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Domain Specificity and Vata ATR Spreading

Wendell Kimper
University of Massachusetts, Amherst, wkimper@linguist.umass.edu

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Abstract
Vata (Kru, Ivory Coast) has two distinct processes of ATR harmony. Within words, harmony is unblocked, obligatory, and not subject to directional restrictions. Across word boundaries, however, harmony is optional, directional (right-to-left), and subject to blocking by certain height configurations. Additionally, it is non-iterative into polysyllabic words, but iterative across sequences of monosyllabic words. In Alignment-based theories of domain bounding, these facts are problematic because they represent paradoxical strength relationships; harmony across junctures is able to create forms inconsistent with within-word harmony, and yet is subject to more stringent restrictions. In this paper, I show how a theory of domain bounding which is (a) based on constraints that are sensitive to the location of a feature's head and (b) situated in Harmonic Serialism (a derivational version of Optimality Theory) is able to provide an account of both the facts in Vata and the crosslinguistic range of juncture harmony processes.

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Wendell Kimper*

1 Introduction

Vata (Kru, Ivory Coast) has two distinct processes of ATR harmony. Within words, harmony is unblocked, obligatory, and not subject to directional restrictions. Across word boundaries, however, harmony is optional, directional (right-to-left), and subject to blocking by certain height configurations. Additionally, it is non-iterative into polysyllabic words, but iterative across sequences of monosyllabic words.

The differences between these two harmony processes pose difficulties for theories of domain bounding based on alignment constraints, because they represent conflicting strength relationships. Because harmony across word boundaries does not iterate into polysyllabic words, it creates disharmony; the constraint motivating it must therefore rank above the constraint motivating harmony within words. However, harmony across word boundaries is subject to height and directional restrictions; by transitivity, these restrictions are incorrectly predicted to apply within words as well.

In this paper, I propose that the constraint motivating harmony is split into domain-specific and juncture-specific versions. The domain-specific constraint is sensitive to the location of the feature's head – it does not assign violations to disharmony outside the domain where the head is located. Because of this, there is no motivation for juncture-specific harmony to iterate into polysyllabic words; furthermore, situating the analysis in Harmonic Serialism (HS) ensures that harmony does not iterate through a polysyllabic word to spread across a juncture on the other side, and permits an account of the range of variation shown across sequences of monosyllabic words. Because this analysis does not require a juncture-specific harmony constraint to dominate its domain-specific counterpart, the comparative weakness of juncture-specific harmony in Vata is not problematic.

The paper is organized as follows. Section 2 presents the patterns of ATR harmony in Vata; Section 3 discusses the challenges these patterns pose for alignment-based domain bounding, and outlines the constraint set proposed in this paper. Section 4 motivates the use of serial evaluation, and presents an analysis of iterativity and non-iterativity in Vata, while Section 5 presents an analysis of the relative strength of the two harmony processes. Finally, Section 6 discusses the typological implications of the current analysis.

2 Vata ATR Harmony

Vata has a 10-vowel system, which can be divided into two harmonic sets. Within native monomorphemic roots, vowels from the ATR set (i, e, u, o, ʌ) do not co-occur with vowels from the non-ATR set (ɪ, ɛ, ʊ, ɔ, a); examples of harmonic roots are given in (1). Harmony in Vata is root-controlled; suffixes take on the ATR value of the root (2).

(1) Harmonic Roots[1]

a. lɛtɛ	'iron'	c. m**e**n**ʌ**	'nose'
b. gɔlʊ	'dugout'	d. b**i**d**o**	'wash'

(2) Instrumental/locative: lɛ ∼ le

a. kla	'sieze'	klalɛ	(*kjal**e**)	'sieze with'
b. ŋɔŋʊ	'sleep'	ŋɔŋʊlɛ	(*ŋɔŋʊl**e**)	'sleep in'
c. p**i**	'prepare'	p**i**l**e**	(*p**i**lɛ)	'prepare with'
d. s**u**	'crush'	s**u**l**e**	(*s**u**lɛ)	'crush with'

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[1] All data and generalizations are from Kaye (1982). Tone markings have been omitted, as they do not play a role in the processes under discussion. ATR vowels appear in boldface, for clarity.

Within words (*domain* harmony), all vowels participate fully, and harmony is obligatory. Aside from a small number of exceptional loanwords (where /a/ co-occurs with ATR vowels, and acts as a blocker), harmony is unrestricted. Root control combined with suffixing morphology creates the illusion of (left-to-right) directionality, but within exceptional disharmonic stems there are no positional restrictions on ATR vowels, suggesting that this apparent directionality is accidental rather than based on specific restrictions.

