

Vowel Harmony in Lango: Noniterativity and Licensing

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1 Iterativity

- As part of the vowel harmony system in Lango (Nilotic; Uganda), [+ATR] spreads from suffixes to root-final syllables (Wooock and Noonan 1979, Noonan 1992, Smolensky 2006):

- (1)
- | | | | |
|----|--------------|-----------|--------------|
| a. | /bòŋó + ní/ | → bòŋóní | ‘your dress’ |
| b. | /còŋò + ní/ | → còŋòní | ‘your beer’ |
| c. | /àmók + ní/ | → àmúkí | ‘your shoe’ |
| d. | /dàktàl + ê/ | → dàktàlê | ‘doctors’ |
| e. | /mòtòkà + ê/ | → mòtòkàê | ‘cars’ |

- Cf. Kinande, e.g., where [\pm ATR] spreads regressively from roots to the beginning of the word (*a* is transparent; Archangeli and Pulleyblank 1994, Cole and Kisseberth 1994):

- (2)
- | | | | |
|----|------------------|--------------|---------------------|
| a. | /tU-ka-kI-lim-a/ | → tukakilima | ‘we exterminate it’ |
| | /tU-ka-kI-huk-a/ | → tukakihuka | ‘we cook it’ |
| b. | /tU-ka-kI-lim-a/ | → tɔkakilima | ‘we cultivate it’ |
| | /E-rI-hum-a/ | → ɛrɪhuma | ‘to beat’ |

- The Lango data look like a noniterative version of Kinande’s harmony.
- Many rule-based theories (e.g. Jensen and Strong-Jensen 1976, Archangeli and Pulleyblank 1994): By turning an iterativity parameter off, analyses for whole-word processes can be used for shorter processes.

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(3)
$$\begin{array}{c} V \dots V \\ \swarrow \downarrow \\ [+ATR] \end{array} \quad \text{Iterativity Parameter: } \left\{ \begin{array}{l} \text{ON (Kinande)} \\ \text{OFF (Lango)} \end{array} \right\}$$

- But Lango presents two difficulties for Optimality Theory (OT; Prince and Smolensky 1993[2004]):

I. “Sour grapes”: Typical constraints driving whole-word processes are unsuited for less comprehensive processes (Padgett 1995, McCarthy 2003, 2004):

- AGREE (Lombardi 1999, Baković 2000)
- ALIGN (McCarthy and Prince 1993, Kirchner 1993, Cole and Kisseberth 1995, Pulleyblank 1996)
- SPREAD (Padgett 1997, Walker 2000), etc.

- Wholly different analyses for Lango and Kinande are needed: the similarities are lost.

II. If Lango is truly noniterative—i.e. spreading [+ATR] leftward by exactly one vowel—OT can’t account for it.

(4) *Noniterative spreading:*

- $/b\grave{o}\eta\acute{o} + n\acute{i}/ \rightarrow b\grave{o}\eta\acute{o}n\acute{i}$ ‘your dress’
- $/b\grave{o}\eta\acute{o} + n\acute{i}/ \rightarrow b\grave{o}\eta\acute{o}n\acute{i}$ (hypothetical)

- The markedness constraint driving harmony must see the input to determine which output form is correct, but only faithfulness constraints have access to the input.

⇒ What does it mean to be noniterative? Is it problematic that OT can’t formalize the notion of doing a process exactly once?

- OT is correct: Lango and Kinande are fundamentally different; Lango isn’t actually noniterative.

- Lango: (1) is best analyzed as a product of Positional Licensing (Steriade 1994a,b, Zoll 1998a,b, Itô and Mester 1999, Crosswhite 2000), not standard harmony drivers.

- Cf. Walker (2004): The harmonizing feature in Tदानca Spanish is attracted to stress.

- Structure of talk:

- The facts of Lango’s harmony
- Positional Licensing
- Alternatives: Positional Faithfulness, LOCAL

2 ATR Harmony in Lango

- [+ATR] vowels: *i, e, u, o, ə* Their [-ATR] correspondents: *ɪ, ɛ, ʊ, ɔ, a*

- Smolensky (2006) is followed here; see Noonan (1992) for a different characterization of the same facts. Noonan’s approach is also consistent with the Positional Licensing analysis developed below.

