

Metrical tone shift and spread in Harmonic Serialism

Jeroen Breteler
University of Amsterdam

Bounded high tone shift and spread

Some Bantu languages feature a process called *high tone shift*, where “high tones delink from the sponsor syllable [and] surface on the so-called target syllable” (Zerbian and Barnard, 2008). In *bounded* tone shift, the target syllable is defined relative to the location of the sponsoring element. Crosslinguistically, such target syllables are generally either one or two syllables away from the sponsor. Analogous to bounded tone shift is bounded tone spread. In spreading, the tone does not delink from the sponsoring syllable.

Saghala (Patin, 2009), spoken in southeast Kenya, shows both bounded tone shift and spread. Example forms are shown in (1). Syllables that are underlyingly specified for high tone are underlined, and surface high tones are marked with an acute accent.

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|-----|----|------|--------|-------------------|
| (1) | a. | ∅ | nɔ̃ɔvu | ‘elephant(s)’ |
| | b. | ĩzĩ | nɔ̃ɔvu | ‘that elephant’ |
| | c. | ĩlya | nɔ̃ɔvú | ‘these elephants’ |

(1a) shows that in isolation, the noun [nɔ̃ɔvu] is toneless. In (1b) and (1c), tone is contributed by a determiner. Because the two determiner phrases differ in their surface tonal pattern, H tone must be linked to different parts of the two determiners underlyingly: word-initial in (1b), and word-final in (1c). The generalization for Saghala is then: tone surfaces on the two syllables following the sponsor syllable.

This presentation focuses on a metrical, serial OT analysis of Saghala. First, the following section will motivate the analytical approach. Then, a sample derivation is presented.

The metrical foot as a bounding domain

A recurrent question in analyzing bounded tone shift and spread is how to derive the bounded nature of the processes. Research since the 1980s has sought to employ metrical feet as a bounding domain; if tone must stay contained within a foot, it follows that it can only shift a limited number of syllables (see Sietsema, 1989, for an overview). However, later works on bounded tonology (Bickmore, 1996; Odden, 2001; Patin, 2009) refrained from using a metrical approach. Bickmore (1996) cites a.o. the ternary nature (i.e. two-syllable distance) of some tonal processes as a problem for metrical accounts.

In recent years, the concept of the metrical foot has gained flexibility: there are proposals for layered, ternary feet (Martínez-Paricio, 2013; Martínez-Paricio and Kager, 2014) as well as for a general organizing role for feet in various tonal processes (De Lacy, 2002; Pearce, 2006; Weidman and Rose, 2006; Shimoji, 2009). This warrants a renewed investigation of the role of metrical structure in bounded tonal shift and spread.

Recent work on bounded tone processes still often couches its analysis in a rule-based framework, rather than in an Optimality Theoretic context. This is because the derivational nature of rule-based theory is better suited for tone shift than the parallel nature of standard OT. However, Harmonic Serialism (HS, McCarthy, 2010) unites the OT principle of constraint interaction with the seriality present in earlier frameworks. Consequently, it should be explored whether HS can account for bounded tonal processes.

This presentation aims to contribute to the above challenges with the following results:

- The bounded nature of Saghala tonology is accounted for with ternary feet
- Tone shift is derived using Harmonic Serialism

Saghala sample derivation

The combined domain of Saghala shift and spread spans three syllables. It is proposed here that this domain coincides with the edges of a ternary foot. Following Martínez-Paricio and Kager (2014), this foot is layered, consisting of a binary foot head and a satellite syllable. For example, the metrical structure for (1c) is shown below in (2). The inner and outer foot are referred to as minimal foot (MinFt) and non-minimal foot (NonMinFt).

(2) $i((\underline{ly}a \ nJó)_{\text{MinFt}} \ vÚ)_{\text{NonMinFt}}$

The derivation will cover a schematized version of (1c), where the grammar maps /oóoo/ to [ooóó]. This is the default pattern in Saghala. Four deviating patterns also exist, involving word boundaries and tonal contact. While the full analysis can account for these facts, the present account is simplified for reasons of space.

In HS, GEN is defined as a set of operations that may be applied to change the input form. For the present analysis, these operations are tone spreading, tone delinking, foot placement and foot expansion. Furthermore, the following markedness constraints are used in the derivation:

Name	Effect	Definition
LICENSE-H	Foot creation	* for each H not associated to a footed syllable
CHAIN-L(σ_ω)	Foot directionality	* for each unparsed syllable not in a chain from [PrWd.
ALIGN-R(H,MINFT)	Tonal spreading	* for each H not associated to a Ft _{Min} -final syllable
ALIGN-R(H,NONMINFT)	Tonal spreading	* for each H not associated to a Ft _{NonMin} -final syllable.
*ALIGN-L(MINFT,H)	Tonal delinking	* for each H associated to a Ft _{Min} -initial syllable.

The tableaux below show the six steps of the process. For reasons of space, the derivation shows only the deciding constraints at each step, and constraint names have been abbreviated.

1. Foot construction.

oóoo	LICENSE-H	CHAIN
a. oóoo	*!	
b. o(óo)o		*
c. (oó)oo		**!

2. Rightward foot expansion.

o(óo)o	CHAIN	A-R(H,MINFT)
a. o(óo)o	*!	*
b. o((óo)o)		*
c. (o(óo))o	*!	*
d. o(óó)o	*!	

3. Tone spreading to the right edge of FtMin.

o((óo)o)	A-R(H,MINFT)
a. o((óo)o)	*!
b. o((óó)o)	

4. Tone spreading to the right edge of FtNonMin.

o((óó)o)	A-R(H,NMFT)	*A-L(MINFT,H)
a. o((óó)o)	*!	*
b. o((óó)ó)		*
c. o((oó)o)	*!	

5. Tone delinking from the left edge of FtMin.

o((óó)ó)	*A-L(MINFT,H)
a. o((óó)ó)	*!
b. o((oó)ó)	

6. Further delinking is suboptimal; termination with output [ooóó].

o((oó)ó)	A-R(H,MINFT)
a. o((oó)ó)	
b. o((oo)ó)	*!

The above derivation has correctly produced the Saghala pattern: an underlying high tone associated to a single sponsor syllable has surfaced on the two syllables to the right of the sponsor, and delinked from the sponsor itself.

Conclusion

This presentation has used cutting-edge insights in phonological theory to offer a metrical, serial OT analysis of Saghala tonology. Future work will take a crosslinguistic perspective on tone shift and spread to further support the present contention that metrical structure in a serial OT context is sufficient to account for bounded tone phenomena.

Selected References

- Bickmore, Lee, 1996. Bantu tone spreading and displacement as alignment and minimal misalignment.
- Martínez-Paricio, Violeta and Kager, René, 2014. Non-intervention constraints and the binary-to-ternary rhythmic continuum. Unpublished manuscript, Norwegian University of Science and Technology & Utrecht University.
- McCarthy, John J, 2010. An introduction to Harmonic Serialism. *Language and Linguistics Compass*, 4(10): 1001-1018.
- Patin, Cédric, 2009. Tone shift and tone spread in the Saghala noun phrase. *Faits de langues*, (1).