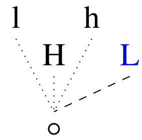
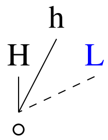
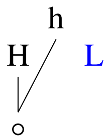
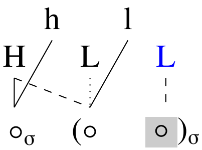
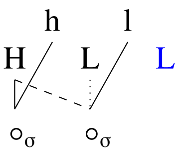
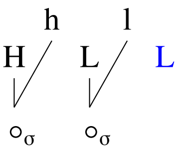
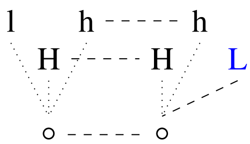
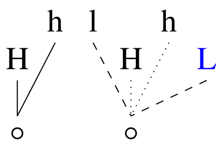
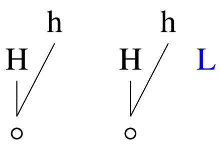
An Infection Analysis of Across-the-Board Lowering in Jumjum

Summary: Utterance-final lowering of H-tones in Jumjum (Western Nilotic) instantiates a case of fully productive opaque rule interaction which challenges standard approaches to morphosyntactically conditioned across-the-board spreading (Akinlabi 1996, Finley 2009) and to opacity in Optimality Theory (Benua 1997, McCarthy 2005, Bermúdez-Otero 2011). In this talk, I propose a strictly parallel analysis in Containment Theory (Zimmermann and Trommer 2014) under the tonal feature geometry of Snider (1999) where a floating L-melody tone 'infects' a High-tone stretch that simultaneously undergoes coalescence. **Data:** Utterance-final H-tones in Jumjum become phonetically L (/d̪̺ìŋ:ʌ́/ → [d̪̺ìŋ:ʌ̀]% 'pestle', all data from Andersen 2004) a process which applies unboundedly across word boundaries, and even affects utterance-initial syllables (/lɛ́ŋ ʊ́l-áŋ/ → [lɛ̀ŋ ʊ̀làŋ]% axe:SG be:black-3SG 'The axe is black'). While lowering is plausibly due to a final boundary tone, *leftward* spreading of L-tones is not only unattested elsewhere in the language but also the converse of an otherwise exceptionless phrasal *rightward* spreading of H-tones (introducing downsteps) to adjacent L-tone syllables (/ʔìkɛ̀ kʌ̀t-t-ʌ́ dì:k já:-k-ɔ́/ → [ʔìkɛ̀ kʌ̀ttʌ́ ↓dí:k jà:kɔ̀]% 3SG steal-AP-PST-3 goat:PL PRO-PL-1PL 'He stole our goats'). Moreover, H-spreading blocks lowering of H-tones if the utterance-final tone is L, resulting in a final falling tone (/wílll̀ʌ/ → [wíl↓lʌ̂]% 'guests') showing that Final Lowering can also not be captured as simple deletion of utterance-final Hs. Assuming spreading can be avoided if lowering is taken to be literal lowering of an across-the board H-tone fused by the OCP (Myers 1997), but this introduces a case of postsyntactic opacity (lowering counterbleeds H-tone fusion) problematic for standard approaches to opacity such as paradigmatic (Benua 1997, McCarthy 2005) and stratal models (Kiparsky 2000, Bermúdez-Otero 2011). **Analysis:** I assume the feature-geometric representation of tone in Snider (1999) where L = (register) l + (melody) L, H = (register) h + (melody) H, ↓H = (register) l + (melody) H, with register and melody tones associated to tonal root nodes ('∘'). Independent evidence for this representation in Jumjum comes from the location of downstep derived by H-spreading which along the lines of Hyman (1985) can be captured as spreading of a melody H (not of a full H-tone) from a high tone (H+h) to a low (L+l) root node resulting in downstep *on* the original L-tone where the standard floating L-approach to downstep (Pulleyblank 1986, Paster and Kim 2011) would predict downstep on the following syllable ($H_\sigma+L_\sigma+H_\sigma \rightarrow H_\sigma+H_\sigma+\textcircled{L}+H_\sigma \approx *H_\sigma+H_\sigma+{}^{\downarrow}H_\sigma$). Similarly, the utterance-final boundary tone is a floating L melody (without tonal root node and register feature) which due to the constraint L → ∘ ('Every L-melody must be associated to some tonal root node') associates to the root node of the utterance-final tone, as shown in (1). *L∘{h,H} states the surface incompatibility of L melody and l register with melodic H on the same root node which are consequently deassociated (indicated by dotted association lines). (2) shows the interaction with H-spreading triggered by H▷ which demands spreading of lexical H-tones. In this case, the boundary L is realized via insertion of an epenthetic tonal root node resulting in a falling tone. Across-the-board lowering is achieved by the interaction of H-tone coalescence (implemented by lateral association of tonal nodes on the same tier) triggered by OCP_H. Since nodes linked under the lateral theory of coalescence (Trommer 2016) count as a single node for constraint evaluation, associating the floating boundary L to the final tonal root node enforces lowering (deassociation of melody H and register h) for all left-adjacent H-tones capturing thus the counterbleeding of H-tone fusion by lowering. **Further Consequences:** Finally, I show that the infection analysis extends to other classical cases of across-the-board lowering/raising such as Edoid associative raising (Akinlabi 1996) providing a more principled alternative to multiple morphologically indexed alignment constraints whose justification outside of tonal phonology is problematic, and to question lowering in Igbo, which has been one of the classical arguments for otherwise unmotivated postlexical strata (Clark 1990).