- ATR spreads from roots to suffixes (prefixes don’t harmonize):

(5) *Harmony with /-Ca/ ‘1sg inalienable’*

- a. /òpúk + Cá/ → òpúkkó ‘my cat’ (cf. *dèkká* ‘my stew’)
 b. /píg + Cá/ → píggó ‘my juice’ (cf. *òttá* ‘my house’)

(6) *Harmony with /-Co/ ‘infinitive’*

- a. /lwək + Co/ → lwəkkə ‘to wash’ (cf. *riŋŋo* ‘to run’)
 b. /lɔb + Co/ → lɔbbə ‘to follow’ (cf. *ketto* ‘to put’)

- Certain phonotactic conditions block harmony (see Appendix and Smolensky 2006):

- (7) a. /twəl + ná/ → twəllá ‘my snake’
 b. /dèk + wú/ → dèkwú ‘your (pl) stew’
 c. /lɪm + Co/ → lɪmmo ‘to visit’
 d. /gwèn + ná/ → gwènná ‘my chicken’

- [+ATR] can spread regressively:

(8) *Harmony with /-ni/ ‘2sg possessive,’ /-wú/ ‘2pl possessive’*

- a. /kóm + ní/ → kòmí ‘your chair’
 b. /dèk + ní/ → dèkkí ‘your stew’
 c. /ɲìŋ + wú/ → ɲìŋwú ‘your (pl) name’

- But [+ATR] only targets the root-final vowel:

- (9) a. /bòŋó + ní/ → bòŋóní ‘your dress’ (**bòŋóní*)
 b. /còŋò + ní/ → còŋòní ‘your beer’ (**còŋòní*)
 c. /àmúk + ní/ → àmúkkí ‘your shoe’ (**àmúkkí*)
 d. /dàktəl + ê/ → dàktələ ‘doctors’ (**dàktələ*)
 e. /mòtəkà + ê/ → mòtəkê ‘cars’ (**mòtəkê*)

- Noniterativity is epiphenomenal: It results from a Positional Licensing constraint that interacts with Faithfulness constraints to produce assimilation that does minimal violence to the input.

- Root-affix harmony creates disharmonic roots (9). Whatever drives assimilation can’t encourage generic harmony.


3 Positional Licensing

- Smolensky (2006) accounts for the direction and possibility of harmony, but not the noniterativity.
- Harmony is driven by AGREE (10).

(10) AGREE($[\pm\text{ATR}]$): Vowels in adjacent syllables must have the same value for $[\pm\text{ATR}]$. (Smolensky 2006)

- Six other constraints block harmony and derive progressive/regressive harmony as appropriate; see Appendix.
 - In Tableaux below, PROGRESSIVE HARMONY and REGRESSIVE HARMONY stand in for these constraints.
- AGREE, etc., can't account for (9):

(11)

	/bòŋó + ní/	AGREE	IDENT($[\pm\text{ATR}]$)
()	a. bònóní	*!	*
()	b. bònóní		**
	c. bònóní	*!	

- No iterativity parameters in the OT constraints and no obvious way to modify AGREE.
- Despite similarities, typical harmony and Lango have fundamentally different motivations.
- The iterativity parameter common among rule-based theories is misguided.
- After assimilation, the suffix vowel shares its ATR feature with some root segment.

⇒ Roots are “prominent positions which license more contrasts than other non-prominent positions” (Urbanczyk 2006:194; see also Steriade 1995, Beckman 1999).

(12) LICENSE-[ATR]: $[\pm\text{ATR}]$ features must be linked to root segments. (cf. Zoll 1998b, Crosswhite 2000; see also Walker 2004)

- I.e., a contrast based on $[\pm\text{ATR}]$ is only permitted in roots.
- Spreading in either direction can be sufficient.

(13)

	/bòŋó + ní/	REGHARM	LIC-[ATR]	IDENT([±ATR])
	a. b̀òŋóní		*!	
☞	b. b̀òŋóní			*
	c. b̀òŋóní			**!
	d. b̀òŋóní	*!		*

- A noniterative rule works just as well for this form.
- Polysyllabic suffixes:
 - Noniterative rule: Only first suffix vowel should harmonize.
 - Licensing: All suffix vowels must harmonize in order to be licensed.

- (14)
- | | | | |
|----|---------------|------------|------------------------|
| a. | /cèg + éré/ | → cègéré | ‘to be closed’ |
| b. | /cul + méré/ | → cullere | ‘penis (3sg alien)’ |
| c. | /kùl + méré/ | → kùlléré | ‘wart hog (3sg alien)’ |
| d. | /gwòk + méré/ | → gwòkkéré | ‘dog (3sg alien)’ |

- This is consistent with Licensing, but not a noniterative rule.
- Also: harmony isn’t foot-bound. (Plus, stress is roughly root initial.)

