

## Licensing and Noniterative Harmony in Lango\*

Aaron F. Kaplan

University of California, Santa Cruz

### 1. Introduction

In Lango, a Nilotic language spoken in Uganda, [+ATR] can spread from suffixes to root-final syllables (Woock & Noonan 1979, Noonan 1992, Smolensky 2006; tones are omitted and [ə] is [+ATR]):

- (1)
- |    |              |           |              |
|----|--------------|-----------|--------------|
| a. | /bɔŋɔ + ni/  | → bɔŋoni  | ‘your dress’ |
| b. | /cɔŋɔ + ni/  | → cɔŋoni  | ‘your beer’  |
| c. | /amɔk + ni/  | → amukki  | ‘your shoe’  |
| d. | /daktal + e/ | → daktələ | ‘doctors’    |
| e. | /mɔtɔka + e/ | → mɔtɔkə  | ‘cars’       |

Compare this to, for example, Kinande’s vowel harmony system in which ATR features spread rightward all the way to the beginning of the word (*a* is transparent; Archangeli & Pulleyblank 1994, Cole & Kisseberth 1994):

- (2)
- |                  |              |                   |
|------------------|--------------|-------------------|
| /tU-ka-kI-huk-a/ | → tukakihuka | ‘we cook it’      |
| /tU-ka-kI-lim-a/ | → tukakılma  | ‘we cultivate it’ |

The assimilation in (1) looks like a noniterative version of the spreading in (2). Rather than spreading all the way to the beginning of the word, [+ATR] in Lango spreads exactly once. The similarity between Lango and Kinande is easily captured in rule-based theories that include an iterativity parameter (e.g. Jensen & Strong-Jensen 1976, Archangeli & Pulleyblank 1994). We can adopt a rule that spreads ATR features from one vowel to another regressively and turn the iterativity parameter *on* for Kinande and *off* for Lango.

---

\* Thanks to the following people for many helpful suggestions throughout the development of this paper: Lev Blumenfeld, Abby Kaplan, Anya Lunden, Armin Mester, Jaye Padgett, David Teeple, and audiences at Santa Cruz, the Berkeley Phorum, NELS 37, TREND, and the 2007 meeting of the Linguistic Society of America.

In contrast, an Optimality Theoretic (OT; Prince & Smolensky 1993[2004]) approach to these languages cannot provide such a unified account. Typical vowel harmony-driving constraints such as ALIGN (McCarthy & Prince 1993), AGREE (Lombardi 1999, Baković 2000), and SPREAD (Padgett 1997, Walker 2000) cannot motivate less than comprehensive assimilation (Padgett 1995, McCarthy 2003, 2004). Lango requires a wholly different analysis, and the similarities between Lango and Kinande are lost. Consequently, OT predicts (correctly, as we will see) that these languages' assimilatory patterns are substantively different.

Moreover, if the assimilation in Lango is truly noniterative (meaning that [+ATR] spreads exactly one syllable to the left of its input host), standard Markedness constraints cannot drive it. In order to select *bɔŋoni* (1a) over *\*boŋoni*, the markedness constraint that motivates spreading must know that the input is /bɔŋo + ni/ so that it can tell which candidate has noniterative spreading. Likewise, *boŋoni* would have to be selected for the (hypothetical) input /bɔŋo + ni/, and again the markedness constraint must have access to the input to know that this previously suboptimal form is now optimal. But in standard OT, only Faithfulness constraints may see the input. Markedness constraints must evaluate output forms independently of inputs. (Faithfulness constraints obviously cannot drive the assimilation in (1) because the input-output mappings involve a decrease in faithfulness.)

Therefore, if an OT analysis of Lango is to be satisfactory, two things must be true: Lango's assimilation must be fundamentally different from typical vowel harmony, and it must not be strictly noniterative. This paper argues for these positions. The analysis of Lango presented below claims that the noniterativity seen in (1) is epiphenomenal. It is the result of a Positional Licensing constraint (Steriade 1994a,b, Zoll 1998a,b, Itô & Mester 1999, Crosswhite 2000), which motivates spreading to the root in much the way Walker (2004) uses Positional Licensing to produce attraction of certain features to the stressed syllable in Tudañca Spanish. Standard harmony-driving constraints are irrelevant, and the Licensing constraint conspires with Faithfulness constraints to produce minimal spreading.

