→	ŋmgbétə́ fə́tə	'two trees'
	c.	dòɓtà # kúrún	→	dòɓtə̀ kùrún	'four bushes'
	d.	bōltā # kúrún	→	bōltə̄ kūrún	'four pumpkins'

TONE SYSTEM: TONE SPREAD

- Moreover, a L does not spread onto a following M and a M does not spread onto a following L.

(2) dòɓtà # fə̄tə̄ → dòɓtè fə̄tə̄, *dòɓtè fə̂tə̄ ‘two bushes’

(3) bàltā # bùː → bàltə̄ bùː, *bàltə̄ bū̂ː ‘ten hills’

- H spreads irrespective of the context on the right side of the tone that follows this H.

TONE SYSTEM: TONE SPREAD

- "can (and normally does) spread": although extremely productive, tone spread remains optional and a tone may spread further than one position to the right.

(4) a. nű: # dàsè → nű: dàsè 'the eye of a bean'

b. nű: # dàsè → **nű: dásè** 'the eye of a bean'

c. nű: # dàsè → nű: dásê 'the eye of a bean'

TONE SYSTEM: TONE ABSORPTION

- Tone absorption: The final part of a complex tone is deleted if it is followed by an identical tone, e.g. HL#L → H#L.

(5) *kálsâ # bəmbəm → kálsə́ bəmbəm* 'fat monkeys (sp.)'

- Unlike tone spread, tone absorption also productively applies within words.

(6) tó꞉ # gò꞉ → tó꞉ gô꞉ 'take a chicken!'

(7) tó꞉ # gò꞉sà → tó꞉ gô꞉sà → tó꞉ gó꞉sà 'take chickens!'

TONE SYSTEM: FLOATING TONES

- tones of all three levels can float, viz. ^{H}, ^{M} and ^{L}.
- No sequences of floating tones exist: $^{T1} + {}^{T2} > {}^{T1}$
- Floating tones are usually lexically specified, but may sometimes result from the application of tone rules
- They are found only in the lexical specifications of function morphemes (with one exception)

  ɔ̄n^{H} 'with', *à*^{M} 'on, at', *áy*^{L} '3SG.AN.be'

  àtwā́ŋ$^{(H)}$ 'grasshopper (sp)'

TONE SYSTEM: FLOATING TONES

- The rules governing the docking of floating tones are largely similar to the rules applied to linked tones:
  - tone absorption (but T_1^M/_L > T_1 and T_1^L/_M > T_1)
  - tone spread
- All floating tones first try to dock to the right.
- If they cannot dock to the right, floating ^{H} and ^{M} are deleted, while a floating ^{L} may also dock to the left if the preceding syllable is H.

(8)	a.	áy^L # bə̀m	→	áy bə̀m	‘(s)he is large’
	b.	áy^L # ʧɛ̄ɓʧɛ̄ɓ	→	áy ʧɛ̄ɓʧɛ̄ɓ	‘(s)he is black’
	c.	áy^L # ɓwáláŋ	→	áy ɓwàláŋ	‘(s)he is tall’
	d.	áy^L # lósă	→	ây lósă	‘(S)he is like that’

TONE SYSTEM: DIRECTIONALITY OF INTERACTIONS

- Perseveratory (left-to-right) tone interaction
  - tone spread and tone absorption proceed only left-to-right
  - floating tones dock to the right, if they can
  - As a result, tones tend to be realized one position to the right of their lexical attachment site

(9)

ā	bá:	nə̀	bâ:rā
|ā^{H}	bà:	nə́	bà:rā|
3SG.PFV	scoop\PFV	1SG	lie

‘He lied to me.’ (lit.: ‘He scooped me a lie’)

INTERNAL TONAL RECONSTRUCTION: FIRST CUES

- The **number of H** monosyllabic nouns and verbs more or less equals the **sum of L and M** words

	Nouns	Verbs
H	25	25
M	10	15
L	15	12

- L and M behave similarly in Bena-Yungur tonology

INTERNAL TONAL RECONSTRUCTION: [+VOICE]

