

The root-affix metaconstraint and its reversal in vowel harmony

"There are apparently no systems in which suffixes exclusively control harmony"

(Anderson 1980)

Root-Affix Faithfulness Metaconstraint: Root-Faith >> Affix-Faith

(McCarthy & Prince 1995)

1. The basic types of harmony

1.1 Dominant-recessive harmony

(1) Diola Fogni vowel inventory (Baković 2000: 52)

Dominant: +ATR	i	u	e	o	ɤ
Recessive: -ATR	ɪ	ʊ	ɛ	ɔ	ɑ

(2) Diola Fogni ATR harmony

- a. ni- bqj -ɛn -ʊ → [nɪbqjenu]
1SG have CAUS 2PL 'I have caused you to have'
- b. ni- jitum -ɛn -ʊ → [nijitumenu]
1SG lead away CAUS 2PL 'I have caused you to be lead away'
- c. ni- bqj -ul -ʊ → [nɪbɤjulu]
1SG have from 2PL 'I have from you' (Baković 2000: 52)

1.2 Stem control

(3) Wolof vowel inventory (Pulleyblank 1996:314)

+ATR	i	e	o	u
-ATR	ɛ	a	ɔ	

(4) Wolof harmony with suffixes

- a. ATR gën-é [gəne] 'be better in'
réér-é [reere] 'be lost in'
dóór-é [doore] 'hit with'
- b. RTR xam-é [xame] 'know in'
dem-é [deme] 'go with'
xool-é [xoolɛ] 'look with' (Pulleyblank 1996:314f)

(5) Yoruba vowel inventory (Pulleyblank 1996:297)

+ATR	i	e	o	u
-ATR	ɛ	a	ɔ	

High vowels are invariably advanced, the low vowel is invariably retracted.

Yoruba has only prefixes, no suffixes.

(6) Harmony with prefixes

- a. [oʃewɛ] 'publisher' ò/ò + /ʃèwé/ 'publish a book'
[oʃowu] 'jealous person' ò/ò + /jowú/ 'be jealous'

- b. [ɔkɔsɛ] 'person who refuses ò/ò + /kɔ/ /iʃɛ/ 'refuse'
to run errands' 'message' (Pulleyblank 1996:306)

(7) Dɛgɛma vowel inventory

+ATR	i	e	ɔ	o	u
-ATR	ɪ	ɛ	a	ɔ	ʊ

(8) Dɛgɛma vowel harmony targeting prefixes and suffixes

	Advanced		Retracted	
high	ù-hír-!óm	'surrounding'	ù-ḃí	'leaf'
	ù-súw-!óm	'ironing'	ù-ḃò	'doctor'
mid	è-sén	'fish'	ù-téy-!ám	'descending'
	ù-vóy-!óm	'fetching'	ù-sɔl-!ám	'jumping'
low	é-dò	'river'	è-nám	'animal, meat'

(Pulleyblank et al 1995: 2)

In Dɛgɛma, harmony is triggered by the stem vowel and proceeds outward to prefixes and suffixes.

1.3 Affix control

(9) Pulaar vowel inventory

+ATR	i	e	o	u
-ATR	ɛ	a	ɔ	

(10) Pulaar mid stem vowels and harmony

a. ATR words	gloss	b. RTR words
sof-ru	'chick'	ɔɔf-ɔn
ser-du	'rifle butt'	ser-ɔn
^m beel-u	'shadow'	^m bɛɛl-ɔn
peec-i	'slits'	peɛc-ɔn
beel-i	'puddles'	bɛɛl-ɔn
dog-oo-ru	'runner'	dɔg-ɔ-w-ɔn
lot-oo-ru	'washer'	lot-ɔ-w-ɔn

(Paradis 1992: 87)

(11) Pulaar dominant e and o

a. ATR forms	b. non-ATR forms	gloss
lef-ol		'ribbon'
lef-el	lef-ɔn	dim. sg. and pl.
keer-ol		'boundary'
keer-el	keɛr-ɔn	dim. sg. and pl.
paɔ-el	paɔ-ɔn	'shoe dim. sg. and pl.'

(Paradis 1992: 90)
(Paradis 1992: 1)

(12) Pulaar high stem vowels and harmony

dill-ere	'riot'	*dillere	
fuy-ere	'pimple'	*fuyere	
bin ⁿ d-ɔɔ-wɔ	'writer'	*bin ⁿ doowo	(Paradis 1992: 87)
tum ^m bu-kɔn	'small calabashes'	*tum ^m bukon	(Paradis 1992: 1)

(13) Pulaar high vowels in affixes

a. ATR forms	gloss	b. RTR forms	gloss
ɓet-ir-dɛ	'to weigh with'	ɓet-dɛ	'to weigh'
hɛl-ir-dɛ	'to break with'	hɛl-dɛ	'to break'
ɗɔkk-ɪɗ-dɛ	'to become one-eyed'	ɗɔkk-ɔ	'one-eyed person'
fɛyy-u-dɛ	'to fell'	fɛyy-a	'to fell (imperfective)'

(Paradis 1992: 87)

(14) The low vowel in Pulaar

a. ɓɔɔt-aa-ri	'lunch'	*bootaari	
ɓɔɔf-aa-li	'breaths'	*poofaali	
nɔɔd-aa-li	'call'	*noddaali	
^ɓ gɔr-aa-gu	'courage'	* ^ɓ goraagu	(Paradis 1992: 88)
b. ^m bar-oo-di	'lion'	* ^m barɔɔdi	
bar-o-gel	'lion(dim.)'	*barɔgel	(Paradis 1992: 94)
ɓal-w-ee-ki	'blackness'		(Paradis 1992: 127)

If this were dominant-recessive harmony, we would expect the occurrence of triggering vowels in stems as well. In Pulaar, it is only the suffix vowels which control harmony.

