Tone in Lagwan Verbs: The Conflict between Perceptual Prominence and Lexical Contrast[1]

Joy Naomi Ruff
University College London
j.ruff@ucl.ac.uk

1 Lagwan

Alternative names: Logone, Logone-Birni (Kotoko), Lagouané, Lagwane

Speakers: 10,000 (Tourneux 2006)

Geographical location: primarily Northern Cameroon, but also adjacent regions of Chad and one village in Nigeria

2 Aims

- to establish what factors determine the realisation of tone in Lagwan verbs
- to consider why Lagwan allows two different tonal systems to operate within verbs
- to place these within the wider context of natural phonological processes

3 Overview of vowel system

3.1 Contrastive vowels

Like many Chadic languages (Mohrlang (1972), Schuh (1971), Wolff (1983)), more vowel contrasts word-finally than elsewhere:

(1) *Initial and medial vowel contrasts:*

	Front	Central
Mid	e	
Low		a

(2) *Final vowel contrasts:*

	Front	Central	Back
High	i		u
Mid	e		o
Low		a	

3.1.1 Lexically contrastive vowels in verbs

In verbs, no back vowels (but [u] may be present as an epenthetic vowel; see 3.2 below):[2]

(3) *Medial[3] vowel contrasts in verbs:*

	Front	Central
Mid	e	
Low		a

[1] I would like to thank Sean Allison, Steve Anderson, Mary Pearce, Aaron Shryock and Moira Yip for very helpful discussion and suggestions concerning the data and ideas presented in this paper, as well as audiences at the University of York (1st June 2006) and Moira Yip's Current Issues in Phonology course at University College London (27th March 2007). Any errors are of course my own.

[2] That is to say that back vowels are absent as *lexical* vowels. *–o* may be attached as a 'vowel-integrating' suffix to give the verb a ventive reading (see Ruff 2005:39).

[3] Verbs do not permit initial vowels; see tables (5), (33) and (34) below.

(4) *Final vowel contrasts in verbs:*

	Front	Central
High	i	
Mid	e	
Low		a

3.2 Epenthetic high vowel

As is common in Chadic, there is a short epenthetic high vowel *ə*[4] (Schuh's (1971) 'zero vowel'):

- present only when required for well-formed syllabification[5]
- assimilates to its environment → [i], [ə], [u][6]

4 Tone on verbs

4.1 Subset of verbs with lexical tone

As for some other Chadic languages (Dera (Schuh 1971:36-37), Migaama (Roberts 2005)), in Lagwan tone is lexically contrastive on only a subset of verbs:

(5) *Verb structures with lexical tone*[7] (excluding known loans; to be revised in (32))

Structure	(L)	**LH**	**H**[8]	**HL**
C.CV: 8 (24)	(16: ǹ.k'à *create*)	8: m̀.ɓí *crawl*	-	-
C.CVC: 1 (2)	(1: s̀.k^{w}àl *look for*)	1: s̀.χél *suit*	-	-
Cə.CV: 10 (26)	(16: wù.ɬà *fill*)	3: sə̀.mé *touch*	2: ɬə́.ná *feel*	5: s'í.yà *tear*
Cə.CVC: 2 (7)	(5: k^{w}ù.làm *boil*)	2: ɗə̀.vál *fear*	-	-
Cə.CV.Cə:1 (3)	(2: k^{w}ù.rè.hə *scratch*)	1: vənáhə́[9] *vomit*	-	-
Total: 22 (62)	(40)	6	5	11

ə = epenthetic vowel (see 3.2 above)

V = lexically contrastive vowel (see 3.1.1 above)

- L would be default for these verbs (see 4.2 below)
- all underlyingly CCV(C), the most common structure for verbs (cf. Ruff 2005:59)

---

[4] Following Chadic conventions, [ə] represents a high central vowel (IPA [ɨ]), [r] represents a flap (IPA [ɾ]) and [y] a glide (IPA [j]).

