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Phonetically conditioned sound change: /u/-fronting in Zuberoan Basque

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1. Abstract: As many other languages in Europe, Zuberoan Basque (Souletin) has developed a contrastive high front rounded vowel lyl. While the development of the sound pattern itself may be due to contact, the specific inhibitory contexts found in Basque are unparalleled. We argue that the inhibitory contexts are phonetic in nature and form a set difficult to classify by means of phonological natural classes.

2. Phonological inventory of Literary Zuberoan Basque

- Rhotics: /r, r/ Vowels: /i, e, a, o, u, y/ - Diphthongs:/au, eu, ai, ei, oi/ - Laterals: /Ι, ٨/ - Fricatives: /f, ទួ, ទ្គ, ʃ, ʒ/ - Glides: /j, w/ - Oral stops: /b, d, g, J/, /p, t, k, c/ - Africates: /t̪s, t̪s, tʃ/ - Aspirates: /h, ĥ/ - Nasals: /n, m, n/.



3. Systematic /u/-fronting: Zuberoan /u/ was systematically fronted to /y/ (Egurtzegi 2013) during the second half of the Middle Ages (1). In addition, a parallel sound pattern fronted /u/-based diphthongs to /Vi/ (2).

		xamples	of the fror	nting:							
)	(1) Fro	(1) Fronting of /u/ > /y/									
	Std.	Zub.	Trans.	Gloss	Std.	Zub.	Trans.	Gloss			
•	ZU	zü	[s̪y]	'you'	lur	lür	[lyr]	'ground'			
	egun	egün	[eγֶyn]	'day'	urre	ürhe	[yrhe]	'gold'			
	punta	phünta	[pʰyn̪ta]	'top'	txakur	txakhür	[ʧakʰyr]	'dog'			
	uko	ükho	[ykho]	'refusal'	guzti	güzi	[gys̞i]	'all'			
	urgatz	i ürgaiztü	[yrγ <u>ai</u> sty]	'to help'	leku	lekhü	[lekhy]	'place'			
	_	ürpho	[yrpho]	'manure pile'	ume	hüme	[hyme]	'child'			
	(2) Fr	onting of	/Vu/ > /Vi/								
	Std.	Zub.	Trans.	Gloss	Std.	Zub.	Trans.	Gloss			
	gau	gai	[gai̯]	'night'	leun	lein	[lejූn]	'soft'			
	gauza	gaiza	[gai̯sa]	'thing'	iraun	irain	[iɾaj̯ŋ]	'to last'			
	laudat	u laidatü	[lajðaty]	'to laud'	irauli	iraili	[iɾaj̞ʎi]	'to spin'			

- 5. Development of lyl: Harrington (2012) argues that context-free fronting of lul starts from coarticulatory contexts. Perception-production relationships tend to be aligned in coarticulatory patterns. Sound change occurs as the context-dependent and context-independent phonetic variants come closer together and the perceptual compensation for coarticulatory effects is reduced, giving rise to a new production-perception alignment (Harrington 2012: 104). The most usual fronting context involves alveolar consonants (Flemming 2003). Both the onset and offset of /u/ in /tut/ and the onset of /u/ in /kuk/ tend to be well into the /y/ space (Harrington et al. 2011).
- 6. Inhibition of the fronting: As in Zuberoan, in some varieties of English, /u/-fronting is inhibited in certain contexts (Labov et al. 2006). The inhibition of English /u/ > /u/ by a following dark [the consonant and the affected vowel. The consonants that inhibit palatalization in Zuberoan do not fit this description. However, Recasens and Pallarès (2001) suggest reasons for the resistance to coarticulatory processes in a combination of place and manner: highly constrained consonants have large coarticulatory effects in contiguous vowels and can inhibit vowel dependent effects. Some consonants involving apical activity of the tongue also require a concrete dorsal placement of the tongue, and this may inhibit neighboring vowels from articulatory processes towards the palatal zone (Recasens & Pallarès 2001: 288). While the shift from /u/ to /y/ involves a fronting in the placement of the tongue, the consonants "involving demanding manner requirements and little dorsopalatal contact" crucially require a lowering and back placement of the tongue dorsum, and thus inhibit /u/-fronting.