Prefix controlled harmony is unattested so far, as is triggering by prefixes in dominant-recessive harmony.

2. Identifying the problem

(15) The IDENT(F) Constraint Family (McCarthy & Prince 1995:264)

Let α be a segment in S_1 and β be any correspondent of α in S_2 .

If α is $[\gamma F]$ then β is $[\gamma F]$.

(Correspondent segments are identical in feature F.)

- Consonantal assimilation is Agreement. (Pulleyblank 1997, Gnanadesikan 1997, Lombardi 1999, and many others)
- All assimilation is correspondence (Krämer 1998, 2001a, 2001b, Baković 2000).

(16) S-IDENT(F) σ :

Adjacent segments/syllables/moras are identical in feature F (i.e., ATR, height, backness, roundness).

- (17) a. Harmony: S-IDENT >> IO-IDENT
 b. No harmony: IO-IDENT >> S-IDENT

Beckman (1995, 1997, 1998): Positional Faithfulness applies to elements in psycholinguistically/grammatically prominent positions.

(18) Positional Faithfulness effect: IDENT_{stem}, IDENT σ 1, ... >> PHONOCONSTRAINT >> IDENT

Baković (2000): Stem control is Stem-Affixed-Form-Faithfulness; dominance is local conjunction of markedness with faithfulness, affix control is excluded.

The problem: In rule-based phonology, Fula might have been analysed as a right-to-left harmony rule $[\alpha ATR] \rightarrow [\beta ATR] / _ (C) [\beta ATR]$, in directionless correspondence approach, affix control is systematically excluded.

Affixes are generally considered as relatively unimportant. Fula: IDENT_{lastsyllable} effect?

→ Positional Faithfulness is inadequate, does not account for the "medial-vowel-puzzle".

(19) "The medial vowel puzzle":

- a. The medial vowel under stem control:
 /CIC-OC-AC/ → CiCiCaC, *CiCaCaC
 b. The medial vowel under affix control:
 /CIC-OC-AC/ → CiCaCaC, *CiCiCaC

A vowel between a stem vowel and an opaque vowel agrees with the stem vowel under stem control. The vowel between the rightmost affix vowel and an opaque stem vowel agrees with the affix vowel in affix control.

(20) Fula failed Positional Faithfulness

	bin ⁿ d-OO-wɔ	*[+hi, -ATR]	IDENT σ #	S-IDENT	IDENT
a.	bin ⁿ d-ɔɔ-wɔ	*!			
b.	bin ⁿ doowo		*!		***
☞ c.	bin ⁿ doowɔ			*	**
☞ ⊗ d.	bin ⁿ d-ɔɔ-wɔ			*	**

The same problem for Positional Faithfulness occurs in stem controlled systems.

3. Restoring Positional Faithfulness

(21) INTEGRITY — "No Breaking" (McCarthy & Prince 1995:372)

No element of S_1 has multiple correspondents in S_2 .

For $x \in S_1$ and $w, z \in S_2$, if $x \text{ ʒ}w$ and $x \text{ ʒ}z$, then $w = z$.

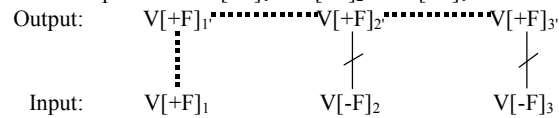
(22) *Multiple Correspondence (*MC) (Lamontagne & Rice 1995: 218)

Elements of the input and the output stand in a one-to-one correspondence relationship with each other.

(23) INTEGRITY(F) — "No assimilation" (Krämer, 2001a,b)

No feature of S_1 has multiple correspondents in S_2 .

(24) Indirect correspondence of [+F]₁ and [+F]₂ over [+F]₁:



(25) Positional Integrity:

a. INTEGRITY(F)affix

No feature of an affix in an input has multiple correspondents in the output.

b. INTEGRITY(F)stem

No feature of a stem in an input has multiple correspondents in the output.

c. Typologically preferred ranking: INTEGRITY(F)affix >> INTEGRITY(F)stem

(26) {Right, Left}-ANCHOR(S₁, S₂) (McCarthy & Prince 1997)

Any element at the designated periphery of S₁ has a correspondent at the designated periphery of S₂.

Let *Edge*(X, {L,R}) = the element standing at the *Edge* = L,R of X.

