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Tonal suppletion as multi-modal featural affixation

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Allomorphy in Kalam Kohistani

(Dardic language, spoken in Kalam in the North-West Frontier Province of Pakistan; Baart (1999a,b, 2004))

- L- and H-tone; HL and LH only on CV:(C) or CVC ➙ TBU=μ and codas are moraic
- two forms for nouns: a 'base' form in the singular of the direct case and an 'inflected' form in the plural of the direct case and all oblique cases

(1) *C-final nouns (Baart, 1999a:36 and Baart, 1999b:96+96)*

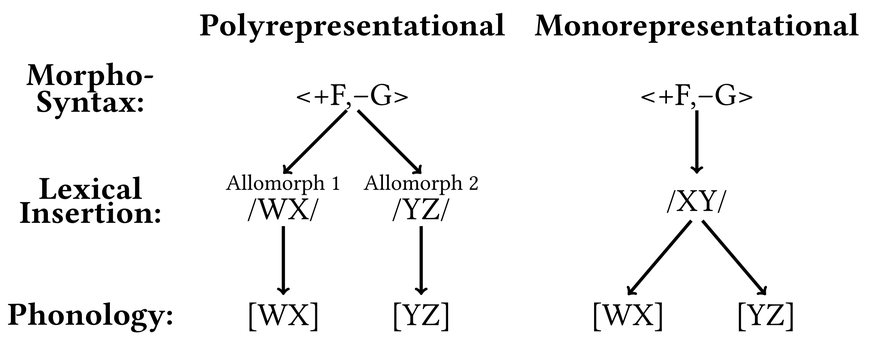
	Base	Inflected			
a.	bóːr	bôːr	'lion'	H → HL	
	ʃáːk	ʃâːk	'piece of wood'		
	úǰ	îǰ	'lie' (fem)		➙ **Additional L on the final syllable**
	ʧǽróːr	ʧǽrêːr	'sparrow'	H.H → H.HL	
b.	bòbǽj	bòbæ̀j	'apple'	L.H → L.L	
	dæ̀tǽr	dæ̀tæ̀r	'cooking frame'		
	dæ̀rín	dæ̀rìn	'ground'		
c.	múràːl	múràːl	'ram'	H.L → H.L	
d.	bằg	bằg	'place'	LH → LH	
	khằn	khằn	'mountain'		

(2) *V-final nouns (Baart, 1999a,b)*

	Base	Inflected			
a.	gò	góː$^{(L)}$	'ox'	L → H(L)	
b.	dæ̀ːrá	dǽːrǽː$^{(L)}$	'guest room'	L.H → H.H(L)	➙ **Inflected form is H-toned and has L that is realized on following word**
	xàːpæ̀ríː	xáːpǽríː$^{(L)}$	'fairy'	L.L.H → H.H.H(L)	
c.	báːʧà	bǽːʧǽː$^{(L)}$	'king'	H.L → H.H(L)	
	pátílà	pátílǽː$^{(L)}$	'pot'	H.H.L → H.H.H(L)	

➙ **phonologically predictable allomorphy**

The theoretical challenge



A monorepresentational analysis for Kalam Kohistani?

➙ Why should the **nature of the base-final segment (C or V)** determine the choice between realizing an H- or L-tone?

➙ Why is the L-tone only realized at the **right edge** whereas the H-tone **overwrites** the base tone melody completely?

Main Claim

Inflection for V-final forms also involves **final V-lengthening.**

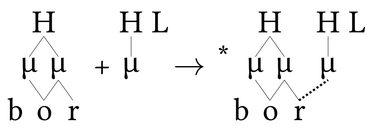
Such a **multi-modal nonconcatenative exponent** is predicted in an autosegmental account that assumes **(complex) floating autosegments** as representations for morphemes (Lieber, 1992; Wolf, 2007).

The exponent for noun inflection in Kalam Kohistani: – H L / μ

A monorepresentational analysis

1. Complementary distribution of affix-μ and affix-L

- C-final bases: affix-μ not realized since there are no trimoraic syllables:



- V-final bases integrate affix-μ (and affix-H) but never affix-L as well:
  - a new association between elements belonging to the same morpheme (b.) excluded by Alternation (van Oostendorp, 2007, 2012)
  - no crossing association lines (c.)

(3)

		Alt	No Cross	Max μ_{Af}	Max L_{Af}
	L H H L / μ μ μ μ + μ / d ä r a				
(☞) a.	L H H L / μ μ μ μ / d ä r a [dà:ré:]				*
b.	L H H L / μ μ μ μ / d ä r a [dà:rê:]	*!			
c.	L H H L / μ μ μ μ / d ä r a [dà:rě:]		*!		

