A formal typological account of metaphony

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Metaphony in Romance languages operates as a type of morphemic vowel harmony (cf. Finley 2009) that involves raising at least the stressed vowel of a word, triggered by height features belonging to an inflectional suffix (e.g. Grado Venetian *zóven-o - zúvin-i* 'young man.SG/PL'). In metaphonic systems (see next table), the triggering suffix can be either a set of phonological features linked to a root node (surface-true) or a set of floating features (opaque). If opaque, the trigger can be: (i) a mixed affix, i.e. a set of floating features plus a fully specified vocalic root node, or (ii) a featural affix, i.e. a set of floating features. If metaphony affects proparoxytones (antepenultimate-stressed words), it also affects paroxytones (penultimate-stressed words). We propose a typology of metaphony in OT (Prince & Smolensky 1993/2004) with all trigger types, supported by a careful inspection of the data from the sources listed in the references.

Trigger →	Surface-true	Opaque (mixed affix)	Opaque (featural affix)
Paroxytone	/rót-i/ → [rút-i]	/rót-e$_{[F]}$/ → [rút-e]	/rót$_{[F]}$/ → [rút]
Proparoxytone	/rókot-i/ → [rúkut-i]	/rókot-e$_{[F]}$/ → [rúkot-e]	/rókot$_{[F]}$/ → [rúkot]
Myopia/AIS	/rákot-i/ → [rákut-i]	/rákot-e$_{[F]}$/ → [rákot-i]	/rákot$_{[F]}$/ → [rákot]

When surface-true metaphony affects proparoxytones, the property of myopia arises: the posttonic vowel is always affected, even when the stressed vowel is a neutral segment (Mascaró 2019, cf. Walker 2010; Kimper 2012). With opaque triggers, only the stressed vowel is affected; posttonic vowels in proparoxytones, participating or neutral, always remain unaffected. Metaphony triggered by mixed affixes can display an interesting property that we call 'anchoring in situ' (AIS): when floating features are realized not only by the stressed vowel but also by the vowel of the morph they belong to. If the stressed vowel is a participating segment and the posttonic vowel is a neutral segment, the neutral segment is opaque and metaphony is blocked. Our typologies explore the predictions of a set of harmony-driving constraints. For surface-true triggers, these constraints are: AGREE, ALIGN (both its distance-sensitive/-insensitive versions) and SPREAD. To reflect the implication that metaphony applies in paroxytones if also in proparoxytones, one member of the constraint pair applies to binary feet and the other to maximal feet (binary and layered feet: $(('\sigma\sigma)_{Ftmin}\sigma)_{Ftmax}$, Martínez-Paricio & Kager 2015). We assume that proparoxytones contain a right-aligned layered foot. Firstly, we show that only SPREAD, defined in (1), fits the attested languages, as it undergenerates unattested non-myopia and generates attested myopia. Secondly, we claim that metaphony caused by opaque triggers (mixed or featural affixes) is the result of satisfying a different constraint family, ANCHOR (2). Furthermore, we present a Property Theory analysis of the factorial typologies derived with the constraints SPREAD and ANCHOR. Property Theory (Alber & Prince in prep.) aims to determine the ranking conditions, or properties, that distinguish all the languages of a typological system. In this model, each property corresponds to pairs of (sets of) constraints, call them X and Y, that can be ranked w.r.t. each other. Each property can thus take two values, *a* and *b*, which are each other's logical opposite ($X \gg Y$ or $Y \gg X$), or it can be *moot* if both the rankings $X \gg Y$ and $Y \gg X$ yield one and the same language. Property Theory allows for a deeper understanding of factorial typologies in OT and of how languages are organized in the typological space. The properties for both the SPREAD and ANCHOR typologies are defined and illustrated in (5).

(1) SPREAD (Walker 1998: 37; see also Walker 2012: 577)

a. SPREAD[F]/Ft$_{min,max}$
Assign 1 violation mark for each token of [F] not linked to all segments within Ft$_{min,max}$.

b. SPREAD[F]/Ft$_{max}$

Assign 1 violation mark for each token of [F] not linked to all segments within Ft_{max}.

(2) ANCHOR (based on Finley 2009; Mascaró 2016)

a. ANCHOR[F]/'V

Assign 1 violation mark for every occurrence of a floating [F] in the input that is not associated to the stressed vowel in the output.

b. ANCHOR[F]/morph

Assign 1 violation mark for every occurrence of a floating [F] affiliated to a morpheme in the input that is not associated to a segment in the corresponding output morpheme.

(3) The other constraints

a. IDENT[high] (included in the typology of SPREAD and ANCHOR)

Assign 1 violation mark for every input-output value mismatch of the feature [high].

b. NO-GAP (included in the typology of SPREAD)

Assign 1 violation mark for every [F] that is linked to non-contiguous root nodes.

c. *FLOATING[F] (included in the typology of ANCHOR)

Assign 1 violation mark for every floating [F].

(4) Factorial typologies generated in *OTWorkplace* (Prince et al. 2007-2022)

with SPREAD (surface-true triggers)				
inputs →	e-i	o-e-i	a-e-i	e-a-i
NoMetaphony	é-i	ó-e-i	á-e-i	é-a-i
Paroxytaphony	í-i	ó-e-i	á-e-i	é-a-i
OpaqueH.	í-i	ú-i-i	á-i-i	é-a-i
TransparentH.	í-i	ú-i-i	á-i-i	í-a-i

with ANCHOR (opaque triggers)				
inputs →	e-o[F]	o-e-o[F]	a-e-o[F]	e-a-o[F]
NoMetaphony	é-o	ó-e-o	á-e-o	é-a-o
AIS	é-u	ó-e-u	á-e-u	é-a-u
NarrowAIS	í-o	ú-e-o	á-e-u	í-a-o
DoubleAnchor	í-u	ú-e-u	á-e-u	í-a-u
Metaphony	í-o	ú-e-o	á-e-o	í-a-o

(5) Property Analysis performed in *OTWorkplace* (Prince et al. 2007-2022)

	Property name	*a*	*b*
with SPREAD	Metaphony?	IDENT[high]	{SPREAD[F]/Ft_{max}, SPREAD[F]/$\text{Ft}_{min,max}$}.dom
	IdentMax	IDENT[high]	SPREAD[F]/Ft_{max}
	NoGapMax	NO-GAP	SPREAD[F]/Ft_{max}
with ANCHOR	Floating	IDENT[high]	{*FLOATING[F], ANCHOR[F]/morph}.dom
	Anchoring	ANCHOR[F]/morph	{ANCHOR[F]/'V, IDENT[high]}.sub
	IdentStrV	IDENT[high]	ANCHOR[F]/'V

with SPREAD (surface-true triggers)			
	Metaphony?	IdentMax	NoGapMax
NoMetaphony	a	a	*moot*
Paroxytaphony	b	a	*moot*
OpaqueH.	b	b	a
TransparentH.	b	b	b

with ANCHOR (opaque triggers)			
	Floating	Anchoring	IdentStrV
NoMetaphony	a	*moot*	a
Metaphony	a	b	b
NarrowAIS	b	b	*moot*
AIS	b	a	a
DoubleAnchor	b	a	b

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