## 2. ATR Assimilation in Lango

Lango has five [+ATR] vowels, *i, e, u, o, ə*, and each of these has a [-ATR] counterpart, *ɪ, ɛ, ʊ, ɔ, a*, respectively. I follow Smolensky's (2006) discussion of Lango here, and the analysis below builds on Smolensky's analysis, which is itself based on Archangeli & Pulleyblank (1994). Noonan's (1992) very different approach to these facts is equally compatible with the Positional Licensing approach pursued here.

Lango's assimilation<sup>1</sup> holds exclusively between roots and suffixes (prefixes are invariant) and has several aspects. First, either value of [ $\pm$ ATR] can spread from roots to suffixes:

---

<sup>1</sup> One argument in this paper is that Lango does not have a genuine vowel harmony system, so I use the more neutral term "assimilation." It should be noted, though, that Noonan (1992), Smolensky (2006), and Archangeli & Pulleyblank (1994) all treat Lango as possessing genuine vowel harmony.

### *Licensing and Noniterative Harmony in Lango*

- (3) *Harmony with /-Ca/ '1sg inalienable'*  
/opuk + Ca/ → opukkə 'my cat' (cf. dəkka 'my stew')  
/pig + Ca/ → piggə 'my juice' (cf. ɔtta 'my house')
- (4) *Harmony with /-Co/ 'infinitive'*  
/lwək + Co/ → lwəkkə 'to wash' (cf. riŋŋo 'to run')  
/lub + Co/ → lubbə 'to follow' (cf. ketto 'to put')

Certain phonotactic conditions block assimilation. Some examples are given in (5). Space limitations prevent a discussion of the blocking conditions; see especially Smolensky (2006) for a detailed analysis of these facts but also Noonan (1992).

- (5) /twol + na/ → twolla 'my snake'  
/dək + wu/ → dəkwu 'your (pl) stew'  
/lim + Co/ → limmo 'to visit'  
/gwen + na/ → gwenna 'my chicken'

Finally, as already shown in (1), [+ATR] (but not [-ATR]) can spread regressively from suffixes to roots. Further examples of this are given in (6). As (1) shows, when [+ATR] spreads regressively, it only targets the last root vowel. (1e), with a trisyllabic root, shows that this fact cannot be attributed to root-initial vowel preservation (see also Section 4.1).

- (6) *Harmony with /-ni/ '2sg possessive,' /-wu/ '2pl possessive'*  
/kəm + ni/ → kommi 'your chair'  
/dək + ni/ → dekki 'your stew'  
/ɲiŋ + wu/ → ɲiŋwu 'your (pl) name'

One indication that standard harmony drivers are inappropriate for Lango (in addition to the mechanical issue noted above) is that assimilation can create disharmonic roots, as seen in (1). All the inputs in (1) are arguably as harmonic as their outputs, especially from the point of view of root harmony. Whatever drives assimilation in Lango therefore cannot encourage generic vowel harmony (i.e. featural uniformity across the word).

### **3. Positional Licensing**

The analysis of Smolensky (2006) is the starting point for the Positional Licensing analysis, so I briefly summarize that analysis here. Smolensky's analysis derives the correct directionality and blocking effects and is not concerned with the noniterativity from (1). The AGREE constraint in (7) drives assimilation.

- (7) AGREE([±ATR]): Vowels in adjacent syllables must have the same value for [±ATR].

Six other constraints that outrank AGREE produce spreading in the correct direction and block spreading where appropriate. Three of these constraints prohibit [+ATR] spreading to and from certain vowels and syllabic configurations. The candidate with [-ATR] spreading wins when the [+ATR]-spreading candidate violates one or more of these constraints. The other three constraints block [-ATR] spreading to and from certain other vowels and syllabic configurations, and the [+ATR]-spreading candidate wins when the [-ATR]-spreading candidate violates one of these constraints. When both [+ATR] and [-ATR] are blocked from spreading, the disharmonic forms in (6) result. Space does not permit an elaboration of these constraints, so instead the cover constraints [+ATR]SPREAD and [-ATR]SPREAD are used in the Tableaux below to derive the correct directionality. See Smolensky (2006) for the formalizations of the constraints that [+ATR]SPREAD and [-ATR]SPREAD represent.

