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

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To be published as: Egurtzegi. 2017. Phonetically conditioned sound change: Contact induced /u/-fronting in Zuberoan Basque. *Diachronica* 34.3, 331-367.

All modern Basque dialects have at least 5 contrastive vowels /i, e, a, o, u/. One Basque dialect, Zuberoan, has developed a contrastive sixth vowel, the front rounded high vowel /y/. This development is arguably due to sustained contact with neighboring Gallo-Romance languages. This paper supports empirically the historical development of the /u/ vs. /y/ contrast and provides a detailed analysis of the contexts that inhibited the /u/ > /y/ sound change. Fronting was inhibited when the vowel was followed by an apical sibilant, a tap /r/ or an rT cluster (where r is a rhotic, and T an alveolar obstruent), arguably due to co-articulatory effects. Fronting occurred when /s̪/, /r/ or non-coronal rhotic-obstruent clusters followed /u/. Zuberoan /u/-fronting illustrates the importance of language contact and phonetics in the phonological analysis of historical developments.

Keywords: u-fronting; sound change; coarticulatory effects; language contact; Basque; Zuberoan

1. Introduction*

All modern Basque dialects have at least 5 vowels /i, e, a, o, u/. Of these dialects, only Zuberoan (also known as Souletin) and Low Navarrese from Mixe (cf. Lafon 1999 [1962b]: 105-106; Camino 2009a, 2009b), two varieties in close contact with Bearnese Gascon, have developed a contrastive sixth vowel quality, the front rounded high vowel /y/. This vowel systematically corresponds to /u/ in the other dialects and can be traced back to that segment by means of cross-dialectal comparison. Nevertheless, /y/ now contrasts with /u/, since certain phonological contexts

* I am greatly indebted to Juliette Blevins, Gorka Elordieta, Jonathan Harrington, José Ignacio Hualde, Joseba Lakarra, two anonymous reviewers and the editor of the journal for their comments and suggestions to previous versions of this paper. They have considerably improved the paper. Markus Jochim and Beatriz Umbon helped me with the German and French translations of the abstract, respectively. All remaining errors are mine. This research has been partially funded by the Spanish MINECO (FFI2016-76032-P; FFI2015-63981-C3-2; FJCI-2014-21348), the Basque Government (IT769/13) and the Alexander von Humboldt Foundation.

inhibited fronting (Michelena 2011 [1977]: 42; see below) and since there are other sources of /u/ in this dialect (cf. Egurtzegi 2014a: 171-188).

This study has two goals. On the empirical side, Zuberoan evidence is supported by an analysis of the earliest texts in this dialect. On the theoretical side, I tackle three aspects of the /u/ > /y/ shift with implications for theories of sound change. First, while contact has clearly played a role, the evolution of /y/ in Zuberoan Basque is complex: it is not the simple result of the influx of Romance loanwords with /y/, nor is it a borrowed sound change. Instead, it is best treated as a consequence of contact-induced sound change, where the change in question shows clear phonetic conditioning not present in the contact language. Second, this phonetic conditioning involves the set of contexts where /u/ > /y/ was inhibited; interestingly, this environment is problematic in terms of traditional phonological natural classes. A final problem for the general account is why the /u/ of inherited /au/ and /eu/ sequences fails to undergo the /u/ > /y/ shift. I suggest that this is because the vowel devocalized (or was non-syllabic) prior to the /u/ > /y/ shift. This detail is of general interest, since it is rare to find arguments for true glides in Basque phonological systems.

Before turning to historical data, I offer a few remarks on modern Zuberoan phonetics and phonology. Zuberoan has six contrastive vowels /i y u e o a/ as well as contrasting high and low nasalized vowels /ĩ ỹ ũ ã/. According to Michelena (2011 [1977]: 41), the realization of Zuberoan /y/ is closer to French [ø] than [y]. Hualde (1993: 290) also describes this segment as being intermediate between French [y] and [ø]. Following Larrasquet (1932) and Lafon (1999 [1958]), he notes that this is consistent with the evidence that Zuberoan /i/ and /u/ are more open than they are in French (Hualde 1993: 290-291). Gavel also describes the three Zuberoan high vowels as lower than their French counterparts and states that this is also the case in many Bearnese varieties of Gascon (Larrebat 1926: 29 fnt. 1, cf. Michelena 2011 [1977]: 41 fnt. 6).

A contrast between front high rounded /y/ and back /u/ is evident in 17th century documents in the Zuberoan dialect based on the interpretation of distinct orthographic symbols for the two vowels. The contrast is present in the authors Bela (Michelena 2011 [1964]: 168-171) and Etxart (in his letters from 1616-1617; edited by Lakarra et al. forthcoming). Oihenart (2003 [1657]) describes the vowel /y/ and writes it as <u>, as opposed to /u/, which he writes as <ou>.[1] Michelena mentions Tartas (1995 [1666]) as the first book written in Zuberoan and says the author is consistent with this tradition (cf. Michelena 2011 [1977]: 41).[2] Other 17th century documents that distinguish the two

1 Peillen (1992: 252) claims to have seen <u> used this way in manuscripts from the 14th century, without providing details on the source. However, there is, to date, no evidence of a consistent orthographic convention distinguishing /u/ vs. /y/ in Zuberoan prior to the 17th century. The oldest texts I examine in §2.2 from the end of the 14th century do not show this contrast in a clear way (the manuscript Peillen referred to might be the *Censier* examined there).

2 Nevertheless, the classification of Tartas' variety as Zuberoan is highly debatable today (Ricardo Gómez, personal

high rounded vowels include Belapeire (1997 [1696]) and *Pronus* (Agirre Sarasola 1998 [ca. 1676]).

Following French written tradition, /y/ is written as <u> and /u/ is written as <ou>. However /y/ is consistently written as <ü> in modern texts, and that is the grapheme that will be used in the examples given here. In some old texts, <eu> is used instead of <u> (cf. Oyharçabal 1991, where the word *lür* /lyr/ "Earth, land" is written <leur> more than ten times). In French, <eu> represents /ø/ or /œ/: *heureux* /øʁø/ "happy", *feu* /fø/ "fire" and *peu* /pø/ "a little", but also *peur* /pœʁ/ "fear", *jeune* /ʒœn/ "young" and *leur* /lœʁ/ "their, them". This is consistent with the aforementioned observation that Zuberoan high vowels are more open than their French counterparts. Also consistent with this height difference is the pattern of some loanwords involving /œ/ borrowed with /y/ in Zuberoan: French *tracteur* /tʁaktœʁ/ >> Zuberoan *traktür* /tɾaktyr/ "tractor", French *beurre* /bœʁ/ >> Zuberoan *bürra* /byra/ 'butter' (Coyos 2002: 207).