- Stem-initial $C_{[+voice]}$ + L vs. $C_{[-voice\ /\ +implosive]}$ + H or M
  - Exceptions are mostly clear recent borrowings and names for animals, which tend to have exceptional shapes

(10)

góndà ~ gwándà	'pawpaw'
gó꞉dê	'to thank' (from Hausa gó꞉dè 'to thank')
kùltà	'lizard (sp.)'
pùkkō	'savannah monitor lizard'
kàdìn	'grasshopper (sp.)'
tə̀ndò	'ant (sp.)'
tòrî	'gerbil'
tàɓsā	'plant (sp.), *Senna obtusifolia*'
pàvˇàdˇ	'(appear) suddenly' (ideophone)
tàsàw	'measure, container used to measure things'
tàbā	'tobacco, cigarette'

INTERNAL TONAL RECONSTRUCTION: [+VOICE]

- Other phonemes and NC clusters (*m, n, r, l, f, h, mb, nd, ŋg, ŋmgb*) largely pattern with $C_{[\text{-voice / +implosive}]}$
- The voiceless fricative ***s*** shows no clear preference for a following tone
- This is due to a **recent neutralization** of the opposition **between *s* and *z*** in the Pra dialect of Bena-Yungur

INTERNAL TONAL RECONSTRUCTION: [+VOICE]

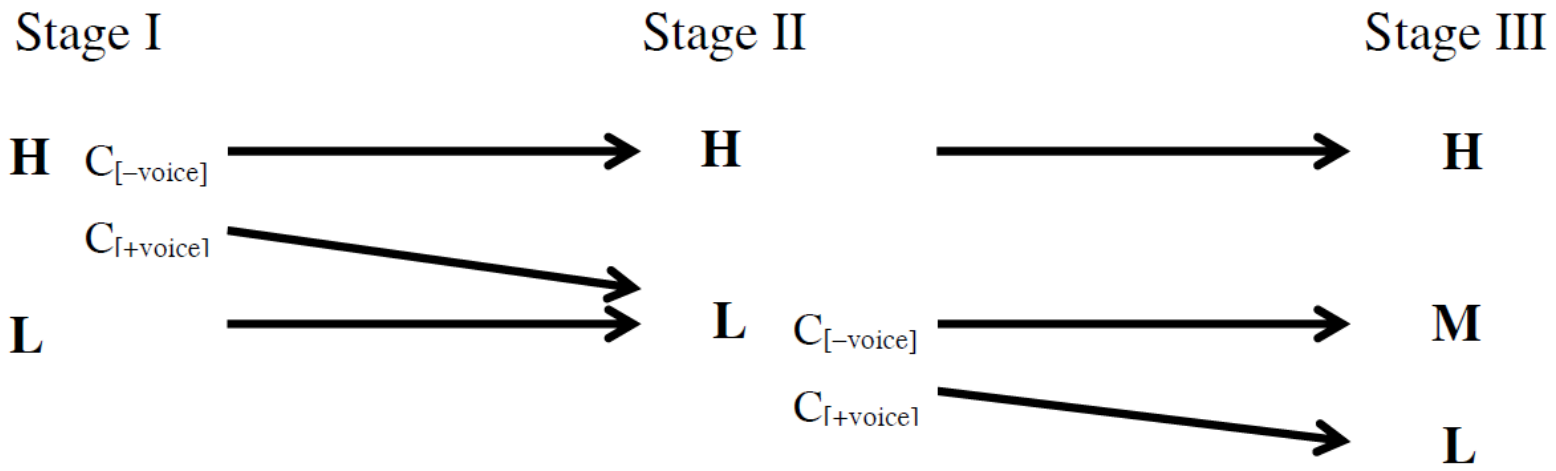
- In the Guto dialect spoken to the south of Pra, all nouns with an initial *z* have a L tone and correspond to an initial *s* followed by a L tone in Pra

(11)

Guto	Pra	
zɪ̀ːsà	*sɪ̀ːsà*	'honey'
zɪ̀yɔ̀	*sɪ̀ɔ̀*	'bee'
zàːŋgà	*sàːŋgà*	'tree (sp.)'
zɑ̀ɔ̀	*sɑ̀ɔ̀*	'snake'
zɑ̀ː	*sɑ̀ː*	'gently'
zɑ̀ːrà	*sɑ̀ːrà*	'pole'
zəkə̀	*səkə̀*	'make'