AGREE, however, cannot produce noniterative spreading. This is shown in (8). The intended winner, candidate (b), is harmonically bound by the fully faithful candidate (a). Both candidates are ruled out by AGREE, and candidate (c) wins because it fully satisfies AGREE.

(8)

	/bɔŋɔ + ni/	AGREE([±ATR])	Ident([±ATR])
	a. bɔŋɔni	*!	
(☞)	b. bɔŋɔni	*!	*
☛	c. bɔŋɔni		**

If the full range of facts are to be accounted for, AGREE must be replaced with a constraint that treats candidates (a) and (b) differently. In searching for a replacement constraint, it's worth considering the result of assimilation. In all the data presented so far, the result of assimilation is that the suffix vowel shares its ATR feature with some root vowel. I claim that this is in fact the goal of assimilation. Roots are “prominent positions which license more contrasts than other non-prominent positions” (Urbanczyk 2006:194; see also Steriade 1995, Beckman 1999). A suffix vowel's ATR feature is therefore more salient (i.e. more likely to be correctly perceived) if it is also carried by a root vowel. This is exactly the intuition captured by Positional Licensing: The feature [±ATR] is *licensed* on roots. The constraint in (9) formalizes this intuition (cf. Zoll 1998b, Crosswhite 2000, Walker 2004).

(9) LICENSE-[ATR]: [±ATR] features must be linked to root segments.

Of course, non-root vowels in a well-formed surface structure must be specified for [±ATR], but LICENSE-[ATR] does not penalize such specifications as long as they are shared by some root segment (much like Steriade's (1995) Indirect Licensing). Notice also that LICENSE-[ATR] is satisfied by spreading in either direction. It does not matter whether the root ATR feature or the suffix ATR feature survives in the output as long as the suffix vowel shares a specification with a root vowel. (LICENSE-[ATR] is also satisfied by deletion of suffix vowels since this would eliminate non-root sites for ATR features to be linked to. This means MAX or possibly REALIZE-MORPHEME (Kurusu 2001) must be highly ranked.)

*Licensing and Noniterative Harmony in Lango*

Once AGREE is replaced by LICENSE-[ATR], the noniterative spreading forms can be produced, as shown in (10). The crucial difference between (8) and (10) is that candidate (b) no longer violates the assimilation-driving constraint, which is now LICENSE. Candidate (a)—the fully faithful candidate—fatally violates LICENSE because the [+ATR] feature of suffix vowel is not shared by any root vowel. Candidate (d) incorrectly spreads [−ATR], and Smolensky’s (2006) blocking constraints (instantiated here as [+ATR]SPREAD) rule this out for this form. Candidates (b) and (c) both satisfy LICENSE because the suffix’s [+ATR] feature has spread to the root. The choice therefore falls to the lower-ranked IDENT, which selects the candidate with minimal spreading because this candidate is more faithful to the input.

(10)

	/bɔŋɔ + ni/	[+ATR]SPREAD	LICENSE-[ATR]	IDENT([±ATR])
a.	bɔŋɔni		*!	
b.	bɔŋɔni			*
c.	bɔŋɔni			**!
d.	bɔŋɔni	*!		*

Of course, a noniterative rule can also successfully produce this form and the other forms in (1). To distinguish the Licensing analysis from the rule-based analysis, we must look at other configurations. One place to look is polysyllabic suffixes. When progressive spreading occurs in a form with a polysyllabic suffix, the rule-based approach predicts that only the first suffix vowel should undergo assimilation: The rule is noniterative, so the ATR feature spreads exactly once, changing only the first suffix vowel. The Licensing analysis, on the other hand, predicts that spreading should reach all suffix vowels. Otherwise, there will be at least one suffix vowel whose ATR feature is not licensed.

The data in (11) show forms with two polysyllabic suffixes, the middle voice suffix (11a) and the third-person singular alienable possession suffix (11b–d). In all four cases, both suffix vowels harmonize. These data are consistent with the Licensing analysis but not with the rule-based approach. To save the latter, we could adopt a noniterative regressive spreading rule and an iterative progressive rule, but this would be a pyrrhic victory in that it would mean abandoning any hope of a unified analysis of Lango’s assimilation.