ATR harmony also applies optionally across word boundaries (*juncture* harmony); adjacent words with differing ATR values may surface faithfully (3a), or ATR may spread leftward across the word boundary (3b).

(3) n la yo
I called child
'I called a child'
a. n la y**o**
b. n l**ʌ** y**o**

Unlike domain harmony, juncture harmony is directionally restricted; right-to-left harmony occurs (3b), but left-to-right harmony is prohibited (4b). Furthermore, while the unrestricted nature of domain harmony makes diagnosing the active feature nearly impossible, ATR is clearly dominant in juncture harmony – an ATR word can impose its specification on an adjacent word to its left (3b), but a non-ATR word cannot (4c).

(4) n no kɔ
I hear man
'I hear a man'
a. n n**o** kɔ
b. *n n**o** k**o** — *cf. (3b)*
c. *n nɔ kɔ — *cf. (3b)*

Across a sequence of monosyllabic words, juncture harmony may optionally iterate; all the possibilities in (5) are attested.

(5) ɔ ka za pi
3SG FUT food cook
'He will cook food'
a. ɔ ka za p**i**
b. ɔ ka z**ʌ** p**i**
c. ɔ k**ʌ** z**ʌ** p**i**
d. **o** k**ʌ** z**ʌ** p**i**

Juncture harmony is non-iterative, however, into a polysyllabic word. For a sentence like (6), there are only two options available – adjacent words may surface faithfully (6a), or ATR may spread one syllable to the left (6b). Unlike in (5), no further spreading is permitted.

(6) ɔ nɪ saka pi
3SG NEG rice cook
'He didn't cook rice'
a. ɔ nɪ saka p**i**
b. ɔ nɪ sak**ʌ** p**i**
c. * ɔ nɪ s**ʌ**k**ʌ** p**i** — *cf. (5c)*

Juncture harmony is also blocked by certain height configurations; a non-high vowel cannot trigger juncture harmony if the target is high (7; cf. above). See Kaye (1982) for a full description of the pattern.

(7) n nʊ kpʌ
1SG make-PST stool
'I made a stool'
a. n nʊ kpʌ
b. * n n**u** kpʌ

To summarize, Vata has two distinct processes of ATR harmony. Domain harmony is obligatory, unblocked, and not subject to directional restrictions. Juncture harmony is optional, non-iterative into polysyllabic words, occurs right-to-left only, and is subject to height restrictions.

3 Domain Bounding

The patterns of harmony described above are problematic for alignment-based theories of domain bounding, because they represent seemingly paradoxical strength relationships (Davis 1995, McCarthy 1997, Mullin 2010) between domain and juncture harmony – juncture harmony is able to create structures that do not conform to domain harmony, and yet is subject to more stringent restrictions.

Alignment constraints motivate harmony by requiring that the edge of a feature domain is aligned with the edge of some morphological or prosodic constituent. Domain bounding follows from these constraints – spreading beyond the local domain disrupts alignment (Archangeli and Pulleyblank 2002, Cole and Kisseberth 1994, and others).

The fact that juncture harmony does not iterate into polysyllabic words poses a problem for domain bounding via alignment constraints. Juncture harmony introduces an alignment violation, and therefore the constraint motivating it must dominate ALIGN (8a). In order to prevent resolution of this alignment violation by spreading throughout the new domain, IDENT must dominate ALIGN (8b). However, in order to motivate domain harmony, ALIGN must dominate IDENT (8c). The rankings required to produce the pattern attested in Vata are paradoxical.

(8)

winner ∼ loser	JUNCT-ASSIM	ALIGN-L(ATR, WORD)	ID(ATR)
a. sakʌ p**i** ∼ saka p**i**	W	L	L
b. sakʌ p**i** ∼ sʌkʌ p**i**		Ⓛ	Ⓦ
c. b**i**d**o** ∼ bɪd**o**		Ⓦ	Ⓛ

Furthermore, the additional restrictions imposed on juncture harmony are problematic for alignment. The constraint motivating juncture harmony must dominate ALIGN (9a). To impose restrictions on juncture harmony, the constraint responsible (here *[+HI]←[-HI] stands in for the constraint or constraints limiting height configurations in Vata) must dominate the constraint motivating juncture harmony (9b). However, to ensure that domain harmony is not subject to those restrictions, ALIGN must dominate the constraints responsible for those restrictions (9c). Again, the rankings required to produce the attested pattern are paradoxical.