INTERNAL TONAL RECONSTRUCTION

- ***2 tone levels** > 3 tone levels due to **depressor consonants**



- Subsequent blurring of the straightforward relation between tones and consonants
  - the application of tone rules
  - devoicing of stem-initial voiced obstruents
  - erosion of segmental material

INTERNAL TONAL RECONSTRUCTION

- Due to the **perseveratory** nature of tone interaction (especially, tone spread), in **disyllabic words** the tone of the second syllable tends to be identical to that of the first

		σ_2 H	HL	M	L
σ_1	H	43	4	—	—
	M	—	—	36	—
	L	1	—	—	75

Tone patterns of disyllabic verbs (imperative forms)

INTERNAL TONAL RECONSTRUCTION

- Due to the **perseveratory** nature tone interaction (especially, tone spread), in **disyllabic words** the tone of the second syllable tends to be identical to that of the first

σ_1 \ σ_2	H	HL	HM	M	ML	MH	L	LH	LM
H	145	20	—	—	—	—	4	—	—
M	9	5	1	121	1	3	—	—	—
L	17	7	5	62	1	—	112	4	—
HL	—	—	—	2	—	—	—	—	—

Tone patterns of disyllabic nouns

INTERNAL TONAL RECONSTRUCTION

- The **perseveratory** nature of tone interaction is likely to be an **innovation**, as suggested by:
  - variability in the application and the domain of tone spread (see example 4)
  - dialectal data

(12)

Guto	Pra	
gìráŋgó	*gìràŋgó*	'crocodile'

RECONSTRUCTION: NC CLUSTERS

- Word-initial $NC_{[+voice]}$ /_H or M → *** $NC_{[-voice\ /\ +implosive]}$** :
  - *mb* /_H or M < **mp* or **mɓ* /_*H or *L
  - *nd* /_H or M < **nt* or **nɗ* /_*H or *L
  - *ŋg* /_H or M < **ŋk* /_*H or *L
- Word-initial $NC_{[+voice]}$ /_L → *** $NC_{[+voice]}$** :
  - *mb* /_L < **mb* /_*H or *L
  - *nd* /_L < **nd* /_*H or *L
  - *ŋg* /_L < **ŋg* /_*H or *L
- Less likely: **mɓ, *nɗ > mb, nd*+L as a tone depressor

TONAL MORPHOSYNTAX: DTS OF NOUNS

- Nouns have a higher number of tone schemes as dependents in genitive constructions (**DTS = Dependent Tone Scheme**) than in other contexts:

- DTS A = lexical tone is preserved
- DTS B = lexical tone changes: H → M (≥1σ), L → L.HL (≥2σ)

(13) a. tə́má ‘sheep’ (DTS_A)
b. dɜ̃ːrə̀ tə̀má ‘sheep skin’

(14) a. náː ‘cow’ (DTS_B)
b. bwàːrə̀ nāː ‘cow dung’

(15) a. dùŋgà ‘iroko tree’ (DTS_A)
b. līŋgē dùŋgà ‘the top of the iroko tree’

(16) a. dòɓrà ‘bush’ (DTS_B)
b. tɔ̄ːrə̄ dòɓrâ ‘the road of the bush’

TONAL MORPHOSYNTAX: DTS OF NOUNS

- DTS of nouns is used with:
  - the dependents in the genitive construction
  - complements of nominalized verbs
  - complements of the prepositions *dã̀*^{H} 'in' and *à*^{M} 'on, at'

TONAL MORPHOSYNTAX: DTS OF NOUNS

- The change $DTS_B \rightarrow DTS_A$ can be used as a derivational tool: a concrete space (DTS_B) → some abstract object associated with this space (DTS_A) (metonymical extension)

(17)

		DTS_B	DTS_A
a.	bùtò	'ground, soil'	'land'
b.	líwrá	'sky, heaven'	'God'

(18)

	DTS_B	DTS_A
káɲtá	'stones (sp); *Káɲtá* (the name of a village located in an area with many such stones)'	*Káɲtá* (a non-existent, but possible clan name)