(15)

	/cèg + éré/	PROGHARM	LIC-[ATR]	IDENT([±ATR])
	a. cègéré		*!(*)	
	b. cègéré		*!	*
☞	c. cègéré			**
	d. cègéré	*!		*

- Assimilation in Lango isn’t simply noniterative spreading. It’s spreading with a purpose, and the Licensing requirement is typically met after one “iteration” of spreading.

Benefactive Verbs

- (16) seems to show purely noniterative spreading: [+ATR] appears one vowel to the left of its input host.
- Sometimes the root assimilates ((16-a), (16-b)), or just the first suffix ((16-c), (16-d)).

- (16)
- | | | | |
|----|-----------------|-----------------|-----------------------------|
| a. | /ò-wìll-ì-í/ | → ò-wìll-í | ‘he bought it for you (sg)’ |
| b. | /ò-wìll-ì-ú/ | → ò-wìll-ú | ‘he bought it for you (pl)’ |
| c. | /ò-wìll-ì-wùnú/ | → ò-wìll-ì-wùnú | ‘he bought it for you (pl)’ |
| d. | /ò-wìll-ì-wú/ | → ò-wìll-ì-wú | ‘he bought it for you (pl)’ |

- The benefactive suffix /-ì/ doesn't harmonize with the root (Noonan 1992):

- (17) a. ò-kèll-ì 'she brought it to' (*ò-kèll-ì)
 b. ò-tèdd-ì 'she cooked it for' (*ò-tèdd-ì)

- This is a morphological restriction, not a phonological one: Cf. (16-a), which shows that *i*, *ɪ* do participate in harmony.

- (18) ALIGN-L: The left edge of the benefactive suffix is aligned with the left edge of an ATR domain.

- When followed by a vowel-initial suffix, the benefactive suffix deletes: (16-a), (16-b), (19-a), (19-b).

- (19) a. /ò-wìll-ì-á/ → ò-wìll-á 'he bought it for me'
 b. /ò-wìll-ì-é/ → ò-wìll-é 'he bought it for him/her'

- In these cases, [+ATR] may spread from the second suffix to the root ((16-a), (16-b)): There's no benefactive suffix to stop this.

- When the benefactive suffix remains ((16-c), (16-d)), ALIGN blocks spreading to the root.

- Why spread at all in (16-c), (16-d)?

⇒ If all suffix vowels share an ATR feature, Licensing violations are minimized, even though Licensing can't be fully satisfied.



4 Alternatives

- Positional Faithfulness (Beckman 1999) can block assimilation of initial Vs:

- (20) IDENT[ATR]-[σ: Corresponding segments in root-initial syllables have identical values for [±ATR].

- Now monosyllabic roots can't be produced:

(21)

/pí + wú/ 'for you'	IDENT[ATR]-[σ	REGHARM	AGREE
 a. píwú			*
 b. píwú	*!		
c. píwú		*!	

- Positional Faithfulness predicts *màtòkàê, not mətòkàê 'cars' (9-e).

- Noniterative tone spread/shift is common in tone.
 - LOCAL (Myers 1997) limits tone shift to one syllable:
- (22) LOCAL: “If an input tone T has an output correspondent T', some edge of T must correspond to the edge of T'.”
- But one edge of ATR's domain is the same in the input and output, regardless of the extent of spreading.
 - Another version of LOCAL (Yip 2002):
- (23) LOCAL: “An output tone cannot be linked to a TBU that is not adjacent to its [input] host.”
- I.e., ATR spreading by one vowel in either direction is fine.
 - This fails with polysyllabic suffixes (14), e.g. *cègéré* ‘to be closed’: spreading by two syllables.
 - Only Licensing permits flexibility in the size of the harmonizing domain.
 - Positional Faithfulness and LOCAL too rigidly impose size requirements.