(9)

winner ∼ loser	*[+HI]←[-HI]	JUNCT-ASSIM	ALIGN-L(ATR, WORD)
a. sakʌ p**i** ∼ saka p**i**		W	Ⓛ
b. nʊ kpʌ ∼ n**u** kpʌ	Ⓦ	L	
c. b**i**d**o** ∼ bɪd**o**	Ⓛ		Ⓦ

Rather than motivating domain bounding via alignment constraints, I follow analyses in rule-based prosodic phonology (Nespor and Vogel 1986, Selkirk 1980) in splitting the constraint motivating harmony (here a version of the SHARE constraint proposed in McCarthy to appear) into a domain-specific version (10) and a juncture-specific version (11).

(10) SHARE[ATR]-DOMAIN$_{(PWd)}$: Assign one violation mark for every pair of segments s_i and s_j that are not linked to the same token of [F], where s_i and s_j, are contained within the same Prosodic Word and s_i is [F]'s head.

(11) SHARE[ATR]-JUNCTURE$_{(PWd,IP)}$: Assign one violation mark for every pair of tier-adjacent segments s_i and s_j that are not linked to the same token of [F], where s_i and s_j belong to different Prosodic Words and are contained within the same Intonational Phrase as [F]'s head.

Unlike ALIGN and other domain-referencing constraints compelling harmony, SHARE-D doesn't refer to just any domain of the relevant type. Rather, SHARE-D only assigns violations within the particular domain where [F]'s head[2] is located – assuming privative ATR, this means that SHARE-D is not violated by juncture harmony. SHARE-J, like its predecessor in rule-based prosodic phonology, is itself bounded within a larger domain; it is sensitive to the location of the head with respect to that domain bounding, but applies to every juncture of the relevant type within that larger specific domain.

4 Non-/Iterativity

Domain harmony in Vata results from a ranking of SHARE-D over IDENT. The faithful candidate in (12a) loses to the competitor with harmony (12b).

(12)

bɪd**o**	SHARE-D	IDENT(ATR)
a. bɪd**o̲**	W₁	L
b. ☞ b**i**d**o̲**		1

Juncture harmony results from a ranking of SHARE-J over IDENT. The faithful candidate (13a) loses to a candidate where ATR has spread across the word boundary (13b). Crucially, (13b) does not incur any violations of SHARE-D – the segments in [saka] are outside of the domain where the ATR feature's head is located, so SHARE-D assigns no violations to any of the candidates in (13). Since SHARE-J is equally satisfied by both (13b) and (13c), the choice falls to IDENT; the candidate with non-iterative harmony (13b) wins.

(13)

saka p**i**	SHARE-D	SHARE-J	IDENT(ATR)
a. saka p**i̲**		W₁	L
b. ☞ sak**ʌ** p**i̲**			1
c. s**ʌ**k**ʌ** p**i̲**			W₂

However, this in and of itself is not sufficient to prevent iteration. In sequences of words with multiple junctures, harmony is predicted to propagate through the polysyllabic word to resolve the SHARE-J violation on the other side. As in (13) above, the faithful candidate in (14a) loses to a candidate where ATR has spread across the word boundary (14b). However, (14b) still violates SHARE-J – the predicted winner spreads through the polysyllabic word and into the preceding word, resolving all SHARE-J violations (14d).

[2] Heads are marked with underlines. I assume (following Smolensky 2006 and others) that the head of [F] is the segment that bears [F] in the input. Furthermore, I assume that head status comes "for free" – it does not constitute an operation that requires a distinct derivational step.

(14)

nɪ saka p**i**	SHARE-D	SHARE-J	IDENT(ATR)
a. nɪ saka p**i**		W_2	L
b. nɪ sak**ʌ** p**i**		W_1	L_1
c. nɪ s**ʌ**k**ʌ** p**i**		W_1	L_2
d. ☞ * n**i** s**ʌ**k**ʌ** p**i**			$_3$

The attested surface form in Vata is (14b), not (14d). The prediction above is problematic, but can be avoided in Harmonic Serialism (HS), a derivational variant of OT with independent typological advantages (Elfner 2009, Jesney 2009, Kimper to appear, McCarthy 2002, 2007, 2008a,b, to appear, Pater 2008, Pruitt 2008).