The high front rounded vowel is not completely unknown in the other two northern dialects, Lapurdian and Low Navarrese. However, in these dialects, it is limited to French borrowings such as *faktüra* [faktyɾa] "receipt", *kandidatüra* [kaɲdiðatyɾa] "candidacy", *nümero* [nymeɾo] "number" (cf. Zuazo 2008: 43). There is no evidence for a /u/ > /y/ shift in these varieties.

Zuberoan has other sound patterns in common with neighboring Romance languages as well. One of these is the contrast between oral and nasalized vowels (not only present in Zuberoan but also in western Basque dialects such as 16th century Bizkaian; cf. Egurtzegi 2015). Nasalized vowels in Basque are due to the loss of nasalized /h̃/, which developed from intervocalic *n (cf. Michelena 2011 [1950]: 8-9, 2011 [1977]: 171; Hualde 1993: 294; Igartua 2015; Egurtzegi 2014a: 68-72, forthcoming). Both the loss of intervocalic *n and the development of nasalized vowels are common to Bearnese Gascon and Zuberoan Basque. Both languages have similar accentual systems and share other sound patterns including /o/-raising and /u/-fronting (Egurtzegi 2014a).

There has been extensive contact between Zuberoan and Bearnese Gascon for centuries, as described, for example, by Haase (1992: 19-22) who speaks of intense bilingualism, mentioning close connections between the counties of Zuberoa and Béarn since the early Middle Ages. Zuberoa was part of Béarn since the 12th century (Haase 1992: 19) and Bearnese Gascon has been the only written language in use in Zuberoa until the 17th century (Séguy 1952: 385). In addition, Gascon was an official language and the language for scholarly communication in Zuberoa during that period (Gavel 1920: 47). Although French is the main language now, the presence of Gascon has

communication). In addition, in most work, Tartas does not distinguish /u/ from /y/ orthographically and consistently uses <u> for all high rounded vowels (cf. Tartas 1995 [1666], 1996 [1672]). However, when he does distinguish /y/ from /u/, he also writes the first as <u> and the second as <ou>.

been mantained in the region. In sum, Basque-Gascon bilingualism has existed for centuries (Lafon 1999 [1962a]: 108).

2. Describing the u > y change

This section describes in detail the Zuberoan sound change of /u/ > /y/. First, I summarize earlier descriptions of this process. Then, two new studies are shown to be consistent with the historical evidence. The first (cf. Egurtzegi 2014a, 2014b) randomly surveys more than 500 pages of the *General Basque Dictionary* (*Orotariko Euskal Hiztegia*; Michelena & Sarasola 1987-2005), in addition to a sample from the *Dictionnaire basque-français* of Lhande (1926-1938) and the glossary in *Le Basque de la Basse-Soule Orientale* by Larrasquet (1939). These examples are used to describe the distribution of /y/ in the language. A second study surveys the oldest documents written in Zuberoan from the 14th-17th centuries. The results are compared to those of the first survey in order to highlight differences in the distribution of /y/ in the attested stages of the dialect and details of the sound change and its inhibition not noted in the earlier literature.

2.1 Previous descriptions of the sound change

The fronting of u > y in Zuberoan has been described in earlier literature (cf. Uhlenbeck 1903; Gavel 1920; Lafon 1999 [1937], 1999 [1958], 1999 [1962a], 1999 [1962b]; Michelena 2011 [1977]) with a range of commonly agreed upon findings. As in various Gallo-Romance languages such as French (Harris 1988: 211) and Occitan (Wheeler 1988: 247), Zuberoan Basque developed a sound pattern in which most instances of the high back vowel /u/ were fronted to /y/. This process appears to have been context-free, as shown by the examples in (1), though a subclass of coronals inhibits fronting, as discussed below. Modern Zuberoan lost the tap /ɾ/ during the 19th century – see Michelena (2011 [1977]: 272), who mentions that Gèze (1873: 2) already shows this loss (cf. also Camino 2009a: 167); for this reason, Literary Zuberoan, which maintains the tap, is used in all the Zuberoan examples.

The general pattern is shown in (1): (1a) shows word-final contexts; (1b) shows instances of fronting before some coronals; (1c-d) show instances of /u/ fronting in pre-velar and pre-labial contexts respectively; and (1e) are loans that are arguably old, predating the fronting sound change and regularly undergoing it.

(1) /u/-fronting in Zuberoan Basque

a) Word-final position

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
su	*sü*	[s̻y]	“fire”
zu	*zü*	[s̺y]	“you (SG)”
sagu	*sagü*	[s̻aɣy]	“mouse”

b) Before a coronal consonant

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
egun	*egün*	[eɣyn]	“day”
uda	*üda*	[yð̞a]	“summer”
dut	*düt*	[dyt]	“I have”
mutur	*müthür*	[mytʰyr]	“snout”
guzti	*güzi*	[ɡys̺i]	“all”
buztan	*büztan*	[bys̺tan]	“tail”
lur	*lür*	[lyr]	“ground”
egur	*egür*	[eɣyr]	“wood”
zuzen	*xüxen*	[ʃyʃen]	“direct”

c) Before a velar consonant

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
suge	*süge*	[s̻yɣe]	“snake”
sukalde	*sükhalte*	[s̻kʰalte]	“kitchen” (with root *sü* “fire”)
ukan	*ükhen*	[ykʰen]	“to have”
uko	*ükho*	[ykʰo]	“refusal”

nauk *nük* [nyk] "I am (ALLOC.M)"

d) Before a labial

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
zubi	*zübü*	[s̪yβ̪y]	"bridge"
ume	*hüme*	[hyme]	"child"

e) In loanwords

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
mundu	*mündü*	[myn̪dy]	"world"
duda	*düda*	[dyð̞a]	"doubt"
lukainka	*lükhainka*	[lykʰaɲ̟ŋka]	"spicy sausage" (cf. Vulgar Latin *lucanicia*)
zeru	*zelü*	[s̪ely]	"sky"
kutxa	*hütxa*	[hytʃa]	"box"
uxatu	*üxütü*	[yʃyty]	"to shoo"

Based on this data, the /u/-fronting sound change in Zuberoan can be stated as in (2).

(2) Definition of /u/-fronting in Zuberoan Basque
/u/ > /y/

Two details of the sound change are remarkable and are reviewed in §2.2 in the context of the oldest written Zuberoan texts. First, there are specific contexts where the sound change is inhibited, as detailed below. Inhibitory effects are always the result of a following coronal, though not all coronals inhibit the shift. A second observation is that Common Basque /u/ does not front to /y/ when it is part of an inherited /au/ or /eu/ sequence. For example, from Common Basque *gau* "night", we do not find Zuberoan ***gaü*, but instead, *gai*. Older texts allow us to refine and ultimately explain these details.