5 Conclusion

- Lango [\pm ATR] harmony holds between root-final and suffix vowels.
- A standard harmony rule turned noniterative seems appealing.
- A Licensing account within OT is superior.
- AGREE, ALIGN, etc., may drive standard cases of harmony, but a separate analysis is required for Lango: these phenomena have distinct motivations.
- Iterative and noniterative phenomena are not two sides of the same coin. They have different motivations and different analyses.
- In fact, noniterativity is epiphenomenal: it isn't mentioned explicitly in the Licensing analysis.
- Other apparently noniterative phenomena (e.g. umlaut, metaphony) may have other driving or limiting factors such as attraction to prominence. (McCormick 1981, Chung 1983, Flemming 1994, Walker 2004, Kaplan 2006)

References

- Archangeli, Diana & Douglas Pulleyblank (1994) *Grounded Phonology*. Cambridge, MA: MIT Press.
- Baković, Eric (2000) *Harmony, Dominance, and Control*. Ph.D. thesis, Rutgers University.
- Beckman, Jill N. (1999) *Positional Faithfulness*. London and New York: Routledge.
- Chung, Sandra (1983) Transderivational Relationships in Chamorro Phonology. *Language* **59**: 35–66.
- Cole, Jennifer & Charles Kisseberth (1994) An Optimal Domains Theory of Harmony. *Studies in the Linguistic Sciences* **24**(2): 101–114.
- Cole, Jennifer S. & Charles Kisseberth (1995) Nasal Harmony in Optimal Domains Theory, ROA-49 <http://roa.rutgers.edu>.
- Crosswhite, Katherine M. (2000) Length Neutralization and Vowel Lengthening in Orlec Čakavian. In *Formal Approaches to Slavic Linguistics #8: The Philadelphia Meeting*, Tracy Holloway King & Irina A. Sekerina, eds., vol. 45 of *Michigan Slavic Materials*, Ann Arbor: Michigan Slavic Publications.
- Flemming, Edward S. (1994) The Role of Metrical Structure in Segmental Rules. In *Proceedings of NELS 24*, vol. 1, Amherst, MA: GLSA.
- Itô, Junko & Armin Mester (1999) Realignment. In *The Prosody-Morphology Interface*, René Kager, Harry van der Hulst, & Wim Zonneveld, eds., 188–217, Cambridge, U.K.: Cambridge University Press.
- Jensen, John T. & Margaret Strong-Jensen (1976) Ordering and Directionality of Iterative Rules. vol. 100 of *Janua Linguarum*, 104–121, Conference on Rule Ordering, The Hague: Mouton.
- Kaplan, Aaron F. (2006) The Nature of Iterativity: Evidence from Lango, ms., University of California, Santa Cruz.
- Kirchner, Robert (1993) Turkish Vowel Harmony and Disharmony: An Optimality Theoretic Account, ROA-4 <http://roa.rutgers.edu>.
- Lombardi, Linda (1999) Positional Faithfulness and Voicing Assimilation in Optimality Theory. *Natural Language and Linguistic Theory* **17**(2): 267–302.
- McCarthy, John & Alan Prince (1993) Generalized Alignment. In *Yearbook of Morphology*, 79–153.
- McCarthy, John J. (2003) OT Constraints are Categorical. *Phonology* **20**(1): 75–138.

- McCarthy, John J. (2004) Headed Spans and Autosegmental Spreading, ROA-685
<http://roa.rutgers.edu>.
- McCormick, Susan (1981) A Metrical Analysis of Umlaut. *Cornell Working Papers in Linguistics* **2**: 126–137.
- Myers, Scott (1997) OCP Effects in Optimality Theory. *Natural Language and Linguistic Theory* **15**: 847–892.
- Noonan, Michael (1992) *A Grammar of Lango*. Berlin, New York: Mouton de Gruyter.
- Padgett, Jaye (1995) Feature Classes. In *University of Massachusetts Occasional Papers in Linguistics*, Suzanne Urbanczyk Jill Beckman & Laura Walsh, eds., vol. 18, 385–420, Amherst: GLSA.
- Padgett, Jaye (1997) Partial Class Behavior and Nasal Place Assimilation. In *Proceedings of the 1995 Southwestern Workshop Optimality Theory*, Keiichiro Suzuki & Dirk Elzinga, eds., 145–183, Tucson, AZ: The University of Coyote Papers.
- Prince, Alan & Paul Smolensky (1993[2004]) Optimality Theory: Constraint Interaction in Generative Grammar, ms., Rutgers University, New Brunswick and University of Colorado, Boulder. Published in 2004 by Blackwell Publishers.
- Pulleyblank, Douglas (1996) Neutral Vowels in Optimality Theory: A Comparison of Yoruba and Wolof. *Canadian Journal of Linguistics* **41**: 295–347.
- Smolensky, Paul (2006) Optimality in Phonology II: Harmonic Completeness, Local Constraint Conjunction, and Feature Domain Markedness. In *The Harmonic Mind: From Neural Computation to Optimality-Theoretic Grammar*, Paul Smolensky & Géraldine Legendre, eds., vol. 2, chap. 14, 27–160, Cambridge, MA and London: The MIT Press.
- Steriade, Donca (1994a) Licensing by Cue, Ms, UCLA.
- Steriade, Donca (1994b) Positional Neutralization and the Expression of Contrast, Ms, UCLA.
- Steriade, Donca (1995) Underspecification and Markedness. In *Handbook of Phonological Theory*, John Goldsmith, ed., 114–174, Oxford: Blackwell.
- Urbanczyk, Suzanne (2006) Reduplicative Form and the Root-Affix Asymmetry. *Natural Language and Linguistic Theory* **24**(1): 179–240.
- Walker, Rachel (2000) *Nasalization, Neutral Segments, and Opacity Effects*. New York: Garland.