TONAL MORPHOSYNTAX: DTS REGULARIZATION

- For some nouns, both DTS may be acceptable

(19) bìnò ‘song; drumming’

a. ɗā bínò ‘in the song’ (DTS_A)

b. ɗā bînô ‘in the song’ (DTS_B)

- Lexicalized traces of DTS_B, e.g. in compounds

(20) nú꞉ ‘eye’

a. ɗā nú꞉ ‘in the eye’ (DTS_A)

b. áw nē꞉ ‘eyeball’ (lit. ‘child of the eye’) (DTS_B)

- Tendency for **regularization** $DTS_B \rightarrow DTS_A$ (= analogical levelling)
  - DTS_A is much more frequent
  - DTS_A is identical to the lexical tone pattern

RECONSTRUCTION: GENITIVE CONSTRUCTION

- It is clear that DTS_B reflects:
  - ***HL** of the respective **L stems** (with SI $C_{[+voice]}$)
  - ***LH** of the respective **H stems** (with SI $C_{[-voice\ /\ +implosive]}$)
- This is also confirmed by **comparative evidence**:
  - BY *nám-ó* 'meat' ($DTS_{B\sim A}$) vs. Laala-Roba *nàm-ō*
  - BY *fə́tá(:)* 'horn' ($DTS_{B\sim A}$) vs. Laala-Roba *fə̂tā(:)*
  - BY *bùt-ò* 'ground' (DTS_B) > *bùt-ò* 'land' (DTS_A) vs. Laala-Roba *pûtū* 'ground; land'
  - BY *bìn-ò* 'song; singing; drumming' ($DTS_{B\sim A}$) vs. Proto Bantu **bín-à* 'song and dance'
  - Full analogical levelling: BY *tṹ:* 'rat' (DTS_A) vs. Laala-Roba *tṹ:* 'rat'

RECONSTRUCTION: GENITIVE CONSTRUCTION

- That in head nouns *LH > H after SI $C_{[-voice\ /\ +implosive]}$ suggests that tone interaction used to be **anticipatory** (= right-to-left)

  (recall that we've already seen other indications that the perseveratory nature of tone interaction is likely to be an innovation)

- The Genitive construction can be reconstructed as:

  *[N_1 # **H_1** # N_2 # **H_2**]
  Head **GEN** Dependent **GEN**

  Something like *a friend **of** John's*

  - H_1 is needed to account for the change ***LH > M after $C_{[-voice\ /\ +implosive]}$** in N_2
  - H_1 is likely to be the source of the floating tones in the prepositions *dã́*^{H} 'in' and *à*^{M} 'on, at'
  - H_2 is needed to account for the change ***HL > L.HL after $C_{[+voice]}$** in N_2

- **Lexical tone** patterns on **verbs**:
  - 3 major tone patterns on verbs ≥ 1σ: H, M, L
  - 2 marginal tone patterns on verbs = 2σ: L.H and H.HL
  - L after $C_{[+voice]}$ and H and M after $C_{[-voice\ /\ +\ implosive]}$
- Lexical tones stay put in all TAMP constructions with the exception of **Positive Perfective**:
  - **H → M**
  - **M → H**

(21) a. nə^{M} # tómó = n → nə tōmōn 'I did it.'

b. nə^{M} # kānā = n → nə kānán 'I entered.'

c. nə^{M} # bìnǐ = n → nə bìnìn 'I sang.'

PFV+ TONE SCHEME: RECONSTRUCTION

- It is clear that the **PFV+ tone scheme** (with SI $C_{[\text{-voice / + implosive}]}$) reflects:
  - ***LH** of the respective **H stems**
  - ***HL** of the respective **M stems**
- This is also confirmed by **comparative evidence**:
  - BY *tómó* 'do' vs. Laala-Roba *tòmō*
  - BY *kāwā* 'break' vs. Laala-Roba *kāwà*
- The **PFV+ verb form**: *[**L-**Verb]