- (11)
- a. /ceg + εε/ → cegere ‘to be closed’
  - b. /cul + mεε/ → cullere ‘penis (3sg alien)’
  - c. /kul + mεε/ → kullere ‘wart hog (3sg alien)’
  - d. /gwok + mεε/ → gwokkere ‘dog (3sg alien)’

The Tableau in (12) confirms that the Licensing analysis handles these forms correctly. As candidate (b) shows, unless [+ATR] spreads to both suffix vowels, LICENSE will not be satisfied. Candidate (a) incurs one or two fatal violations of LICENSE, depending on whether

or not the suffix vowels share a single [-ATR] feature. Candidate (d) loses because Smolensky's (2006) constraints demand [+ATR] spreading in this case.

(12)

/ceg + εε/	[+ATR]SPREAD	LICENSE-[ATR]	IDENT([±ATR])
a. cegerε		*!(*)	
b. cegerε		*!	*
☞ c. cegerε			**
d. cegerε	*!		*

Another way to test the Licensing analysis is by looking at words with multiple suffixes. The only such words I am aware of are benefactive verbs. In these words, the root is followed by the benefactive suffix /-ɪ/, and this suffix is followed by a pronominal suffix. Some examples are given in (13). The morphemes in these forms are: /o-/ 'he,' /willo/ 'buy' (which loses the stem-vowel *o* when the benefactive suffix is added), /-ɪ/ 'benefactive,' /-a/ 'me,' /-i/ 'you (sg),' /ε/ 'him/her,' /-wa/ 'us,' /-wunu/, /-wu/, /-u/ 'you (pl),' /-gɪ/ 'them.'

In (13a–c,e), the benefactive suffix is deleted for hiatus resolution. Tones are included in (13b) to confirm that it is the low-toned benefactive suffix /-ɪ/ and not the high-toned second person singular object suffix /-i/ that is deleted. (The pattern of ATR features is further confirmation: The only underlyingly [+ATR] vowel in this form is the pronominal suffix, so the simplest explanation for the presence of [+ATR] in the surface form is that the benefactive suffix rather than the pronominal suffix was deleted.)

(13)

a.	/o-will-ɪ-a/	→ o-will-a	'he bought it for me'
b.	/o-will-ɪ-ɪ/	→ o-will-ɪ	'he bought it for you (sg)'
c.	/o-will-ɪ-ε/	→ o-will-ε	'he bought it for him/her'
d.	/o-will-ɪ-wa/	→ o-will-ɪ-wa	'he bought it for us'
e.	/o-will-ɪ-u/	→ o-will-u	'he bought it for you (pl)'
f.	/o-will-ɪ-wunu/	→ o-will-ɪ-wunu	'he bought it for you (pl)'
g.	/o-will-ɪ-wu/	→ o-will-ɪ-wu	'he bought it for you (pl)'
h.	/o-will-ɪ-gɪ/	→ o-will-ɪ-gɪ	'he bought it for them'

In (13b,e,f,g), the pronominal suffixes contain [+ATR] vowels, and this feature spreads to the immediately preceding vowel. These data seem to support the rule-based analysis and not the Licensing analysis. [+ATR] spreads exactly once to the left, regardless of whether this places it in the root. In (13b,e), where the benefactive suffix deletes, noniterative regressive spreading targets the root. But in (13f,g), the benefactive suffix remains, and noniterative spreading targets this vowel. The root vowel emerges faithfully.


*Licensing and Noniterative Harmony in Lango*

However, the Licensing analysis immediately accounts for (13) once a morphological idiosyncrasy is recognized. Noonan (1992:98) explains that the benefactive suffix never acquires an ATR feature from a root: *o-nekk-i* ‘she killed it for’ does not become \**o-nekk-i*. This must be a morphological fact, not a phonological one, because high front vowels participate in assimilation elsewhere in Lango (e.g. (1a), (13b), and other examples above). One way to account for this is with an Alignment constraint like the one in (14) requiring the left edge of the benefactive suffix to align with the left edge of an ATR domain. This constraint rules out configurations in which an ATR feature straddles the left boundary of the benefactive suffix (but straddling the right boundary is permitted, hence the spreading in (13f,g) is allowed).