[5] For rules, see Ruff (2005:§§4.1.2 & 4.2).

[6] See Ruff (2005:§3.5.1) for rules.

[7] The data used in this paper were collected from native speakers of Lagwan in Cameroon mainly over an eighteen-month period from 2004-2005. For details, see Ruff 2005:§1.5.

[8] A couple of verbs with syllable structures other than those shown have high tone throughout, but these can essentially be ignored: 'ɬáhə́' (*laugh*) is onomatopoeic (thanks to Steve Anderson for pointing this out to me); 'ɗákál' ~ 'ɗálká(l)' (*wait (for)*) may very well be a loan, indicated by the medial consonant cluster, never found in native Lagwan verbs (see Ruff 2005:59). The fact that it has a variant with a deleted consonant suggests that some speakers have reanalysed it to conform to native Lagwan verb structures.

[9] There is some free variation here: [vᵊnàhə́] ~ [vənăhə́] ~ [vənāhə́] ~ [vənáhə́]. I suspect the optional and variable spreading of the low tone is due to the shortness of the first vowel, particularly when, as is usually the case (except in the imperative, the tone of which is not yet fully understood), the verb is preceded by an open syllable. I am treating this spreading as a purely phonetic phenomenon here, a result of the fact that it requires some time to produce, and to change, tone. Notice however that the low tone does not spread on disyllabic CəCV(C) verbs with a LH melody; presumably each lexical tone must be realised on at least one whole syllable.

Initial tone-bearing syllabic consonants:

- found whenever initial CC sequence is:
  - geminate
  - sonorant + obstruent
  - voiceless obstruent + voiceless/glottalic obstruent[10]

- evidence from polar tone and downstep:

(6)	wú wùɬà	*I fill*	(10)	wú m!ɓí ~ wû mɓí	*I crawl*
(7)	wú sə̀mé	*I touch*	(11)	wú n!ɬí ~ wû nɬí	*I swim*
(8)	wù ɬə́ná	*I feel*	(12)	wú k!ká	*I hold*
(9)	wù s'íyà	*I tear*	(13)	wú χ^{w}!ɓí	*I get old*

cf:

(14)	káŋkə́rmá	*chilli pepper*	(17)	mákə́mmí	*sesame seeds*
(15)	tándá	*flirtatious lady*	(18)	lák^{w}ɗé	*younger sibling*
(16)	ʁə́llá	*weight*	(19)	kə́skə́r	*basket*

- evidence from pluractional:[11]

	Structure	*Verb*	*Pluractional*	
(20)	Cə.CV	ʁù.ví	ʁù.ʁù.vì	*run*
(21)	Cə.CV	s'ù.wà	s'ù.s'ù.wà	*twist*
(22)	C.CV	m̀.ɓí	m̀.ɓì.ɓì	*crawl*
(23)	C.CV	m̀.tì	m̀.tì.tì	*die*
(24)	C.CV	s̀.ɗà	s̀.ɗà.ɗà	*roughcast*

- Why do syllabic consonants only bear low tone (cf. (5))?

(25) *Lexical tone on unambiguous nouns* (excluding known loans and compounds)

1σ: 21	2σ: 174	3σ: 66	4σ: 7	5σ: 1	*Total:* 269
L: 15 (71%)	**L**L: 77 (44%)	**L**LL: 26 (39%)	**L**LLL: 4 (57%)		**L**: 122 (45%)
H: 6 (29%)	**H**H: 59 (34%)	**H**HH: 22 (33%)	**H**HHH: 2 (29%)		**H**: 89 (33%)
	LH: 37 (21%)	**LH**H: 14 (21%)			**LH**: 51 (19%)
	HL: 1	HHL: 4 (5%)	LHHL: 1 (14%)	LLLHH: 1	Other[12]: 7 (3%)

(26) **L H**
| /\
ɓarahə
desert

(27) **L H**
| /\
maɬega
plank

[10] See Ruff 2007a:§3.1 for reasons why epenthesis is not permitted in geminates and sonorant-obstruent sequences; see Ruff 2007b:6 for why epenthesis is not permitted between voiceless obstruents and either voiceless or glottalic obstruents.