The contexts hindering fronting involve a following coronal segment, but, as should be clear

from the examples in (1b), not all coronals inhibit fronting. The contexts where fronting is inhibited have been described in earlier literature (cf. Uhlenbeck 1903: 29-31; Gavel 1920: 39-69; Lafon 1999 [1937], 1999 [1958], 1999 [1962a], 1999 [1962b]; Michelena 2011 [1977]) and are also repeated in more recent papers (cf. Zarabozo 1972; Hualde 1993; Zuazo 2008; Oñederra 2009a, 2009b; Egurtzegi 2013: 129, 2014b). Michelena (2011 [1977]: 41-42) described three different contexts where fronting was inhibited: before /s̻/; before /ɾ/; and before /rtʰ, rt, rd/. Examples of maintained /u/ are shown in (3): in (3a) fronting is inhibited before an apical sibilant; in (3b) before a tap; and in (3c) before rhotic-coronal clusters, where the first element is a neutralized rhotic (probably a light trill, as in most modern varieties) and the second element is a coronal oral stop.

(3) Inhition of /u/-fronting in Zuberoan Basque

a) Before an apico-alveolar sibilant /s̻/

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
ikusi	*ikhusi*	[ikʰus̻i]	"see"
itsusi	*itxusi*, *itsusi*	[itʃus̻i], [its̻us̻i]	"ugly"
uste	*uste*	[us̻te]	"thought"
busti	*busta*, *busti*	[bus̻ta], [bus̻ti]	"to wet, wet"

b) Before a tap /ɾ/

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
ur	*hur*	/huɾ/	"water"
zur	*zur*	/s̻uɾ/	"wood"
hura	*hura*	[huɾa]	"he/she/it"
gure	*gure*	[gure]	"our" (but *gü* "we (ABS)", *gük* "we (ERG)", etc.)
zuri	*xuri*	[ʃuɾi]	"white"
urin	*urin*	[uɾin]	"animal fat"
hiru	*hirur*	/hiɾuɾ/	"three"

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
barau	*barur*	/baɾuɾ/	“fasting”

c) Before a (heterosyllabic) rhotic-dental cluster /rt, rtʰ, rd/

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
urte	*urthe*	[urtʰe]	“year”
urde	*urde*	[urd̪e]	“pig, animal”
urdin	*urdin*	[urd̪iɲ]	“blue”

Based on the data in (3), the statement of /u/-fronting in (2) must be revised. A preliminary revision is given in (4).

(4) Definition of /u/-fronting in Zuberoan Basque

/u/ > /y/ except /_X

Where X is either:

i) An apical fricative /s̻/,

ii) A tap /ɾ/,

or

iii) A rhotic + coronal-oral-stop cluster /rt, rtʰ, rd/

The problem posed by the blocking environments is a simple one. What do the environments in (4i-iii) have in common that is not shared by the laminal series /ʂ, ʈʂ/, the pre-palatals /ʃ, ʧ/, the trill /r/, plain /t d n l/ or other rhotic-stop clusters like /rk/ and /rp/? Though it may be tempting to invoke an apical/laminal contrast, both the trilled /r/ and the tapped /ɾ/ are apical sounds. Attempting to define the class of blockers in terms of place of articulation also seems misguided. While all of the inhibitors could be classified as [–anterior] (assuming [–anterior] assimilation in rt/rd clusters), the natural class of [–anterior, +coronal] would include the palatals, which are not inhibiting segments. In §3, a phonetic explanation is proposed for the class of blocking environments, grounded in theories of co-articulation with special reference to the tongue tip and tongue body.

In addition to Zuberoan, the northern subvarieties of Mixean Low Navarrese Basque also show /u/-fronting (cf. Camino 2009a, 2009b: 69). The only notable difference in these two varieties

is the group of segments that inhibit the process. In Mixean, the fronting of /u/ was inhibited before /s̲/, /ɾ/ and the clusters /rtʰ, rt, rd/, as in Zuberoan. However, in addition, fronting did not occur before the two velar obstruents /k/ and /ɡ/ (cf. Lafon 1999 [1962b]: 105-106; Camino 2009b: 70-71), where /ɡ/ is phonetically realized as [ɣ̞] after a vowel. Examples like those in (1c), which were systematically fronted in Zuberoan, do not show fronting in Mixean Low Navarrese, as illustrated in (5).

(5) Maintenance of /u/ before a velar consonant in Mixean Low Navarrese

Standard Basque	**Literary Zuberoan**	**Mixean Low Navarrese**	**IPA**	**Gloss**
suge	*süge*	*suge*	[s̲uɣ̞e]	"snake"
sukalde	*sükhalte*	*sukhalde*	[s̲ukʰalde]	"kitchen" (with root *sü* "fire")
ukan	*ükhen*	*ukhan*	[ukʰan]	"to have"
uko	*ükho*	*ukho*	[ukʰo]	"refusal"
nauk	*nük*	*nuk*	[nuk]	"I am (ALLOC.M)"
lukainka	*lükhainka*	*lukhainka*	[lukʰaɪ̯ŋka]	"spicy sausage" (cf. Vulgar Latin *lucanicia*)

As a consequence, in addition to (4), I also propose an explanation for why Mixean has the pattern of /u/-fronting described in (6).

(6) Definition of /u/-fronting in Mixean Low Navarrese Basque

/u/ > /y/ except /_X

Where X is either:

i) An apical fricative /s̲/,

ii) A tap /ɾ/,

iii) A rhotic + coronal-oral-stop cluster /rt, rtʰ, rd/,

or

iv) A velar oral stop /k, ɡ/

Two additional aspects of Zuberoan sound patterns directly related to the /u/-fronting sound

change have obscured the distribution of /u/ vs. /y/: phonological alternations that result from the sound change; and apparent exceptions to the patterns discussed thus far. First, as a consequence of the sound change in (4), morpheme alternants have evolved. For example, the Common Basque 2nd person pronoun *zu* and its possessive form *zure* and dative form *zuri* are continued as *zü* /ʂ̺y/, *zure* /ʂ̺ʊɾe/, *zuri* /ʂ̺ʊɾi/ in Literary Zuberoan, with an alternation between /y/ and /u/ in the pronominal root. Alternations due to old inherited compounds exist as well. For example, compare Literary Zuberoan *hur* /hʊɾ/ "water" and *zur* /ʂ̺ʊɾ/ "wood" with compounds *ühaitz* /yhaitʂ̺/ "river" (< *hur-han-i-tz "water-big") and *zühañ* /ʂ̺yhaɲ/ "tree" (< *zur-han-i "wood-big"), where the tap which inhibits /u/-fronting in the root has been lost under compound formation, allowing the fronting to take place.