RIGHT-ANCHOR. If x = *Edge*(S₁, R) and y = *Edge*(S₂, R) then x ≅ y.

LEFT-ANCHOR. Likewise, *mutatis mutandis*.

(27) Affixation = Anchoring

a. L-ANCHOR(stem, pwd): The left edge of the stem corresponds to the left edge of the prosodic word.

b. R-ANCHOR(pwd, affix): The right edge of the prosodic word corresponds to the right edge of an affix.

(28) Integrating featural faithfulness in edge correspondence

R/L-ANCHOR ∧ IO-IDENT(F): Violated a) if the requested element is not at the designated edge or b) if (a) is true, but the element is not identical w.r.t. the designated feature.

(29) Edge mapping:

a. The usual case:

L-ANCHOR(stem,pwd), S-IDENT >> R-ANCHOR(pwd,affix), R-ANCHOR(stem,pwd)

b. The Pulaar case I:

R-ANCHOR(pwd,affix), S-IDENT >> L-ANCHOR(stem,pwd) >> R-ANCHOR(stem,pwd)

c. The Pulaar case II:

INTEGRITY(F)stem >> INTEGRITY(F)affix

(30) Pulaar opaque vowel ranking:

*[+hi, -ATR], *[+lo, +ATR] >> S-IDENT(ATR)

(31) Pulaar prominence ranking:

*[+hi, -ATR], *[+lo, +ATR] >> R-ANCHOR >> S-IDENT(ATR) >> IO-IDENT(ATR)

(32) Pulaar mid stem vowel plus high affix vowel

	/sɔf-rʊ/	*[+hi, -ATR]	*[+lo, +ATR]	R-ANCHOR	S-IDENT
a.	sɔfru	*!			
b.	sɔfru				*!
c.	sofru				

(33) Pulaar mid vowels and harmony I

	/lef-ɔn/	*[+hi, -ATR]	*[+lo, +ATR]	R-ANCHOR	S-IDENT
a.	lefon			*!	
b.	leɔn				*!
c.	lefon				

(34) Pulaar mid vowels and harmony II

	/lef-el/	*[+hi, -ATR]	*[+lo, +ATR]	R-ANCHOR	S-IDENT
a.	lefel			*!	
b.	lefel				*!
c.	lefel				

(35) Pulaar mid stem vowel plus low vowel plus high vowel

	/boot-aa-rʊ/	*[+hi, -ATR]	*[+lo, +ATR]	R-ANCHOR	S-IDENT
a.	bɔtaari	*!			
b.	bootææri		*!		
c.	bootaari				**!
d.	bɔtaari				*

(36) The medial vowel in Pulaar I

	/bin ⁿ d-ɔɔ-wɔ/	*[+hi, -ATR]	*[+lo, +ATR]	R-ANCHOR	S-IDENT	INTEGRITY Affix	INTEGRITY Stem
a.	bin ⁿ d-ɔɔ-wɔ	*!			**		
b.	bin ⁿ d-oo-wɔ			*!			
c.	bin ⁿ d-oo-wɔ				*		*
d.	bin ⁿ d-ɔɔ-wɔ				*	*!	

(37) The medial vowel in Pulaar II

	/bin ⁿ d-ɔɔ-wɔ/	*[+hi, -ATR]	*[+lo, +ATR]	R-ANCHOR	S-IDENT	INTEGRITY Stem	INTEGRITY Affix
a.	bin ⁿ d-ɔɔ-wɔ	*!			**		
b.	bin ⁿ d-oo-wɔ			*!			
c.	bin ⁿ d-oo-wɔ				*	*!	
d.	bin ⁿ d-ɔɔ-wɔ				*		*

4. Residual questions

✎ 1 Crosslinguistically, prefixes are not observed to behave as triggers, neither in affix control nor in dominance.

Possible solutions: IO-IDENT σ 1 (Beckman) does not exist.

Leftmost prominence = L-ANCHOR(stem,pwd) \wedge IO-IDENT (see above)

Likewise L-ANCHOR(affix,pwd) \wedge IO-IDENT does not exist

this excludes prefix control ☺

✎ 2 Why is affix control so rare? "Free ranking hypothesis" readily allows for affix control.

Possible solution: Generally, lexical information is more significant to communication than functional information (remember the root-affix metaconstraint).

Therefore FAITH_{lex}/stem \gg FAITH_{func} and INTEGRITY_{func} \gg INTEGRITY_{lex}/stem functionally better.

The same holds for the cross-linguistic preference of suffixation over prefixation:

Lexical information has to be identifiable as early as possible. Contents first = lexical elements first.

5. Conclusion

☉ *Affix control* is rare, but it is attested and quite stable in Fula across dialect boundaries (cf. Breedveld 1995). Probably, Turkana is a case of affix control as well, but compare the analyses in Baković (2000) and Noske (2001).

☉ The pattern can be accounted for in terms of *Positional Faithfulness*.

☉ Morphological control is a question of *INTEGRITY*, not parametric directionality, cyclicity or Base-Output Correspondence.

☉ 'Pathological rankings' are possible.

Comments very welcome!

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