- Walker, Rachel (2004) Vowel Feature Licensing at a Distance: Evidence from Northern Spanish Language Varieties. In *Proceedings of the 23rd West Coast Conference on Formal Linguistics*, Benjamin Schmeiser, Vineeta Chand, Ann Kelleher, & Angelo J. Rodriguez, eds., 787–800, Somerville, MA: Cascadilla Press.
- Wooock, Edith Bavin & Michael Noonan (1979) Vowel Harmony in Lango. In *Papers from the 15th Annual Regional Meeting of the Chicago Linguistic Society*, Paul R. Clyne, William F. Hanks, & Carol L. Hofbauer, eds., Chicago: Chicago Linguistic Society.
- Yip, Moira (2002) *Tone*. Cambridge: Cambridge University Press.
- Zoll, Cheryl (1998a) *Parsing below the Segment in a Constraint-Based Framework*. Stanford, CA: CLSI Publications.
- Zoll, Cheryl (1998b) Positional Asymmetries and Licensing, Ms., MIT ROA-282 <http://roa.rutgers.edu>.

Appendix

Summary of Constraints in Smolensky (2006); see original for formalizations.

$\left. \begin{array}{l} \mathbb{C}_1 : \text{ No [+ATR] spread from [-hi] source in closed } \sigma. \\ \mathbb{C}_2 : \text{ No regressive [+ATR] spread from a [-hi] source.} \\ \mathbb{C}_3 : \text{ No regressive [+ATR] spread from a [-front] V} \\ \quad \text{ onto a [-hi] V in a closed } \sigma. \end{array} \right\} \text{ regulate [+ATR] spread}$

$\left. \begin{array}{l} \mathbb{C}_X : \text{ No regressive [-ATR] spread.} \\ \mathbb{C}_Y : \text{ No [-ATR] spread from a [+fr] vowel.} \\ \mathbb{C}_Z : \text{ *[-ATR, +hi]} \end{array} \right\} \text{ regulate [-ATR] spread}$

- Ranking: $\mathbb{C}_1, \mathbb{C}_2, \mathbb{C}_3, \mathbb{C}_X, \mathbb{C}_Y, \mathbb{C}_Z \gg \text{AGREE}$
- ◊ [+ATR]-spreading candidates win if they don't violate $\mathbb{C}_1, \mathbb{C}_2, \mathbb{C}_3$.
- ◊ [-ATR]-spreading candidates win if they don't violate $\mathbb{C}_X, \mathbb{C}_Y, \mathbb{C}_Z$.
- ◊ Harmony is blocked if no harmonic candidate survives these constraints.
- Example Tableaux:

(24) *[+ATR] Spreading*

/pí + wú 'for you'/'	\mathbb{C}_1	\mathbb{C}_2	\mathbb{C}_3	\mathbb{C}_X	\mathbb{C}_Y	\mathbb{C}_Z	AGREE	IDENT([±ATR])
a. píwú							*!	
☞ b. píwú								*
c. píwó						*!	*!*	*

(25) *[-ATR] Spreading*

/lwək + Co 'to wash'/'	\mathbb{C}_1	\mathbb{C}_2	\mathbb{C}_3	\mathbb{C}_X	\mathbb{C}_Y	\mathbb{C}_Z	AGREE	IDENT([±ATR])
a. lwəkko							*!	
b. lwokko		*!	*!					*
☞ c. lwəkko								*

(26) *No Spreading*

/dèk + wú 'your (pl) stew'/'	\mathbb{C}_1	\mathbb{C}_2	\mathbb{C}_3	\mathbb{C}_X	\mathbb{C}_Y	\mathbb{C}_Z	AGREE	IDENT([±ATR])
☞ a. dèkwú							*	
b. dèkwú			*!					*
c. dèkwó						*!	*!	*