At the same time, Romance loans, as well as analogical leveling, have given rise to clear exceptions to the general patterns of fronting and fronting-inhibition described above. The borrowed Romance suffix /-yɾa/ (cf. Gascon /-yɾa/) shows a front /y/ before a tap, as in Zuberoan /berdyɾa/ "verdure". Internal to Zuberoan, a stem like *larrü* /lary/ "skin, leather", from Common Basque *larru*, maintains the final /y/ in derived forms such as in *larrüsta* "cover with leather", where the suffix-initial segment is expected to inhibit fronting. Note, however, that the form of the suffix may have been *-zta* – with a non-inhibiting sibilant, as attested in other varieties – when the fronting occurred.

2.2 A revised description based on the oldest Zuberoan texts

In order to understand the distribution of /y/ in the oldest attested stages of Zuberoan Basque, I have examined the oldest texts written in this dialect. The results of this second study are compared to those of the first survey in §2.1 in order to highlight differences in the distribution of /y/ in the attested stages of Zuberoan and details of the sound change and its inhibition which were not noted in the earlier literature. Most of the documents for this second study date from the 17th century, although the 14th century *Censier Gothique* is a rare witness of an older stage. The full set of documents is: *Le Censier Gothique de Soule* (14th century, edited by Cierbide 1994); Etxart (from 1616-1617, edited by Lakarra et al forthcoming); Bela (17th century, included in Michelena 2011 [1964]: 168-171); Zalgize (17th century, included in Sarasola 1983: 173-178); Oihenart (2003 [1657]); Tartas (1995 [1666], 1996 [1672]); *Pronus* (Agirre Sarasola 1998 [ca. 1676]); and Belapeire (1997 [1696]). Texts from the 18th and 19th century have also been used for comparison

and are noted where relevant.[3]

Le Censier Gothique de Soule (Cierbide 1994) is the oldest known text which includes words in the Zuberoan dialect. It is a long text written in Gascon from the end of the Middle Ages and it contains many Basque house names from the region of Zuberoa (French *Soule*). The document does not have a date, and it is only known thanks to an attested copy (or vidimus) made in 1690. According to Jaurgain (Cierbide 1994: 16), the census was due to a survey ordered by the King of England in 1377. Orpustan (1990: 147) places it in the 15th century but later proposes the end of the 14th century instead (Orpustan 1999: 31, 75), presumably following Jaurgain's observation.

The writer of the *Censier* does not seem to have any clear differentiation of /u/ and /y/. There are some instances of the digraph <ou> in the document, but these were probably added by the 17th century copyist, given that the use of <ou> for /u/ in Gascon began in the 16th century (cf. Cierbide 1994: 48). Nevertheless, Orpustan (1999: 74-76) suggests that the appearance of assimilated vowels in variants and derivatives of Standard Basque *iturri* "source, fountain" may point to the front rounded vowel being already present in Zuberoan by the 14th century. The forms in question include: <uthurria> /ytʰyria/, <uthurraltea> /ytʰyraltea/; and, especially, the variants with high vowel assimilation together with palatalization of the intervening stop as in <utchurrie> and <utchurry>, /ycʰyria/ and /ycʰyri/.[4] In addition to the *Censier*, Orpustan (1999: 75) discusses the form <uthurburie> /ytʰyrbyria/, attested in Béarn in 1385. This form shows boundary unrounding of /y/ > /i/ (**ithürburü- > üthürbürü- + -a > üthürbüria*), which is necessarily more recent than u-fronting.

A recently discovered early attestation of the Zuberoan dialect is the correspondence between the Roncalese Ros and the Zuberoan Etxart from 1616-1617 (Lakarra et al. forthcoming). Etxart clearly differentiates /y/ from /u/ in the contexts of blocking discussed in §2.1: compare <goure> "our", <gourequi> "with us", <hirour> "three", <hirourec> "the three (ERG)", <irourac> "the three (ABS)", <hamairourguerren> "thirteenth", <ikoussi> "to see", <ikoussiric> "having seen", <ikoussiren> "to see (FUT)", <ouste> "opinion, idea", <eraccoutsi> "to show", <ourthe> "year", <ourthez> "for years", <ourthian> "in the year", <ourthiaren> "of the year", all with inhibition of fronting, to <uda> "summer", <guciac> "all", <hartu> "take", <çu> "you (SG)", where <u> corresponds to the fronted vowel /y/. A few words show variation, including *zure* "your (SG)", written as <çure> 17 times but as <çoure> 3 times. Recall that the uninflected form of this pronoun is *zü* "you (SG)", so, here, it is possible that the alternation in vowels has played a role. On the other

3 I'm grateful to Joseba Lakarra and Manuel Padilla for helping me find certain old Zuberoan texts.

4 Nevertheless, assimilation of a back rounded vowel /u/ with previous palatalization of the stop due to the etymological /i/ (cf. <itchurie>, also in the *Censier*) cannot be ruled out for these examples.

hand, the inflected forms of *gü* "we" do not show variation, and this author may have accommodated to his interlocutor, so the reason for this variation is unclear.

The Zuberoan writer Bela compiled a total of 45 proverbs around the beginning of the 17th century (Michelena 2011 [1964]: 168-171). Bela systematically differentiates /u/ <ou> from /y/ <u>. The contexts of blocking are shown by words such as <çouretic> "from the wood", <goure> "our", <houretaric> "from the waters", <eztakoussa> "s/he doesn't see", <dakoussanac> "the one who sees", <oustegabearen> "of the unexpected" and <bousti> "wet".

The Catechism written by Belapeire in 1696 provides additional evidence for the distribution of /y/ vs. /u/ in the 17th century. The examples of inhibition of u-fronting in this text include <houra> "that, she/he", <hour> "water", <barour> "fasting", <barourtu> "to fast", <hirour> "three", <hamirour> "thirteen", <goure> "our", <gouri> "to us", <çoure> "your", <çourequi> "with you", <çourez> "of wood", <iracourt> "to read", <iracourçaler> "to the readers", <iʃʃouri> "to spill", <itchouran> "in the appearance", <itçour> "to escape", <chouritarçuna> "excuse", <ourthe> "year", <ouste> "opinion, idea", <ikhouʃʃi> "to see", <eracoux> "to show", <eracouʃten> "showing", <houx> /hut͡s/ "mistake, empty". This last example is important as it suggests that the apical affricate /t͡s/ was also a segment that inhibited /u/-fronting, a topic discussed below.