In HS, a derivation proceeds as follows: GEN is restricted to producing candidates that differ from the input by a single instance of a single change; this (finite) candidate set is evaluated by the language's constraint hierarchy at EVAL, but instead of exiting as the surface form, the optimal candidate is sent back to GEN to serve as the new input. The GEN→EVAL loop continues until the single changes produced by GEN are no longer harmonically improving; the derivation converges when the input to the current step is chosen as optimal.

Because of this, HS derivations must be gradual and harmonically improving. The presence of another distant word boundary cannot compel iterativity in examples like (14), because there is no gradual and harmonically improving path to that outcome.

At the first step of the derivation in (15), the faithful candidate loses to a candidate that has spread ATR once and removed a violation of SHARE-J; candidates like (14c-d) are not possible competitors here, because they involve multiple instances of spreading. At the second step, neither of the possible candidates performs any better on SHARE-J, so the choice is left to faithfulness. The candidate that is faithful to the input to this step wins, and the derivation converges.

(15) **Step 1**

nɪ saka p**i**	SHARE-D	SHARE-J	IDENT(ATR)
a. nɪ saka p**i**		W_2	L
b. ☞ nɪ sak**ʌ** p**i**		$_1$	$_1$

Step 2 *Convergence*

nɪ sak**ʌ** p**i**	SHARE-D	SHARE-J	IDENT(ATR)
a. ☞ nɪ sak**ʌ** p**i**		$_1$	
b. nɪ s**ʌ**k**ʌ** p**i**		$_1$	W_2

Non-iterativity is maintained in polysyllabic words, even in sequences of words with multiple junctures, because gradually spreading through to the distant juncture requires an intermediate step that is not harmonically improving. Iterativity is still possible, however, with sequences of monosyllabic words, where it is attested in Vata.

At each step of the derivation in (16), SHARE-J compels ATR to spread leftward one further iteration. Because junctures are local to each other in sequences of monosyllabic words, each step is harmonically improving; harmony will iterate until there are no more junctures available to spread through.

(16) **Step 1**

ɔ ka za p**i**	SHARE-D	SHARE-J	IDENT(ATR)
a. ɔ ka za p**i**		W_3	L
b. ☞ ɔ ka z**ʌ** p**i**		$_2$	$_1$

Step 2

ɔ ka z**ʌ** p**i̲**	SHARE-D	SHARE-J	IDENT(ATR)
a. ɔ ka z**ʌ** p**i̲**		2	L
b. ☞ ɔ k**ʌ** z**ʌ** p**i̲**		1	1

Step 3

ɔ k**ʌ** z**ʌ** pi̲	SHARE-D	SHARE-J	IDENT(ATR)
a. ɔ k**ʌ** z**ʌ** p**i̲**		W_1	L
b. ☞ **o** k**ʌ** z**ʌ** pi̲			1

Step 4 *Convergence*

o k**ʌ** z**ʌ** pi̲	SHARE-D	SHARE-J	IDENT(ATR)
a. ☞ **o** k**ʌ** z**ʌ** pi̲			

Serial evaluation also permits an analysis that accounts for the full range of attested variants in (5). Since juncture harmony is optional, parallel OT predicts that either no juncture harmony will take place (5a) or juncture harmony will iterate across all junctures in a sequence of monosyllabic words (5d); candidates with intermediate-distance iteration (5b-c) satisfy neither SHARE-J nor IDENT, and are collectively harmonically bounded.

In HS, however, Serial Variation (Kimper to appear) predicts that variants like (5b-c) should be possible; at each pass through EVAL, a total order of partially-ordered constraints is chosen (Anttila 1997, Boersma 1997, and others). Because the derivation converges when the input to the current step is selected as the optimum, intermediate-distance iteration occurs when a ranking of IDENT ≫ SHARE-J occurs before all SHARE-J violations are resolved.

For example, a derivation resulting in (5c) is given in (17). At the first step, SHARE-J dominates IDENT, compelling ATR to spread across a word juncture; the same ranking at the second step compels another iteration of spreading. However, on the third step, IDENT dominates SHARE-J; the faithful candidate is chosen as the optimum, and the derivation converges, resulting in a variant with intermediate-distance iteration of juncture harmony.