(1) **Input:** = c.	L ↓ ○	OCP_H	*L○{h,H}	H▷	Dep ○	Faith
☞ a. 						****
b. 			*!*			*
c. 	*!					

(2) **Input:** = c.	L ↓ ○	*L○{h,H}	OCP_H	H▷	Dep ○	Faith
☞ a. 					*	****
b. 	*!					*
c. 	*!			*		

(3) **Input:** = c.	L ↓ ○	OCP_H	*L○{h,H}	H▷	Dep ○	Faith
☞ a. 						**** ****
b. 		*!		*		*
c. 	*!	*!		*		

References

Akinlabi, A. (1996). Featural affixation. *Journal of Linguistics*, 32:239–289.

Andersen, T. (2004). Jumjum phonology. *Studies in African Linguistics*, 33:133–162.

Benua, L. (1997). *Transderivational Identity: Phonological Relations between Words*. PhD thesis, University of Massachusetts, Amherst.

Bermúdez-Otero, R. (2011). Cyclicity. In van Oostendorp, M., Ewen, C. J., Hume, E., and Rice, K., editors, *The Blackwell Companion to Phonology*, volume 4: Phonological Interfaces, chapter 85, pages 2019–2048. Wiley-Blackwell, Malden MA.

Clark, M. M. (1990). *The tonal system of Igbo*. Foris, Dordrecht.

Finley, S. (2009). Morphemic harmony as featural correspondence. *Lingua*, 119(3):478–501.

Hyman, L. M. (1985). Word domains and downstep in Bamileke-Dschang. *Phonology Yearbook*, 2:47–83.

Kiparsky, P. (2000). Opacity and cyclicity. *The Linguistic Review*, 17:351–67.

McCarthy, J. (2005). Optimal paradigms. In Downing, L., Hall, T. A., and Raffelsiefen, R., editors, *Paradigms in phonological theory*, pages 170–210. Oxford: Oxford University Press.

Myers, S. (1997). OCP effects in Optimality Theory. *Natural Language and Linguistic Theory*, 15(4):847–892.

Paster, M. and Kim, Y. (2011). Downstep in Tiriki. *Linguistic Discovery*, 9(1):71–104.

Pulleyblank, D. (1986). *Tone in Lexical Phonology*. Reidel, Dordrecht.

Snider, K. L. (1999). *The Geometry and Features of Tone*. The Summer Institute of Linguistics and The University of Texas at Arlington, Dallas.

Zimmermann, E. and Trommer, J. (2014). Generalized mora affixation and quantity-manipulating morphology. *Phonology*, 31:463–510.