Another text consistently distinguishing /u/ and /y/ is the anonymous Zuberoan translation of the *Pronus singulis diebus Dominicis clarè et distinctè immediatè post Evangelium populo legendus* (c. 1676) thought to have been written by Belapeire (Agirre Sarasola 1998: 22). In this text the author consistently uses <u> for fronted /y/ and <ou> for the cases of inhibition of the fronting, as in <houra> "that", <goure> "our", <gouri> "to us", <çoure> "your", <çouri> "to you", <çourequi> "with you", <hirour> "three", <barour> "fasting", <ourthia> "the year", <houx> "only", <houxic> "empty".

However, not all old texts provide clear evidence of the sound changes discussed in this paper. One of the classic works in the Zuberoan tradition is the collection of proverbs and poems written by Arnaud Oihenart. Although Oihenart specifically mentions the use of /y/ in the regions of Zuberoa and Mixe in the book's preface[5] (Oihenart 2003 [1657]), giving us an unusually concrete picture of the dialectal distribution of this vowel, Oihenart did not write his texts aiming for a Zuberoan public but rather for a wider Basque-speaking public. As a consequence, Oihenart did not use his native Zuberoan dialect in his work but looked for forms closer to the Lower Navarrese

[5] "Vocalic V is pronounced in Basque like "ou", as in Italian and Spanish, except in the region of Soule and a few areas in Lower Navarre, where it is pronounced as French u" ("L' V voyelle se prononce en Basque comme, ou, tout ainsi qu'ès Langes Italienne & Espanole, excepté au païs de Soule, & en quelques endroits de la Basse-Navarre, où il se prononce comme l'u François"; Oihenart 2003 [1657], my transation).

dialect (cf. Michelena 2011 [1964]: 171). Thus, Oihenart shows no graphic difference between /u/ and /y/ in his proverbs nor in his poems, and he uses <u> (or the variant <v>) for both vowels. For example, where /y/ is expected, one finds <ahuns> "goat", <ehun> "hundred" and <leku> "place", and the same where /u/ is expected: <vstea> "opinion, idea", <buʃti> "wet", <barur> "fasting", <hirur> "three", <urde> "pig" or <urte> "year". The use of <ou>, the sequence used to represent /u/ by his contemporaries, is kept to a minimum in his texts. Most instances of <ou> are found in his poetry and are consistently used to represent the vowel /u/, with examples such as <ourdin> "blue" and <ehoula> "in no way". There is one case in which Oihenart seems to make an orthographic distinction between /u/ and /y/, probably due to the proximity of the minimal pair in the text: <ehoun> /ehun/ "nowhere" (Standard Basque *inon*) vs. <ehun> /ehyn/ "hundred" (Standard Basque *ehun*), both in §IV, ¶7, p. 13 of his poetry (see Altuna & Mujika's introduction to Oihenart 2003 [1657]: 38).

Sauguis or Zalgize (Sauguis 1908-1909; Sarasola 1983: 173-178) is another Zuberoan author who seemed to avoid representing dialect differences in his orthography (cf. Sarasola 1983: 182). Zalgize compiled a total of 205 proverbs, none of which shows a difference between /u/ and /y/. He represents all instances of /u/ and /y/ with <u>, the only exception being the word <ourde> "pig" (Standard Basque *urde*), in which he (probably unintentionally) shows the non-fronted nature of the first vowel by using <ou>.

Tartas is yet another classic Zuberoan author who does not distinguish the two rounded high vowels orthographically. *Onsa hilceco bidia* (1666) does not show any graphic difference between the non-fronted vowels in the introduction, in words such as <çure> "your (SG)", <çuri> "to you (SG)", <hura> "that" or <iccuʃtera> "to see" vs. <çu> "you (SG)", <mundu> "world" or <lurrian> "in the Earth", and the same is true in most of his book. Nevertheless, in the first chapter, the author intersperses forms with <u> with forms with <ou> for words with the vowel /u/. As an example, page 12 shows five instances of the word *gure* "our", three of them written as <goure> and two as <gure>. Tartas only uses <ou> in the beginning of his first book, where it seems to be a consistent writing of /u/. In the following chapters, as well as in his second book *Arima penitentaren occvpatione devotaq* (1672), he consistently uses <u> for all examples of /u/ and /y/ where expected under this analysis. Words written with <ou> in inhibition contexts include: <goure> "our", <icouʃʃi> "see", <icouʃteco> "to see", <irakhourtçen> "reading", <houra> "that", <eracouʃten> "showing". Each of Tartas' books has some introductory or final short texts, some of them written in clear Zuberoan dialect, and these distinguish the high rounded vowels consistently. The dedication by P. Darhetz (Tartas 1995 [1666]) includes the words <çouré> "your" and <iracourtzen> "reading", the text by Bonnecasse (Tartas 1995 [1666]) includes <IRACOVRTV>

"to read", and the second text by Bonnecasse (Tartas 1996 [1672]) includes <iracourtu> "to read" and <ourthian> "in the year".

Examination of these texts allows a more comprehensive description of /u/-fronting with respect to the class of inhibiting consonants and the evolution of diphthongs. Most of the examples of inhibited fronting in the oldest texts correlate with those in the initial survey. These words include words derived from *hura* "that", *hur* "water", *gure* "our", *zure* "your", *zuri* "white", *zura* "wood", *hirur* "three", *barur* "(to) fast", *axuri* "lamb", *isuri* "to spill", *itzuri* "to escape", *irakurtu* "to read", *urte* "year", *urde* "pig", *urdin* "blue", *ikhusi* "to see", *itsusi* "ugly", *uste* "opinion", *busti* "wet" and *gustü* "flavor".

The tap /ɾ/ is a consistent inhibitor from the earliest texts showing a /u/ vs. /y/ contrast. One word that shows a non-fronted vowel in the oldest texts but fronting in the modern language is *itxura* "appearance" *ütxüa* in modern Zuberoan. Modern Zuberoan *ütxüa* appears as *itxura* in Belapeire (1997 [1696]) and in Maister (1757). The intermediate form *itxüra*, with fronting but no assimilation of the initial /i/ to /y/, appears at least in Maister (1757), Eguiateguy (1983 [1785]) and Archu (1848). The form *ütxüra*, with fronting and assimilation of the high front vowels, can be found in later texts such as the 19th century Inchauspe (1852) and *Catuchuma españoul* (1899, in Padilla-Moyano forthcoming). The irregular *itxura* > *itxüra* > modern *ütxüa* might be due to analogy with the suffix *-üra*. Recall that this suffix has been borrowed directly from Romance with a fronted vowel; furthermore, it is a high frequency suffix in both Zuberoan and Gascon, and it is expected to exert an analogical influence on similar wordforms.