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

This Alignment constraint also predicts that ATR features cannot spread from the benefactive suffix to a root because such spreading would create the illicit straddling configuration. The failure of [+ATR] to spread to the root in (13f,g) confirms this prediction. Spreading between the root and benefactive suffix is forbidden, and therefore the benefactive and pronominal suffixes cannot surface with licensed ATR features. Spreading from the pronominal suffix to the benefactive suffix eliminates the latter’s unlicensed [–ATR] feature leaving just one violation of LICENSE-[ATR]:

- (15)

/o-will-i-wu/	ALIGN-L	[+ATR]SPREAD	LICENSE-[ATR]	IDENT([±ATR])
a. o-w[ <u>I</u> ]ll-[ <u>I</u> ]-wu			**!	
 b. o-will-i-wu			*	*
c. o-will-i-wu	*!			**
d. o-w[ <u>I</u> ]ll-[ <u>I</u> -wU]		*!	*	*
e. o-w[ <u>Ill</u> - <u>I</u> -wU]	*!	*		*

Square brackets in the Tableau mark the boundaries of the [–ATR] domain(s). Candidate (e) has spreading from the root to both suffixes, so LICENSE is not violated. But this runs afoul of ALIGN-L. In candidate (d), [–ATR] spreads just from the benefactive suffix, not from the root, so ALIGN-L is not violated. But Smolensky’s constraints block [–ATR] spreading from high vowels, so this option is ruled out. Because of ALIGN-L, LICENSE-[ATR] cannot be satisfied, but violations of this constraint are minimized in the optimal candidate.

In contrast, [+ATR] can spread from the pronominal suffixes to the root in (13b,e) because the benefactive suffix has been deleted. In the absence of this suffix, ALIGN-L does not block spreading to the root.

Taking the benefactive suffix’s idiosyncrasy into account, what looked like noniterative spreading is revealed to be spreading to the root where Licensing can be satisfied, and

spreading among the suffixes to minimize Licensing violations where the benefactive morpheme prevents spreading to or from the root. Data that at first seemed to support the rule-based analysis of Lango turn out to be completely consistent with the Licensing analysis.

This section has argued that ATR spreading in Lango is driven by a requirement that ATR features must surface at least partially in the root. This requirement is grounded in a notion of comparative positional prominence that is well supported in the literature. The Positional Licensing analysis is an improvement over the rule-based alternative because it accounts for forms in which multiple suffix vowels acquire the root vowel's ATR feature. These forms are anomalous from the point of view of a noniterative rule. Additionally, the behavior of benefactive verbs—which at first seemed to argue for the noniterative rule—is predicted by the Positional Licensing account once a special requirement of the benefactive morpheme is recognized. Finally, the data presented here show that Lango's assimilation is truly different from standard vowel harmony because Lango's assimilation does not show an inclination toward featural uniformity throughout the entire word. It is therefore no surprise (and even desirable) that vowel harmony and Lango's ATR assimilation receive distinct analyses.

#### 4. Alternative Analyses

This section addresses two salient alternative OT analyses of Lango and shows that they are both inferior to the Positional Licensing analysis.

##### 4.1 Positional Faithfulness

Perhaps the most obvious alternative analysis of Lango is one that uses Positional Faithfulness (Beckman 1999) to prevent regressive ATR spreading from targeting root-initial vowels. The constraint in (16) can prevent assimilation from affecting the root-initial vowel in *bɔŋoni* and thereby produce the apparent noniterativity of regressive spreading even while using a standard harmony constraint like AGREE.

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

However, an analysis along these lines runs into two problems. The first is that regressive spreading that targets monosyllabic roots (as in (6)) is now blocked:

- (17)

	/ɲiŋ + wu/	IDENT[ATR]-[σ	AGREE-[ATR]	IDENT([±ATR])
•	a. ɲiŋ-wu		*	
(☞)	b. ɲiŋ-wu	*!		*

The problem, of course, is that the last root vowel also happens to be the first root vowel, so noniterative spreading necessarily violates the Positional Faithfulness constraint. To



fix the analysis, we need some constraint that requires at least minimal spreading no matter what. (Promoting AGREE will not work: That would defeat the purpose using Positional Faithfulness to rein in AGREE.) This would have two consequences: First, it would divide the responsibility of motivating assimilation between two constraints, AGREE and the spread-no-matter-what constraint. It is clearly preferable to consolidate this task within just one constraint. Second, we will have covertly reproduced the Positional Licensing analysis. LICENSE-[ATR] essentially requires “spreading no matter what” because it requires just enough spreading to ensure that the suffix's ATR feature is also linked to the root. The Licensing account also tells us why such spreading is required: ATR features need a prominent host. Unless it adopts Licensing itself, the Positional Faithfulness account loses this insight.