[11] See Ruff 2007a:§3.3 for detailed analysis.

[12] It is probable that the exceptions are either loans whose source is yet to be identified or compounds.

(28) *Tone on syllabic-consonant-initial nouns*

C+1σ: 41	C+2σ: 76	C+3σ: 11	*Total:* 128
(L)**L**: 21 (51%) (L)**H**: 20 (49%)	(L)**L**L: 29 (38%) (L)**H**H: 34 (45%) (L)**LH**: 13 (17%)	(L)**L**LL: 4 (36%) (L)**H**HH: 5 (45%) (L)**LH**H: 2 (18%)	(L)**L**: 54 (42%) (L)**H**: 59 (46%) (L)**LH**: 15 (12%)

(29) L **L H**
| | |
mzała
cowry shell

(30) L **L H**
| | |
ŋgəɗə
rib

- The need to preserve lexical contrasts prohibits association of lexical tone to syllables that are not sufficiently prominent perceptually.
- Consonants are at the bottom of the sonority hierarchy and therefore less prominent than vowels:

(31) *Sonority hierarchy*
low vowels > mid vowels > high vowels > liquids > nasal consonants > fricatives > plosives
consonants

- Therefore syllabic consonants are not sufficiently prominent to bear lexical tone and instead bear a default low tone:

(32) *Verb structures with lexical tone* (excluding known loans)

Structure	(L)	**LH**	(L)**H**	**HL**
C.CV: 8 (24)	(16: ǹ.k'à *create*)	-	8: m̀.ɓí *crawl*	-
C.CVC: 1 (2)	(1: s̀.k^{w}àl *look for*)	-	1: s̀.χél *suit*	-
Cə.CV: 10 (26)	(16: wù.ɬà *fill*)	3: sə̀.mé *touch*	2: ɬə́.ná *feel*	5: s'í.yà *tear*
Cə.CVC: 2 (7)	(5: k^{w}ù.làm *boil*)	2: ɗə̀.vál *fear*	-	-
Cə.CV.Cə:1 (3)	(2: k^{w}ù.rè.hə̀ *scratch*)	1: və̀náhə́ *vomit*	-	-
Total: 22 (62)	(40)	6	11	5

4.2 Verbs with predictable tone

- not unusual for Chadic languages to have at least a class of verbs with predictable tone (Ngizim (Schuh 1971:34), Karekare (p36), Dera (p37), Mbuko (Gravina 1999:81), Zina (Odden 2002))

(33) *Verbs with predictable L tone*

Syllable structure	**L**		
C.σ(.σ) = 46	C̀.Cà = 17:	l̀.bù	*wash*
	C̀.CəC = 5:	ɴ̀.ʁər	*bark*
	C̀.Cə.Cà = 1:	ǹ.də.sə	*groan*
	C̀.Cə.CəC = 1:	ǹ.də.bər	*stagger*
	(C̀.CV̀ = 16:	ǹ.k'à	*create*)
	(C̀.CV̀C = 1:	s̀.k^{w}àl	*look for*)
	C̀.CV̀.Cà = 1:	ɬ̀.χà.tə	*comb*
	C̀.CV̀.CV̀ = 4:	ŋ̀.gà.mà	*guard*
Cə.σ(.σ) = 45	Cə.Cà = 12:	ʁə.gə	*close*
	Cə.CəC = 3:	zə.gəl	*crow*
	(Cə.CV̀ = 16:	wù.ɬà	*fill*)
	(Cə.CV̀C = 5:	k^{w}ù.làm	*boil*)
	(Cə.CV̀.Cə = 2:	k^{w}ù.rè.hə	*scratch*)
	Cə.CV̀.CV̀ = 7:	pə.rà.kà	*separate*
Total:	51 (91)		