Several lexical items suggest that a new segment must be added to the list of inhibiting consonants, namely the apical affricate /t̪s̪/. In the oldest texts, *huts* "empty; void; fault; mistake" and *erakutsi* "to show" both have non-fronted vowels, though the former is continued as *hüts* in modern Zuberoan. Confirmation of earlier *huts* is found in other texts: *huts* occurs at least once in *Pronus* and seven times in Belapeire. In contrast, *hüts* appears systematically in the 18th century writer Maister, as well as in later authors. Peillen's (1992: 252) statement about the change of *huts* to *hüts* occurring at the end of the 18th century can be refined: 18th century authors such as Maister and others used the fronted variant *hüts* systematically, but there was already variation between *huts* and *hüts* in the 17th century *Pronus*. The shift from *huts* to *hüts* during this period is difficult to explain but could be due to infection from a distinct lexical item, *ütz* "leave". Additional evidence confirming /t̪s̪/ as an inhibitor comes from Mixean Low Navarrese, where the modern dialect still shows *huts* and *erakutsi*. In sum, this additional evidence suggests that the sound change of /u/-fronting in Zuberoan should be modified as in (7).

(7) Definition of /u/-fronting in Zuberoan Basque

/u/ > /y/ except /_X

Where X is either:

i) An apical fricative or affricate /s̻/, /ʦ̻/

ii) A tap /ɾ/,

or

iii) A rhotic + coronal-oral-stop cluster /rt, rtʰ, rd/,

A phonetic explanation for this set of inhibitory segments is offered in §3.

Other descriptive details gleaned from the oldest texts inform our general understanding of the reflexes of Common Basque *u*. Here I comment on an assimilatory process eliminating earlier /y/ from the stem-determiner boundary. This study allows us to confirm an intermediate stage of glide epenthesis and to date the completed sound change to the 17th century. I also suggest a stage of Zuberoan with incomplete fronting of diphthongs /au/ and /eu/ at the beginning of the 17th century.

The oldest texts provide a clearer picture of the development of processes triggered by the addition of a vowel to a word ending in a vowel.[6] Modern Zuberoan has three prevocalic boundary processes: -e+V > -iV, -o+V > -uV and -ü+V > -iV. Compare *bele* "crow" with *belia* "the crow", *beso* "arm" with *besua* "the arm" and *negü* "winter" with *negia* "the winter".

Boundary e-raising (-e+V > -iV) is nearly systematic from the first texts of the 17th century, such as Etxart (Lakarra et al. forthcoming) from 1616-1617 (<baquia> "the peace", from *bake*, <doblia> "double (DET)", from *doble*),[7] so it may be assumed that this process is the oldest of the three. Boundary raising of -o+V to –uV is variable in the first authors of the 17th century (Bela's <escoüa> /eʂkua/ "the wax" from *ezko* but <bilhoa> "the hair", <otsoa> "the wolf" and <Elçoa> "mosquito", from *bilho*, *otso* and *eltxo*, respectively; cf. Michelena 2011 [1964]: 168-171), while later authors consistently show raising.

The case of boundary /y/ > /i/ (-ü+V > -iV) seems to be more complex. Bela shows maintenance of /y/ and glide epenthesis. Examples of /y/ maintenance are <cençua> "the sense", stem *zentzü*, <eskua> "the hand", stem *eskü* and examples of glide epenthesis include <lekuya> "the place", stem *lekü*. Etxart (1616-1617; in Lakarra et al. forthcoming) probably shows a more developed state of the evolution: he shows boundary epenthesis alongside cases of boundary unrounding: <lekuyetan> "in the places", <abizuia> "the warning", <manuia> "the command",

6 These processes are also found in other Basque dialects, cf. Michelena 2011 [1977]: 89-101.

7 Bela (Michelena 2011 [1964]: 168-171) shows e-raising: <Gossia> "the hunger", <umia> "the kid", etc., but also <luzea> "long (DET)" (cf. the bare forms *gose*, *üme* and *lüze*).

<Parlemenduian> “in the Parliament”, <Conseilhuiac> “the Council” vs. <ordian> “then, in time”, stem *ordü* “hour”, <governamendian> “in the government”, stem *gobernamendü*, <abentiaren> “of December”, stem *abentü*. Boundary glide epenthesis may have been the stage preceding the pattern found in Modern Zuberoan: *mündü – mündüa* > *mündü – mündüya* > *mündü – mündia* “(the) world”. This intermediate stage was first observed by Lafon (1999 [1937]: 87), who noticed that monosyllabic words maintained glide epenthesis in their determined forms for a longer period of time: *sü – süya* “(the) fire”, *blü – blüya* “(the) blue” and *thü – thüya* “(the) saliva”. The intermediate pattern of older stages of Zuberoan is similar to that found in the neighboring Low Navarrese dialect (where -u+V > -ujV) but involving /y/ instead of /u/. The neighboring Roncalese dialect shows determined forms such as *esku* “hand” + *-a* > *eskiua* “the hand”, *buru* “head” + *-a* > *buriua* “the head” (Azkue 1931: 254-255). I suggest that, in Roncalese, a similar pattern of glide insertion is followed by a glide metathesis: -u+V > -ujV > -juV. This would be consistent with the dialectal distribution of the glide insertion, and glide metatheses are attested in Roncalese as well as in other Basque dialects (Egurtzegi 2014a: 195, example 8.5). Later texts such as Tartas (1995 [1666]), *Pronus* (Sarasola 1998 [1676]) and Belapeire (1997 [1696]) show systematic boundary /y/ > /i/ (<Deebriac Infernian> “the demons in Hell”, <ſaintia> “the saint”, <eſpiritia> “the spirit”, <maniac> “the commands”, etc.), with very few exceptions such as <suya> “the fire”, from *su*, a form used by both Tartas and Belapeire.

This apparent evolution during the 17th century contrasts with the pattern of <uthurburie> /ytʰyrbyɾia/ (Béarn, 1385), the example used by Orpustan (1999: 75) to argue for the presence of /y/ in Zuberoan in the 14th century. If this early attestation is to be taken as a first instance of Zuberoan boundary /y/ > /i/ (instead of a mistake or a later adaptation of the place name), then we could assume that either the process spread very slowly from one variety of the dialect to another or that many of the authors from the 17th century tried to accommodate to a different dialect. While this accommodation is clear in the texts of Oihenart, Zalgize and Tartas and may be a possibility in cases such as Etxart accommodating to his Roncalese interlocutor, this does not seem to be the case for other authors such as Bela or Belapeire. Taking into account that the evolution seems to have a path that can be inferred from the texts (/-yV/ > /-yjV/ > /-iV/), this last possibility can probably be dismissed.