TONAL RECONSTRUCTION: VERBS & PFV+

Lexical tone patterns

$C_{[+voice]}$

Stage I		Stage III
*H	>	L
*L	>	L
*HL	>	L
*LH	>	L

$C_{[-voice\ /\ +implosive]}$

Stage I		Stage III
*H	>	H
*L	>	M
*HL	>	M
*LH	>	H

PFV+ tone scheme

Stage I		Stage III
*L-H	>	L
*L-L	>	L
*L-HL	>	L
*L-LH	>	L

Stage I		Stage III
*L-H	>	M
*L-L	>	M → H
*L-HL	>	H
*L-LH	>	M

PFV+ TONE SCHEME: RECONSTRUCTION

- ***L** tone pattern must have been **marginal** in verbs and **was regularized in PFV+** of verbs with after SI $C_{[-voice\ /\ +implosive]}$ by analogy with ***HL** (modern M, PFV+: H)
- The same tone change **H→M** and **M→H** is found in **product NMLZ**, typically with morphological class marker ***-ra/-ta***
  - *káwá* 'make fall; wrestle, struggle' vs. *kāw-rā* 'wrestling'
  - *húrá* 'forget' vs. *hūrāː-tā* 'forgetfulness'
  - *kāŋgā* 'clear bush to make a farm' vs. *káŋ-rá* 'clearing future farmland from trees'
  - *kāwā* 'ululate' vs. *káw-rá* 'ululation' ($DTS_{A\sim B}$)

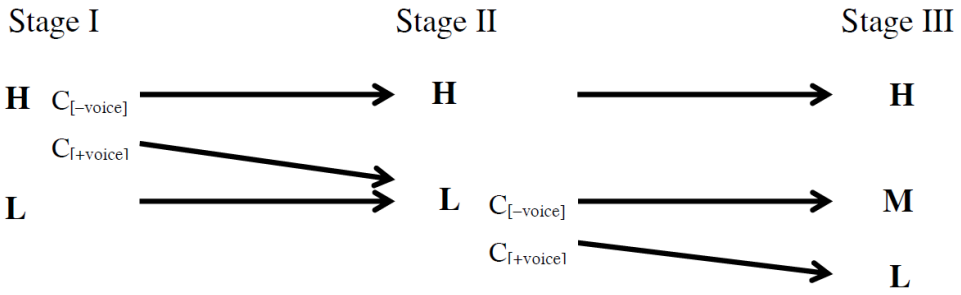
PFV+ TONE SCHEME: RECONSTRUCTION

- In origin, **PFV+** forms were **NMLZ** and **L- prefix** probably a **class prefix**
- Such **product NMLZ**s can also help us to reconstruct tone patterns that cannot be reconstructed otherwise
  - ***L** with $C_{[-voice]}$: *kōdɔ̄* 'coagulate' vs. *kwādmā* 'coagulated blood' (i.e. NOT *kwádmá*)
  - ***HL** with $C_{[+voice]}$: *bìnǐ* 'sing; play a drum' vs. *bìnò* 'song; drumming' ($DTS_{A\sim\mathbf{B}}$)

Supplementary materials

RECONSTRUCTION: GENITIVE CONSTRUCTION

GEN: [N_1#**H_1**# N_2#**H_2**]



- Stage I:

- 2 tone levels
- no depressor consonants
- tones normally stay put

- Stage II:

- 2 tone levels
- anticipatory tone interaction
- depressor consonant effect triggers lowering H > LH and inhibits anticipatory interaction LH > H after stem-initial $C_{[+voice]}$
- the anticipatory interaction LH > H in N_2 is inhibited by the preceding H_1

- Stage III:

- 3 tone levels as a result of the split of *L into M and L due to depressor consonants
- loss of H1
- perseveratory tone interaction (rules of tone spread and tone absorption)
- loss of H2

RECONSTRUCTION: TONE OF NOMINAL STEMS

- Stem-initial $C_{[+\text{voice}]}$

Stage I		Stage III
*H	>	L
*L	>	L
*HL	>	L ($\geq 2\sigma \rightarrow DTS_B$: L.HL)
*LH	>	L

- Stem-initial $C_{[\text{-voice} / +\text{implosive}]}$

Stage I		Stage III
*H	>	H
*L	>	M
*HL	>	M
*LH	>	H (DTS_B: M)