(17) **Step 1**

ɔ ka za p**i**	SHARE-D	SHARE-J	IDENT(ATR)
a. ɔ ka za p**i̲**		W_3	L
b. ☞ ɔ ka z**ʌ** p**i̲**		2	1

Step 2

ɔ ka z**ʌ** p**i̲**	SHARE-D	SHARE-J	IDENT(ATR)
a. ɔ ka z**ʌ** p**i̲**		2	L
b. ☞ ɔ k**ʌ** z**ʌ** p**i̲**		1	1

Step 3 *Convergence*

ɔ k**ʌ** z**ʌ** pi̲	SHARE-D	IDENT(ATR)	SHARE-J
a. ☞ ɔ k**ʌ** z**ʌ** pi̲			1
b. **o** k**ʌ** z**ʌ** pi̲		W_1	L

With serial evaluation, and a domain-specific constraint that is sensitive to the location of the feature's head, an analysis of both iterativity and non-iterativity in Vata juncture harmony is possible.[3] Because SHARE-D is not violated outside of the domain where the feature's head is located, it

[3]Kaplan (2008) provides an analysis of non-iterativity Vata using Stratal OT. However, his analysis relies crucially on the Sour Grapes property of the AGREE constraint (Padgett 1995), which Wilson (2004, 2006) shows makes pathological predictions.

is not violated by juncture harmony, which is correctly predicted to be non-iterative into polysyllabic words. Serial evaluation ensures that this non-iterativity will be maintained even in the presence of other non-local junctures, while permitting iterativity across sequences of monosyllabic words. Furthermore, serial evaluation permits a theory of variation that can produce the full range of attested options when juncture harmony applies variably.

5 The Strength Paradox

The ranking paradox seen in (9) arose because the constraint motivating juncture harmony induced violations of ALIGN, and so was required to dominate it for juncture harmony to take place. This meant that any constraints that restrict juncture harmony should also restrict domain harmony, by transitivity of ranking. However, domain harmony in Vata escapes the limitations imposed on juncture harmony.

The analysis of domain bounding presented in this paper avoids the strength paradox, because SHARE-D is not violated by juncture harmony. It is therefore possible for SHARE-D to dominate SHARE-J, and for constraints ranked between them to impose restrictions on juncture harmony but not domain harmony.

To produce the pattern attested in Vata, the constraint or constraints responsible for preventing juncture harmony in certain height configurations must dominate SHARE-J (18b), but must in turn be dominated by SHARE-D to ensure that domain harmony is unrestricted (18c).

(18)

winner ∼ loser	SHARE-D	*[+HI]←[-HI]	SHARE-J
a. sak**ʌ** p<u>**i**</u> ∼ saka p<u>**i**</u>			W
b. nʊ kp<u>**ʌ**</u> ∼ n**u** kp<u>**ʌ**</u>		W	L
c. b**i**d<u>**o**</u> ∼ bɪd<u>**o**</u>	W	L	

The same type of ranking produces the attested pattern of directionality in Vata – a directional blocking constraint like INITIAL or FINAL (McCarthy to appear) dominates SHARE-J, but is itself dominated by SHARE-J. This blocks left-to-right juncture harmony (19b), but permits left-to-right domain harmony (19c).

(19)

winner ∼ loser	SHARE-D	FINAL	SHARE-J
a. sak**ʌ** p<u>**i**</u> ∼ saka p<u>**i**</u>			W
b. n<u>**o**</u> kɔ∼ n<u>**o**</u> k**o**		W	L
c. p<u>**i**</u>-**le** ∼ p<u>**i**</u>-lɛ	W	L	

With alignment-based domain bounding, the relative weakness of juncture harmony presented a ranking paradox. However, with domain bounding that is sensitive to the location of the feature's head, the fact that juncture harmony is subject to more limitations than domain harmony in Vata receives a straightforward analysis.

6 Predictions

Harmony that crosses word boundaries is robustly attested across a genetically diverse range of languages, including Akan (Archangeli and Pulleyblank 1994 and others), Kinande (Archangeli and Pulleyblank 2002), Nawuri (Casali 2002), Nez Perce (Hall and Hall 1980 and others), and Somali (Andrzejewski 1955). The account of domain bounding presented in this paper makes a number of specific predictions about the range of possible domain and juncture harmony phenomena crosslinguistically.

In Vata, non-iterativity of juncture harmony into polysyllabic words arises because iteration is unmotivated; because SHARE-D is sensitive to the location of the feature's head, nothing compels further iteration. Juncture harmony, therefore, should always be noniterative in this way – word-juncture harmony should never iterate into a polysyllabic word.

This does not, however, mean that harmony that extends across word boundaries must always be non-iterative – domain harmony can operate over constituents other than words. In Somali, for example, the domain of ATR harmony is phrasal; it often extends throughout an entire sentence (20a-b), and is interrupted by pauses indicating prosodic boundaries (20c).