(34) *Verbs with predictable H(L) melody*

Syllable structure	**H**(**L**)		
Cə = 4	Cə́ = 4:	ɗə́	*put*
CəC(.σ.σ) = 45	Cə́C = 24:	ɓə́n	*tether*
	Cə́C.Cə = 14:	ʁə́d.gə	*throb*
	Cə́C.CV̀ = 6:	və́n.nà	*praise*
	Cə́C.CV̀.CV̀ = 1:	bə́r.bà.ɮà	*write*
CV(C.σ.σ) = 63	CV́ = 27:	bá	*pierce*
	CV́C = 1:	tél	*shine*
	CV́.Cə = 9:	lá.h^{w}ù	*have diarrhoea*
	CV́.CV̀ = 21:	dá.nà	*transport*
	CV́.CV̀C = 1:	ɬá.bàl	*wait*
	CV́.CV̀.CV̀ = 4:	má.là.kà	*rule over*
Total:	112		

- It is known that prominent positions prefer H (itself more perceptually prominent) and avoid L; non-prominent positions prefer L and avoid H (De Lacy 1999, 2002; Smith 2003)

- in Lagwan, H associated to psycholinguistically prominent initial syllable if either:
  - heavy syllable: phonetically prominent
  - syllable has V nucleus (i.e. mid or low vowel; cf. (3)): high sonority (cf. (31)) therefore phonetically prominent
  - monosyllabic verb: psycholinguistically prominent since carries all lexical meaning[13]
- default L associated to all remaining (non-prominent) syllables

- elsewhere in Chadic:
  - quantity-sensitivity: Migaama (Roberts 2005), Bole (Newman 1972)
  - H associated to low vowel *a*: Bade, Ngizim (Hombert 1978:96, Schuh 1971:34)

[13] Thanks to Mary Pearce for pointing this out to me

- L associated to high, epenthetic, vowel: Ngizim (Schuh 1971:34)

- Despite displaying some properties of a stress system (quantity- and sonority-senstivity), evidence from polar tone shows that predictable H and L are genuine phonological tones (cf. (6)-(13)):

(35)	wù ɗə́	*I put*	(38)	wú l̀bù	*I wash*
(36)	wù bə́n	*I bathe*	(39)	wú ɗə̀gə̀	*I push*
(37)	wù fá	*I bury*			

- therefore supports ideas that tone and stress are not distinct systems, but extremes of a continuum

4.3 The Conflict between perceptual prominence and lexical contrast[14]

Why should verbs of a particular phonological shape (here CCV(C)) permit lexical tone to surface, while elsewhere tone is predictable?

- nature of phonology = need to preserve lexical contrasts while avoiding what is marked

- in Lagwan verbs:

  i) absolute requirement that a certain number of lexical contrasts be maintained (as for any phonological system)

  - two markedness constraints, to be obeyed where possible:
    ii) Verbs should be CCV(C).
    iii) In verbs, H should be realised on a syllable iff it is both initial and perceptually prominent.

- If both ii) and iii) are satisfied, (taking into account inventory, phonotactic and skeletal structure constraints[15]) the number of potential contrasts among verbs will be relatively small, thus conflicting with the absolute requirement in i).

  - only L verbs in table (32) = 18% of verbs

- Therefore it is permitted that either ii) or iii) be violated, but not both:

  - all verbs in tables (33) and (34) except those in parentheses violate ii) but obey iii) = 72% of verbs

  - LH, H and HL verbs in table (32) obey ii) but violate iii) = 10% of verbs

5 Summary

- Lagwan has two sets of verbs: one with lexical, and the other with predictable, tone, with some overlap between the two.

- In both the relative perceptual prominence of a syllable is significant.

- The difference between the two sets need not be arbitrary, but can be understood according to the competition between lexical contrast and markedness that is inherent to phonology.

[14] Thanks to Moira Yip for pointing out the main idea in this section. Any shortcomings in its implementation are my own.