The oldest text available, the *Censier,* was examined in order to determine whether boundary /y/ > /i/ occurred as early as the 14th century. In this list of house names, many items that end in the determiner *-a* can be found, providing the context for prevocalic boundary processes. Although there are nearly two hundred items with potential contexts for boundary processes, only half a

dozen show boundary e-raising.[8] Thus, the oldest attestations point towards an early development of -e+V > -iV. However, at this point in time, there is no evidence of the other two boundary processes.[9]

Recall from §2.1 that the /u/ of Common Basque vowel sequences /au/ and /eu/ does not undergo fronting to /y/. Instead of yielding a front rounded glide, most /V u̯/ diphthongs were fronted and unrounded to /V i̯/ in both Zuberoan and Roncalese (cf. Michelena 2011 [1977]: 76). Examples of fronted /V u̯/ diphthongs from Literary Zuberoan are shown in (8).

(8) Fronting of /V u̯/ to /V i̯/

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
gau	*gai*	[ɡai̯]	"night"
gauza	*gaiza*	[ɡai̯s̻a]	"thing"
auzo	*aizo*	[ai̯s̻o]	"neighbor"
laudatu	*laidatü*	[lai̯ð̞aty]	"to laud, to praise"
belaun	*belhaiñ*	[belʰai̯ɲ]	"knee"
leun	*lein*	[lei̯ɲ]	"soft"

However, this fronting was contextually limited, in a manner reminiscent of the inhibitory contexts for /u/-fronting discussed above, as illustrated by the examples in (9).

(9) Diphthongs with maintenance of /u̯/

a) Before a rhotic /ɾ, r/ or an apico-alveolar sibilant /s̻, ʦ̻/

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
lau	*laur*	/lau̯ɾ/ [lau̯r]	"four"
hau	*haur*	/hau̯r/ [hau̯r]	"this"

[8] The words identified are *Aguerrie*, *Albistia*, *Barnechia*, *Guaricotchie*, *Iratzssitie* (?) and *Ibarrexia*.

[9] There is one potential instance of boundary /y/ > /i/ in *Aramburrie*, but only if the second word was intended to be written <burie>, with a single <r>. The basis of this suggestion is another housename, *Aramburue* (cf. Standard Basque *haran* "valley", *buru* "head"), and the fact that *burri, burru* are not recognizable words in Zuberoan, while *bürü* "head" is. Nevertheless, it is also possible that this is a scribal error and that the second <r> and the <i> were originally an <u>, so that the original word was <burue> /buɾua/, the expected unaltered form.

zauri	*zauri*	[ʂaʊ̯ɾi]	“wound”
euri	*euri*	[eʊ̯ɾi]	“rain”
ausartu	*ausartüi*	[aʊ̯sarty]	“dare”
euskara	*euskara*	[eʊ̯skara]	“Basque”
haur	*haur*	/haʊ̯r/	“child”
hauts	*hauts*	[haʊ̯ʦ]	“dust”

b) After a palatal glide/fricative /ʒ/ (< *j)

Standard Basque	**Literary Zuberoan**	**IPA**	**Gloss**
jaun	*jaun*	/ʒaʊ̯n/	“sir”[10]
jauki	*jauki*	/ʒaʊ̯ki/	“to commit”
jantzi	*jauntsi*	/ʒaʊ̯nʦi/	“to dress”
jauzi	*jauzi*	/ʒaʊ̯ʂi/	“to fall, to jump”

As shown by (9a), fronting was inhibited when the semivowel was followed by /ʂ/, /ʦ/, /ɾ/ and /r/. Examples in (9b) show inhibition when the palatal glide/fricative precedes the diphthong. Two main differences, then, between this fronting and the general u > y sound change are the inhibitory status of trilled /r/ in the process and the inhibitory role of the syllable-initial palatal.[11]

The fronting of diphthongs is illuminated by the correspondence between Etxart and Ros (1616-1617). Neither Zuberoan nor Roncalese show a consistent pattern until the 17th century. For instance, both use *gauza* “thing” instead of *gaiza*, the form found in the later stages of both dialects. In addition, Etxart uses *gauaz* “at night” instead of *gai-* as well as consistently using verbal forms with the root *-erau-*: *igorten derauziet* “I send (it) to you”, *gomendatzen derauzut* “I recommend (it) to you”, *respuestu eginen derautazu* “You will give me a response”, *eskribaturen derautazula* “that

10 See also Roncalese *jein* “sir”, with fronting of the glide.

11 Concerning the forms in (9b), the inhibition of the fronting has been attributed to avoidance of *jau-* > ***jai-* in the literature, although Michelena (2011 [1977]: 77) expresses doubts about this statement and adds that some instances of *-au-* in verbal radicals may be secondary. Note, however, that had the words in (9b) not diphthongized by the time the general Zuberoan u-fronting occurred, they would show a fronted /y/ instead of a velar semivowel. Word-initial yod is maintained in some Basque dialects, although modern Zuberoan shows [ʒ] instead. Rising diphthongs involving /w/ were unaffected by the process, as they probably evolved after this sound pattern was developed (cf. Egurtzegi 2014a: 126).

you will write to me", etc. Nevertheless, Etxart systematically writes *aizo* "neighbor", showing that fronting of diphthongs was occurring in some words in his variety. Ros does not show any instance of diphthong fronting in the few potential cases where it could occur (e.g., *gauza* "thing"). Tartas (1995 [1666]) does not show fronting in diphthongs either in his most accurately written first chapter (*gauza*, *gauaz* "at night"), nor is it observed in the short texts and dedications written in Zuberoan by other authors in his books (e.g., *lauda* "to laud"), but there are not as many potential examples as in Etxart and Ros' correspondence. Other 17th century works such as *Pronus* (c. 1676), Belapeire (1997 [1696]) and the undated text of Bela (who died in 1667), regularly show fronted diphthongs.

In sum, the oldest texts reveal details of the evolution of vowel sequences that have not been remarked on before. At the word boundary, unrounding of final /y/ followed by the determiner occurred after glide-insertion, and this process was preceded by the raising of /e/ to /i/ at the same boundary. Word-internally, diphthongs /au/ and /eu/ shifted to /ai/ and /ei/ respectively, with inhibitory contexts similar to but distinct from those detailed above and summarized in (7) for /u/-fronting in Zuberoan. More importantly, if the diphthong fronting is as recent as suggested by the texts, beginning only in the 17th century, they must be distinct from the earlier process of /u/ fronting, which appears to have started at least several hundred years before then. With this review of the oldest texts complete, and the description of Zuberoan /u/-fronting stated as in (7), I attempt to explain aspects of this process. How and why did /u/ undergo fronting, and why was this fronting inhibited in certain contexts?