(20) a. kʌn**u** wʌʌ dʌm**ee**rk**ii**s**ii** ‘This is his he-donkey.’
b. kanʊ waa damɛɛrkaagɪɪ ‘This is your (sing.) he-donkey.’
c. waaħaasʊ # mʌ d**oo**nn**i** bʌʌ ‘Is that thing a sailing ship?’

The analysis here also predicts that juncture harmony should, like in Vata, always iterate across a sequence of local junctures (as long as they are in the same higher domain). This is true for tone spreading in Shona (23), which shows the same pattern of iterativity and non-iterativity as Vata. Non-iterative assimilation processes that occur across word boundaries are attested, but it is difficult to distinguish these cases from the effects of sub-phonemic vowel-to-vowel coarticulation. In Akan, for example, non-ATR vowels become gradiently advanced before an ATR word (21); the effect does not iterate, even across sequences of monosyllabic words.

(21) a. bayɪrɛ̣ b**i** ‘yarn’ (cf. bayɪrɛ)
b. ɔsʊnʊ̣ b**i** ‘elephant’ (cf. ɔsʊnʊ)

However, this gradient assimilation process is not specific to junctures – in words where the opaque vowel /a/ blocks harmony, similar gradient advancement can be found (22). Akan, therefore, does not constitute a counterexample to the prediction that juncture harmony should iterate across sequences of adjacent junctures.

(22) a. kaŋkạb**i** ‘millipede’
b. pɪrạk**o** ‘pig’

Another prediction of the analysis presented here concerns the relative strengths of domain and juncture harmony processes. In Vata, juncture harmony is more restricted than domain harmony. However, because SHARE-D and SHARE-J are separately rankable, the opposite is also predicted to exist: a language where domain harmony is more restricted than juncture harmony.

This is attested in Shona, where (left-to-right) tone spreading occurs across morpheme boundaries (Myers 1997). Like Vata, juncture harmony is non-iterative into polysyllabic morphemes (23a), but iterative across sequences of monosyllabic morphemes (23b). In Shona, however, domain harmony does not occur – tone does not spread within a morpheme (23c).

(23) a. ndi-ngá̲ véreng-e ‘I could read’[4]
b. tí̲-té̲ng-és-é ‘We should sell’
c. bá̲zi (*bází) ‘branch’

Finally, the analysis of Vata makes crucial use of one-to-many relationships in autosegmental spreading. In particular, whether or not spreading iterates depends on properties (in this case, domain affiliation) of a potentially non-local segment (the head of the feature domain). Further evidence for this kind of non-local dependency can be found in Baiyinna Orochen, where the length of the originating vowel determines viability of harmony, regardless of the length of intervening members of the harmony domain (Walker 2010).

To summarize, the analysis presented here extends beyond Vata; it makes predictions about the nature of domain bounding and juncture-specific processes which appear to be supported by the known typology of those phenomena.

[4] Underlines represent the underlying host of the tone.

7 Conclusion

In this paper, I have presented an account of domain bounding and juncture-specificity that permits an analysis of the patterns of harmony in Vata and is consistent with the typology of domain- and juncture-specific harmony processes.

The constraint motivating harmony is split into domain-specific and juncture-specific versions. Domain-bounded harmony constraints are sensitive to the location of the feature's head; violations are not assigned to disharmony that occurs outside the domain where the head is located. Furthermore, harmony is evaluated serially, spreading one link at a time.

Head-sensitive domain bounding means that spreading across a word boundary (as compelled by the juncture-specific harmony constraint) does not violate the constraint compelling domain-bounded harmony. There is no pressure to iterate into a polysyllabic word, and the gradual harmonic improvement that is required under serial evaluation ensures that harmony will not iterate through the polysyllabic word in order to spread across a distant juncture – hence, juncture harmony is non-iterative into polysyllabic words. Harmony is still iterative across sequences of monosyllabic words, where junctures are local and can be spread through gradually.

Because an analysis of non-iterativity does not require the constraint motivating juncture harmony to dominate the constraint motivating domain harmony, the increased strength of the latter no longer represents a paradoxical strength relationship, and is accounted for straightforwardly under this analysis.

Where alignment-based domain bounding failed to account for the patterns of domain and juncture harmony in Vata, head-specific domain bounding and serial evaluation permit a successful analysis.

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Department of Linguistics
University of Massachusetts, Amherst
Amherst, MA 01003
wkimper@linguist.umass.edu