[15] See Ruff 2005, 2006:§2 for inventory constraints. Only fifteen different underlying skeletal (CV) structures are attested on Lagwan verbs are quite restricted (see Ruff 2005:59).

References

De Lacy, P. 1999. 'Tone and Prominence.' Ms, University of Massachusetts, Amherst. Available as ROA-333 from the Rutgers Optimality Archive.

De Lacy, P. 2002. 'The Interaction of Tone and Stress in Optimality Theory.' *Phonology* 19, 1–32.

Gravina, R. 1999. 'The Phonology of Mbuko.' Yaounde: SIL.

Hombert, J-M. 1978. 'Consonant Types, Vowel Quality and Tone.' In V. A. Fromkin (ed), *Tone: A Linguistic Survey*. New York, San Francisco, London: Academic Press, 77-112.

Mohrlang, R. 1972. *Higi Phonology* (Studies in Nigerian Languages 2). Zaria: Institute of Linguistics & Kano: Centre for the Study of Nigerian Languages, Abdullahi Bayero College, Ahmadu Bello University.

Newman, P. 1972. 'Syllable Weight as a Phonological Variable: The Nature and Function of the Contrast between 'Heavy' and ' Light ' Syllables.' *Studies in African Linguistics* 3, 301–323. (Reprinted in P. J. Jaggar & H. E. Wolff (eds), 2002, *Chadic and Hausa Linguistics: Selected Papers of Paul Newman with Commentaries*, Cologne: Rüdiger Köppe, 1-19.)

Odden, D. 2002. 'The Verbal Tone System of Zina Kotoko.' B. K. Schmidt, D. Odden & A. Holmberg (eds), *Some Aspects of the Grammar of Zina Kotoko*. Munich: Lincom Europa, 15-34.

Roberts, J. 2005. 'Is Migaama a Tonal or an Accentual Language?' Poster given at Between Stress and Tone, Leiden, June 2005.

Ruff, J. N. 2005. 'Phonology of Lagwan (Logone-Birni Kotoko).' Yaounde: SIL. (Also in *SIL*. [http://www.sil.org/africa/cameroun/bydomain/linguistics/phonologies/Lagwan%20Phonology%202005%20Ruff.pdf] (accessed 02/02/06))

Ruff, J. N. 2006. 'Nasal + Obstruent Sequences in Lagwan.' Paper presented at the 3rd Biennial International Colloquium on the Chadic Languages, Villejuif, November 2005.

Ruff, J. N. 2007a. 'Optimality Theory versus Contingent Extrasyllabicity: Initial Nasal-Obstruent Sequences and Geminates in Lagwan.' Ms, University College London.

Ruff, J. N. 2007b. 'Tone in Lagwan: The Interaction of Perceptual Prominence and Lexical Specification.' Ms, University College London.

Schuh, R. G. 1971. 'Toward a Typology of Chadic Vowel and Tone Systems.' Doctoral qualifying paper, University of California, Los Angeles.

Smith, J. L. 2003. 'Prominence, Augmentation, and Neutralization in Phonology.' In *University of North Carolina at Chapel Hill*. [http://www.unc.edu/~jlsmith/home/pdf/bls26.pdf]. (accessed 05/03/07). (Corrected version of that in L. Conathan et al (eds), 2000, *Proceedings of BLS* 26, Berkeley, CA: Berkeley Linguistic Society, 247-257.)

Tourneux, H. 2006. 'Langues kotoko', in *LLACAN-UMR 8135*. Villejuif: CNRS, Langues 'O, Université Paris 7. [http://llacan.vjf.cnrs.fr/] (accessed 02/02/06).

Wolff, E. 1983. 'Reconstructing Vowels in Central Chadic.' In E. Wolff & H. Meyer-Bahlburg (eds), *Studies in Chadic and Afroasiatic Linguistics*. Hamburg: Helmut Buske Verlag, 211-232.