



Doubly triggered vowel harmony via cumulative cophonologies



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Overview

- Full vowel harmony in Guébie is conditioned by two extra-phonological factors: lexical item and morphosyntactic environment.
 - Distinct frameworks have been developed to model lexical versus morphosyntactic conditioning of phonological processes:
- | Lexical | Morphosyntactic |
|---------------------|-----------------|
| Lexical phonology | Match Theory |
| Indexed constraints | Phase Theory |
| Cophonology Theory | |
- To account for doubly conditioned phonological processes like vowel harmony in Guébie, I expand on the Cophonologies by Phase (CBP) framework of Sande and Jenks (To appear).
 - By combining two crucial features of CBP—spell-out by phase and phonological subrankings of constraints associated with Vocabulary Items—I show that cumulative constraint subrankings straightforwardly account for doubly conditioned phonological effects.

Cophonologies by Phase

- CBP: models of the morpho/phonology interface
 - Phase-based spell-out
 - Late insertion
 - Three components of VIs
- **VI-conditioned phonology:** Vocabulary items are composed of three contentful parts, any of which may be null:
 1. Tonal or segmental featural content (\mathcal{F}),
 2. Prosodic selection or subcategorization (\mathcal{P}),
 3. A constraint subranking (\mathcal{R}).

(1) **Example Vocabulary Entry**

$$[\text{PL}] \longleftrightarrow \left\{ \begin{array}{l} \mathcal{F} : \quad \quad \quad /-i/ \\ \mathcal{P} : \quad \quad \quad [-X]_{\omega} \\ \mathcal{R} : \text{VHARMONY} \gg \text{ID-IO} \end{array} \right\}$$
- **Cyclicity effects:** Constraint subrankings \mathcal{R} associated with VIs override the master ranking of a language (Anttila, 2002; Inkelas and Zoll, 2005, 2007) only in the spell-out domain (phase) containing that VI.
- The master ranking undergoes the minimal changes necessary to comply with the cophonologies triggered in that domain. (Sande and Jenks, To appear)

Vowel harmony: Morphosyntactically conditioned

- Third-person object markers (OMs) and plural suffixes in Guébie trigger full vowel harmony.

OMs: Vowel harmony

	Root =3SG.ACC	=NMLZ	Gloss
(2) a.	bala ^{3.3}	bol=ɔ ^{3.2}	bol=ɔ=li ^{3.2.2} ‘hit’
b.	tulu ^{4.4}	tol=ɔ ^{4.2}	tol=ɔ=li ^{4.2.2} ‘chase’
c.	jula ^{3.3}	jol=ɔ ^{3.2}	jol=ɔ=li ^{3.2.2} ‘ask’

- In the context of other suffixes and clitics, root vowels retain their input features.

(3) Passive: No vowel harmony

	Active	Passive	Gloss
a.	ɔ ^{3I}	ɔ ^{3I2}	‘finish’
b.	pi ³	pi ^{3-o}	‘cook’
c.	bulu ^{2.2}	bul ^{2-o} , *bol ²	‘fly’
d.	bala ^{3.3}	bal ^{3.3-o} , *bol ^{3.2}	‘hit’
e.	jula ^{3.2}	jol ^{3-o} , *jol ^{3-o}	‘take/borrow’

Cumulative cophonologies in CBP

I extend the Cophonologies by Phase model of Sande and Jenks (To appear), to allow for multiple cophonologies to be triggered within a single spell-out domain, with cumulative effects.

- **Default ranking:** ID-IO(V), ID-IO \gg VHARMONY

(5) Object marking Vocabulary item

$$[3sg.hum.acc] \longleftrightarrow \left\{ \begin{array}{l} \mathcal{F} : \quad \quad \quad /ɔ^2/ \\ \mathcal{P} : \quad \quad \quad [= X]_{\omega} \\ \mathcal{R} : \text{VHARMONY} \gg \text{ID-IO} \end{array} \right\}$$

- On its own, the reranking of VHARMONY over ID-IO is not enough to result harmony, since an ID-IO(V) constraint still outranks the constraint requiring harmony.

Vowel harmony: Lexically conditioned

- Only a subset of roots undergo vowel harmony, even in the environment of an OM or plural suffix.
- Based on a sample of 2,000 Guébie roots, vowel harmony only occurs in 33% of them.
- Roots in (4) do not alternate.

(4) Lack of vowel harmony for some lexical roots

	Root	Root+3SG.ACC	Gloss
a.	jula ^{3.2}	jol=ɔ ^{3.2} , *jol=ɔ ^{3.2}	‘take, borrow’
b.	kalale ^{3.2.2}	kalal=ɔ ^{3.2.2.2} , *kolal=ɔ ^{3.2.2}	‘help’

- Alternating roots (2) tend to share certain phonological traits (C2=/l/, V1=V2) (Sande, 2017, 2018).
- Though no set of phonological traits categorically distinguishes alternating from non-alternating roots.
- Ex: the roots in (4) share a number of phonological traits with those in (2); however, only those in (2) undergo harmony in the context of an OM.

- Roots subject to harmony are also associated with a subranking.

(6) Alternating root Vocabulary item

$$[\sqrt{\quad}] \longleftrightarrow \left\{ \begin{array}{l} \mathcal{F} : \quad \quad \quad /bala^{3.3}/ \\ \mathcal{P} : \quad \quad \quad [X]_{\omega} \\ \mathcal{R} : \text{VHARMONY} \gg \text{ID-IO(V)} \end{array} \right\}$$

- Demotion of ID(V) in the context of alternating roots is also motivated by the fact that the initial vowel in the same subset of roots also undergoes optional reduction, while other roots do not.

Cumulative subrankings

	Ranking	Result
Default	ID(V), ID \gg VHARM	No harm
Obj/Pl	ID(V) \gg VHARM \gg ID	No harm
Alt. rts	ID \gg VHARM \gg ID(V)	No harm
Both	VHARM \gg ID(V), ID	Harmony

Implications

- Full harmony only in a spell-out domain containing both
 1. an OM or plural suffix
 2. a root of the alternating class
- Cumulative morpheme-specific subrankings account for harmony.
- Phase-based spell-out accounts for the lack of harmony on outer morphemes: The nominalizer, immune to harmony, is in a separate phase.

Future work

The expanded CBP model presented here for Guébie could account for doubly (lexically and morphosyntactically) conditioned phonology across languages. Future work will search for and investigate such cross-linguistic patterns.

References

- Anttila, Arto. 2002. Morphologically conditioned phonological alternations. *Natural Language & Linguistic Theory* 20:1–42.
- Inkelas, Sharon, and Cheryl Zoll. 2005. *Reduplication: Doubling in morphology*, volume 106. Cambridge University Press.
- Inkelas, Sharon, and Cheryl Zoll. 2007. Is grammar dependence real? A comparison between cophonological and indexed constraint approaches to morphologically conditioned phonology. *Linguistics* 45.1:133–171.
- Sande, Hannah. 2017. Distributing morphologically conditioned phonology: Three case studies from Guébie. Doctoral Dissertation, UC Berkeley.
- Sande, Hannah. 2018. Predicting the lexical distribution of vowel reduction in Guébie with weighted constraints. *Presentation at WOCAL 9*.
- Sande, Hannah, and Peter Jenks. To appear. Cophonologies by phase. *NELS 48 Proceedings*.

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Model summary

When an alternating root and an OM are spelled out within the same phase, their effects accumulate and result in full vowel harmony.