- 4. Inhibitory contexts: However, some specific contexts inhibited /u/-fronting (3-4):
 - 4-A. Contexts inhibiting /u/ > /y/
 - before an apico-alveolar fricative sibilant /s/
 - before an alveolar tap /r/
 - before a rhotic-dental cluster /rth, rt, rd/
 - 4-B. Contexts inhibiting /Vu/ > /Vi/
 - before an apico-alveolar fricative sibilant /s/
 - before an alveolar tap /r/
 - before a trill /r/ (sporadically)

/	E	Examples of the inhibition:									
	(3) Inhibition of /u/ > /y/										
	Std.	Zub.	Trans.	Gloss	Std.	Zub.	Trans.	Gloss			
	ikusi	ikhusi	[ikʰus̪i]	'see'	ur	hur	/hur/	'water'			
	itsusi	itsusi	[it͡susi]	'ugly'	zur	zur	/sٍur/	'wood'			
	pusatu	phusatü	[pʰusaty]	'to push'	hura	hura	[hura]	'he'			
	uste	uste	[uste]	'thought'	zure	zure	[sure]	'your'			
	busti	busti	[busti]	'wet'	urte	urthe	[urthe]	'year'			
	usna	usna	[uzna]	'instinct'	urdin	urdin	[urðin]	'blue'			
	(4) Inhibition of /Vu̯/ > /Vi̯/										
	Std.	Zub.	Trans.	Gloss	Std.	Zub.	Trans.	Gloss			
	haur	haur	/hau̞r/	'this'	nagusi	nausi	[nau̯si]	'boss'			
	zauri	zauri	[saŭuj]	'wound'	deus	deus	[deus] 's	omething'			
	euri	euri	[eŭuj]	'rain'	haur	haur	/hau̯r/	'child'			

7. Contact-induced sound change: /u/-fronting appears to be related to Romance influence. Both languages in contact to Zuberoan Basque, French and Gascon, share this sound pattern. Gascon shows context-free /u/ > /y/, with no inhibition. Zuberoan shows the same pattern, but with inhibitory contexts.

Blevins (to appear) suggests that language experience alters phonetic perception, by the "perceptual magnet effect" (cf. Kuhl 2000). When first acquiring a language, proto-categories act as magnets, drawing nearby perceptual stimuli into them. In language contact situations, continuous exposure to a second language may result in a warping of perceived distances of phonetic tokens. An external phonetic proto-type may be internalized and act as a perceptual magnet in the first language of the infant. The establishment of a phonetic proto-type requires perceptual saliency of the segment involved, and intense language contact spanning multiple generations. This sound change will appear to be natural and phonetically motivated (Blevins to appear).

Speakers of Zuberoan and speakers of Bearnese Gascon have been in close and continued contact.



Map showing the areal range of contrastive /y/ in Europe (Blevins, to appear).

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This work has been partially funded by Basque Government's FFI2010-385 and UPV/EHU's UFI 11/14. Thanks are due to Juliette Blevins and Joseba Lakarra for their comments. All mistakes are mine. This poster includes research from the forthcoming "Towards a phonetically grounded diachronic phonology of Basque" (PhD dissertation, UPV/EHU).

- 8. Conclusions: /u/-fronting occurred systematically in Zuberoan Basque except before /r/, /s/ and the rhotic-dental clusters /rth, rt, rd/, where it was inhibited. Since the inhibitory contexts do not form a natural phonological class, we argue for a phonetic source. Maintenance of *u was a consequence of the coarticulation caused by consonants requiring active tongue dorsum lowering and backing. This tongue dorsum placement is required to perform the fine movements of the tongue involved in the production of inhibitory segments and clusters /r, s, ts, rth, rt, rd/.
- Since there is no clear phonetic conditioning factor for the development of /y/, an areal origin is preferred. /u/-fronting also occurred in Gascon, a Romance language in close contact Zuberoan. Following Blevins (to appear), we have suggested that the perceptual saliency of /y/ alongside the continued contact with Bearnese Gascon have facilitated the development of this sound pattern in Zuberoan Basque. The model predicts this sound change to be similar to other phonetically motivated, natural sound changes, as is the case of /u/ fronting in Zuberoan.
- Overall the Zuberoan /u/-fronting sound pattern illustrates the importance of considering perception, production and contact in the analysis of historical developments.