The second problem for Positional Faithfulness is that it predicts too much spreading in forms with longer stems, such as *mɔkæ* ‘cars’ (1e). This form has a trisyllabic root, and Positional Faithfulness predicts that the final two root vowels should assimilate because only the first vowel is protected. Thus *\*mɔtokæ* is incorrectly predicted, while Positional Licensing successfully predicts *mɔkæ* just as it predicted minimal spreading for *bɔɔni*.

I conclude, therefore, that Positional Faithfulness is an inappropriate tool for analyzing Lango, although I make no claim here about its applicability to other phenomena, both within and outside Lango. The discussion above reinforces the claim that standard harmony drivers like AGREE are inappropriate for ATR assimilation in Lango. Even when their whole-word spreading effects are tempered, they cannot account for the full range of data.

## 4.2 LOCAL

Noniterative tone shift or spreading is very common, so perhaps an OT analysis of tone can be adapted to account for Lango. Myers (1997) proposes the constraint LOCAL in (18) to account for noniterative tone shift. This constraint requires some edge of an input tone to match some edge of its output correspondent. In moving a tone one unit to the right, for example, the right edge of the input tone matches the left edge of the output tone. But if the tone is moved farther, there is no such alignment.

- (18) LOCAL: If an input tone T has an output correspondent T', some edge of T must correspond to the edge of T'.

This formulation of LOCAL is inappropriate for Lango (or spreading in general) because when a feature spreads in one direction, the edge of the feature that does not spread always satisfies LOCAL. For example, in regressive ATR spreading, the right edge of the ATR domain remains constant, so LOCAL is not violated no matter how far to left the feature spreads. Yip (2002), however, has a slightly different formulation of LOCAL:

- (19) LOCAL: An output tone cannot be linked to a TBU that is not adjacent to its [input] host.

This version prevents a tone (or for Lango, an ATR feature) from being linked to anything that is not adjacent to its input host. This correctly produces noniterative spreading, but it fails to permit the forms in (11) with polysyllabic suffixes. These forms have spreading two units to the right, but LOCAL allows only spreading by one unit.

To conclude this section, of the analyses considered here, only Positional Licensing gives us the necessary flexibility in setting the size of the spreading domain. Positional Faithfulness and LOCAL impose requirements that are simply too rigid to account for all the facts. As argued above, an analysis based on a noniterative rule is also too rigid to account for forms with polysyllabic suffixes. Only Positional Licensing accounts for all the data.

## 5. Conclusion

I have argued that, contrary to previous analyses (Noonan 1992, Archangeli & Pulleyblank 1994, Smolensky 2006), ATR assimilation in Lango is best understood as a product of Positional Licensing rather than as a noniterative version of vowel harmony. Standard harmony-driving constraints like AGREE cannot produce the pattern found in Lango, which appeared initially to favor a noniterative assimilation rule. But this solution is inferior to the Positional Licensing analysis, both empirically and conceptually. In addition to generating the correct surface forms, the Licensing analysis sheds light on why minimal spreading might be desirable. In the case of Lango, minimal spreading places suffix ATR features in a prominent position, namely the root. The contrast between [+ATR] vowels and [-ATR] vowels is made more salient in this way. From the point of view of a noniterative rule, or even an AGREE-style approach, minimal spreading is an unexplained eccentricity.

The analysis presented here reveals that Kinande, whose harmony system looked at first like Lango's iterative counterpart, is fundamentally different from Lango. Evidence shows that Lango's harmony is driven by a need to place ATR features in the prominent position of a root. But attraction to prominence cannot be the motivating factor in Kinande, where ATR features spread from prominent roots to less prominent affixes. The two harmony systems are not siblings driven by the same motivation while arriving at different results. Even their motivations must be different.