2. A preference for associating the affix-μ

	Max μ_{Af}	Max H_{Af}	Max L_{Af}
L H L / μ + μ / g o			
(☞) a. L H L / μ μ / g o [gò:]			*
b. L H L / μ μ / g o [gò]	*!	*!	

3. H-overwriting vs. minimal association of L

- spread of the affix-H avoids marked L-tones (=*L)
- preservation of L-tones in the absence of affix-tones: high-ranked DepH and Alt

	Max L_{Af}	*L	Max H_{St}	Max L_{St}
L H H L / μ μ μ μ + μ / d ä r a				
a. L H H L / μ μ μ μ / d ä r a [dà:ré:]	*	*!*		
☞ b. L H H L / μ μ μ μ / d ä r a [dă:ré:]	*		*	*

- minimal overwriting for affix-L except:
  - polysyllabic bases with an LH melody due to *LHL
  - no effect for monosyllabic LH bases due to preservation of initial H (Beckman, 1998)

4. Complementary distribution of affix-H and affix-L

- realization of the affix-L: no realization of affix-H:
  - either the affix-H has two root nodes (b.), violating (4)
  - or the association line between affix-H and its μ is marked as invisible (c.)

	Max $(T\text{-}\mu)_{Af}$	One Rt	Max μ_{Af}	Max L_{Af}	*L
L H H L / μ μ μ + μ / b o b a j					
☞ a. L H H L / μ μ μ μ / b o b a j [bòbàj]			*		***
b. L H H L / μ μ μ μ / b o b a j [bóbàj]		*!	*		**
c. L H H L / μ μ μ μ / b o b a j [bóbàj]	*!		*		**

(4) OneRt
Assign a violation mark for every tone that is phonetically dominated by two highest root nodes.
(Where 'root node' is defined as a node that is not dominated by a higher node.)

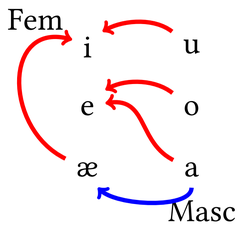
*L – **Predictions:**
I: *all* affix H-tones overwrite ➙ Indeed! E.g. /gàŋkáp/ 'fraud' → /gáŋkápán^{L}/ 'frauds'.
II: *all* floating affix-L's associate minimally ➙ Indeed! 'Delayed fall' (underlying or derived, cf. (2)) realized on first vowel of the following word.

Extension: vowel mutation

- vowel mutation in several morphological contexts

(5) *Vowel mutation (Baart, 1999a; Baart and Sagar, 2004)*

	Base		Inflected
Masc.	laːr	house	læːr
	banaːl	'pasture'	bænæːl
	manuʧ	'person'	mænuʧ
Fem	údʒ	'lie' (f)	îdʒ
	ʧæroːr	'sparrow'	ʧæreːr
	lumaʈ	'stick'	lumeʈ



i	[–back,+high,–low]	u	[+back,+high,–low]
e	[–back,+high,+low]	o	[+back,+high,+low]
æ	[–back,–high]	a	[+back,–high,–low]

➙ **Underspecification of /æ/**: realized as [æ, ʌ], or [ə]; mirrors the analysis in Baart (1999*a*) based on element theory.

Masc	Fem
–back	–back +high / –cons

➙ different vowel mutation patterns (±affecting height)

➙ different locality conditions (±affecting all V's) since the morphemes are of **different complexity**: the floating V feature [–back] spreads through the word; the floating feature complex with a segmental root node associates locally.

➙ different targets (±high V) follow from different complexity as well: underlying [+high] V's are preserved; but if underlying [+high] is overwritten by affix, this faithfulness constraint is not decisive anymore

Appendix: Constraints and full tableaux

1. Constraints

(defined in terms of coloured containment-theoretic OT where deletion of phonological elements and association lines is impossible (McCarthy and Prince, 1995; van Oostendorp, 2006; Trommer, 2011; Trommer and Zimmermann, 2014; Zimmermann, 2014))

(1) a. MaxL$_A$ (parallel: MaxH$_A$ and Maxμ_A)
Assign a violation mark for every affix L-tone that is not dominated by the highest prosodic node via an uninterrupted path of phonetically visible association lines.

b. MaxL$_S$ (parallel: MaxH$_S$ and Maxμ_S)
Assign a violation mark for every stem L-tone that is not dominated by the highest prosodic node via an uninterrupted path of phonetically visible association lines.

c. Max(T-μ)$_A$
Assign a violation mark for an association line between an affix-μ and an affix-tone that is marked as phonetically invisible.

d. Max(T-μ)$_S$
Assign a violation mark for an association line between a stem-μ and a stem-tone that is marked as phonetically invisible.

e. MaxH$_{\#\sigma}$
Assign a violation mark for every phonetically inivisible H that is associated to the first syllable.