To return to the contrast between rule-based theories and OT with respect to iterativity, the prospect of noniterative harmony is not welcome from the point of view of OT. OT cannot differentiate between iterative and noniterative phenomena with a simple switch of a parameter the way rule-based theories can. But examining closely what looked like a case of noniterative assimilation in Lango, we saw that noniterativity was an emergent property of the grammar. Constraints do not need to explicitly recognize the noniterative nature of Lango's assimilation. Perhaps Lango is not alone in this regard. Other apparently noniterative phenomena (e.g. metaphony and umlaut) in other languages may have driving or limiting factors such as attraction to prominence or restriction to a small domain (e.g. Fleming 1994) so that their analyses need no mention of noniterativity. Other researchers, such as McCormick (1981; German umlaut), Chung (1983; Chamorro umlaut), Flemming (1994), Walker (2004; Spanish metaphony), and Kaplan (2006), have argued for such analyses for languages other than Lan-

go. The conclusion that noniterativity is really an emergent property, if upheld, casts an unfavorable light on theories of phonology that adopt noniterativity as an important construct, while the lack of a formalization of noniterativity in OT becomes appealing.

## References

- Archangeli, Diana, and Douglas Pulleyblank. 1994. *Grounded phonology*. Cambridge, MA: MIT Press.
- Baković, Eric. 2000. Harmony, dominance, and control. Doctoral Dissertation, 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, and Charles Kisseberth. 1994. An optimal domains theory of harmony. *Studies in the Linguistic Sciences* 24:101–114.
- Crosswhite, Katherine M. 2000. Length neutralization and vowel lengthening in Orleć Čakavian. In *Formal Approaches to Slavic Linguistics #8: The Philadelphia Meeting*, ed. Tracy Holloway King and Irina A. Sekerina, volume 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*, volume 1. Amherst, MA: GLSA.
- Itô, Junko, and Armin Mester. 1999. Realignment. In *The prosody-morphology interface*, ed. René Kager, Harry van der Hulst, and Wim Zonneveld, 188–217. Cambridge, U.K.: Cambridge University Press.
- Jensen, John T., and Margaret Strong-Jensen. 1976. Ordering and directionality of iterative rules. volume 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.
- Kurisu, Kazutaka. 2001. The phonology of morpheme realization. Doctoral Dissertation, University of California, Santa Cruz.
- Lombardi, Linda. 1999. Positional faithfulness and voicing assimilation in Optimality Theory. *Natural Language and Linguistic Theory* 17:267–302.
- McCarthy, John, and Alan Prince. 1993. Generalized alignment. In *Yearbook of morphology*, 79–153.
- McCarthy, John J. 2003. OT constraints are categorical. *Phonology* 20:75–138.
- 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.

Aaron F. Kaplan

- Padgett, Jaye. 1995. Feature classes. In *University of Massachusetts occasional papers in linguistics*, ed. Suzanne Urbanczyk Jill Beckman and Laura Walsh, volume 18, 385–420. Amherst: GLSA.
- Padgett, Jaye. 1997. Partial class behavior and nasal place assimilation. In *Proceedings of the 1995 Southwestern Workshop Optimality Theory*, ed. Keiichiro Suzuki and Dirk Elzinga, 145–183. Tucson, AZ: The University of Coyote Papers.
- Prince, Alan, and 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.
- 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*, ed. Paul Smolensky and Géraldine Legendre, volume 2, chapter 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*, ed. John Goldsmith, 114–174. Oxford: Blackwell.
- Urbanczyk, Suzanne. 2006. Reduplicative form and the root-affix asymmetry. *Natural Language and Linguistic Theory* 24:179–240.
- 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*, ed. Benjamin Schmeiser, Vineeta Chand, Ann Kelleher, and Angelo J. Rodriguez, 787–800. Somerville, MA: Cascadilla Press.
- Woock, Edith Bavin, and Michael Noonan. 1979. Vowel harmony in Lango. In *Papers from the 15th Annual Regional Meeting of the Chicago Linguistic Society*, ed. Paul R. Clyne, William F. Hanks, and Carol L. Hofbauer. 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>.

Department of Linguistics  
1156 High Street  
Santa Cruz, CA 95064-1077

afkaplan@ucsc.edu