(2) a. *$\sigma_{<2\mu}$
Assign a violation mark for every syllable phonetically associated to more than two μ's.

b. *L
Assign a violation mark for every μ that is phonetically visibly associated to an L-tone.

c. *LHL
Assign a violation mark for every phonetically visible sequence LHL.

d. NoCross
Given the phonetically visible elements A and B on tier n and α and β on tier n-1 and A precedes B and α precedes β: assign a violation mark if A is phonetically associated to β and B to α.

e. Alt
Assign a violation mark for every association line that links two elements of colour α that has not the colour α.

f. OneRt
Assign a violation mark for every tone that is phonetically dominated by two highest root nodes. Where 'root node' is defined as a node that is not dominated by a higher node.

2. Tableaux

2.1. V-final bases

(3) *Monosyllabic L-toned base: long final V and only H*

	L H$_x$ L$_x$ / μ + μ$_x$ / g o	*$\sigma_{<2\mu}$	Max(T-μ)$_A$	OneRt	NoCross	*LHL	Alt	MaxH$_{\#\sigma}$	MaxμS	MaxμA	MaxHA	MaxLA	*L	Max(T-μ)$_S$	MaxHS	MaxLS
a.	L H$_x$ L$_x$ / μ μ$_x$ / g o [gò]									*!	*	*	*			
b.	L H$_x$ L$_x$ / μ μ$_x$ / g o [gò:]											*	*!			
☞ c.	L H$_x$ L$_x$ / μ μ$_x$ / g o [gó:]											*		*		*
d.	L H$_x$ L$_x$ / μ μ$_x$ / g o [gò]									*!	*		*	*		*
e.	L H$_x$ L$_x$ / μ μ$_x$ / g o [gò:]		*!				*!				*		**			

(4) *Polysyllabic L-initial base: long final V and only H*

	*σ<2μ	Max(T-μ)$_A$	OnsRt	NoCross	*LHL	Alt	MaxH$_{\#\sigma}$	Maxμ$_S$	Maxμ$_A$	MaxH$_A$	MaxL$_A$	*L	Max(T-μ)$_S$	MaxH$_S$	MaxL$_S$
a. [dà:ré:]									*!	*!	*	*			
b. [dà:ré:]											*	*!*			
☞ c. [dá:ré:]											*		***	*	*
d. [dà:ré:]		*!				*!						***	*	*	
e. [dà:rè:]				*!								***		*	

2.2. C-final bases

(5) *Polysyllabic L-initial base with H on second syllable: all L*

	*σ<2μ	Max(T-μ)$_A$	OnsRt	NoCross	*LHL	Alt	MaxH$_{\#\sigma}$	Maxμ$_S$	Maxμ$_A$	MaxH$_A$	MaxL$_A$	*L	Max(T-μ)$_S$	MaxH$_S$	MaxL$_S$
a. [bòbáj]									*	*	*!	*			
b. [bòbáj:]	*!										*	*			
c. [bòbáj]								*!			*	*			
d. [bòbâj]					*!				*	*		**	*		
☞ e. [bòbàj]									*	*		***	**	*	
f. [bóbàj]			*!						*			**	***	*	*
g. [bóbàj]		*!							*			**	***	*	*

(6) *Monosyllabic L-toned base: final falling contour*

	H, H_x L_x; μ μ, + μ_x; b o r	$*\sigma_{<2\mu}$	$\text{Max(T-}\mu)_A$	OneRt	NoCross	*LHL	Alt	$\text{MaxH}_{\#\sigma}$	$\text{Max}\mu_S$	$\text{Max}\mu_A$	MaxH_A	MaxL_A	*L	$\text{Max(T-}\mu)_S$	MaxH_S	MaxL_S
a.	[bóːr]									*	*	*!				
b.	[bóːrː]	*!										*				
c.	[bórː]								*!			*				
☞ d.	[bôːr]									*	*		*	*		

(7) *Monosyllabic LH-base: no change*

	L H, H_x L_x; μ μ, + μ_x; b a g	$*\sigma_{<2\mu}$	$\text{Max(T-}\mu)_A$	OneRt	NoCross	*LHL	Alt	$\text{MaxH}_{\#\sigma}$	$\text{Max}\mu_S$	$\text{Max}\mu_A$	MaxH_A	MaxL_A	*L	$\text{Max(T-}\mu)_S$	MaxH_S	MaxL_S
☞ a.	[bǎg]									*	*	*	*			
b.	[bàg]							*!		*	*		**	*	*	
c.	[bâg]						*!			*	*		*	**		*

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