3. Explaining the u > y sound change

Examination of the oldest texts has allowed us to offer a more detailed description of Zuberoan u-fronting and the contexts where fronting did not apply. I now discuss previous approaches to Zuberoan /u/-fronting before presenting a proposal aiming to integrate contact as a causal factor and phonetic factors determining the inhibitory contexts.

3.1 Previous approaches to Basque /u/-fronting

Since Zuberoan /u/-fronting was first described more than a century ago, different authors have refined its description and proposed a range of analyses, briefly reviewed here in chronological order.

Uhlenbeck's treatment of Zuberoan describes the distribution of /u/ vs. /y/ in relation to the segment that follows the vowel. Uhlenbeck (1903: 29-31) describes a general /u/ > /y/ process with

maintenance of /u/ before /ɾ/ and /s̺/ but does not mention other blocking contexts.

Gavel (1920: 46-69) argues generally for a Bearnese origin of Zuberoan /u/-fronting. He describes a distribution of /y/ similar to that of Uhlenbeck (1903) but adds some cases of maintenance before "preconsonantal r", followed by some seemingly similar cases that show fronting instead. In order to account for presence or absence of fronting in the same contexts, he hypothesizes that unfronted /u/ may have been followed by a tap in older times, while the rest were followed by a trill (1920: 45). Gavel treats some of exceptions to the general pattern in terms of analogy and others as due to the influence of Bearnese Gascon (1920: 42-44).

Lafon dedicated several papers to Basque /u/-fronting (cf. Lafon 1999 [1933]; 1999 [1937]; 1999 [1962a]; 1999 [1962b]). In addition to the already established inhibitory effects of /ɾ/ and /s̺/, Lafon (1999 [1962a]: 97) proposes that /u/ was also maintained before /nk/ clusters, although he only offers one word as evidence (*hunki* "to touch"). Lafon (1999 [1933]) also discusses the maintenance of /u/ before rC clusters, as first described by Gavel (1920: 45): According to Lafon (1999 [1933]: 75), /u/ was only maintained when followed by a cluster formed by a rhotic and a dental stop /d, t, tʰ/ or a rhotic and an affricate /ʦ̺, ʧ̺, ʧ/. Nevertheless, the only evidence Lafon offers for maintenance of /u/ before rhotic + affricate clusters is *murtxatü* "to suck". Lafon went farther than Gavel in his discussion of contact-induced change. He proposed that contact and bilingualism with Gascon triggered Basque /u/-fronting (1999 [1962a]: 108-111; 1999 [1962b]: 139-142) but that the different "articulatory habits" of Basque speakers conditioned it (1999 [1962b]: 142). He assumed that /u/-fronting was borrowed either at the same time or shortly after it developed in Gascon, giving preference to the former possibility (1999 [1962a]: 111). Lafon also assumed that /u/ > /y/ preceded /o/ > /u/, given that late /u/ was unaffected by /u/-fronting (1999 [1962a]: 102). Lafon (1999 [1937]: 87) was the first to propose the intermediate stage /y.ja/ in the evolution of boundary unrounding of /y/ (/y.V/ > /y.jV/ > /i.V/), after observing that monosyllabic words showed glide epenthesis in their definite forms: *sü – süya* "(the) fire", *blü – blüya* "(the) blue" and *thü – thüya* "(the) saliva". My analysis of the oldest Zuberoan texts in §2.2 provides further support for these developments.

Zarabozo (1972) was the first to try to propose a unified account of the inhibitory contexts of Zuberoan /u/-fronting. Zarabozo defines the natural class of /ɾ/ and /s̺/) in terms of the phonological feature set [+cor, +cont, –tense, –distr, –lat] (Zarabozo 1972: 176), which he later redefines as [+cor, +back, –tense, –lat] (1972: 177). His use of [–tense] is meant to include the tap and exclude the trill. Zarabozo does not discuss rT clusters, although these clusters were already established as inhibitory contexts by Lafon (1999 [1933]) and the first edition of Michelena (2011

[1977]) in 1961. In addition to rT clusters, Zarabozo (1972) does not treat /ʦ̲/ as a blocking segment. Finally, the natural class Zarabozo defines will include palatals, however, as noted earlier, fronting does occur before palatals in Zuberoan.

Michelena (2011 [1977]: 41-42) places /u/-fronting prior to the oldest Zuberoan documents and describes the contexts where it did not develop as before /ɾ/, /s̲/ and before a cluster formed by a rhotic and an apical stop rT. Michelena discards Lafon's (1999 [1962a]) proposal that /u/-fronting was inhibited in *hunki* "to touch" due to the /nk/ cluster, since /u/ in this case derives from older *o. In addition, Michelena argues against /rʧ/ as a blocking cluster, first by stating that Lafon (1999 [1933]) does not give enough evidence for it (2011 [1977]: 42) and later by finding an etymology for Lafon's only example *murtxatü* "to suck" in Latin *mors-* (*mordere*) "to bite" (2011 [1977]: 360). Michelena (2011 [1977]) refines the contexts of maintenance of /u/ that Uhlenbeck, Gavel and Lafon previously described but does not propose an analysis, leaving the description in the form of a list. Nevertheless, he presents a hypothesis based on reconstructed allophones of /o/ ([ɔ, o]) and /u/ ([ʊ, u]) that, after a new distribution, give rise to a third phoneme (2011 [1977]: 44): [ɔ] > /o/, [o, ʊ] > /u/ and [u] > /y/. Michelena's description of the inhibitory contexts differs from the description in (7) in not including /ʦ̲/ as a blocking segment.

After Michelena's work, the discussion on Zuberoan /u/-fronting did not advance until Oñederra (2009a, 2009b). Most authors mentioning this process just echoed previous descriptions. In his book on contact and sound change in continental Basque, Haase (1992: 41-42) briefly discusses /u/-fronting by describing it and linking it to Gascon. He probably follows Lafon in his description of the inhibitory contexts, given that he includes /rʧ/ clusters among the environments where /u/ was maintained (Lafon 1999 [1933]: 75). Hualde (1993: 291) discusses /u/-fronting briefly and mentions only /ɾ/ and /s̲/ as inhibitory contexts, while Trask (1997: 150) lists the environments of the change as previously described by Michelena (2011 [1977]). More recently, in his overview of Basque dialects, Zuazo (2008: 44) echoes the inhibitory contexts listed by Michelena (2011 [1977]) and states that Zuberoan /u/-fronting is due to the influence from Gascon.

Oñederra (2009a) presents /u/-fronting in Zuberoan as an example of a process which resists explanation in terms of its motivation, stating that "A clear phonetic explanation seems unreachable in light of the available data" ("Una explicación fonética clara parece inalcanzable a la luz de los datos disponibles", my translation) (2009a: 56). Oñederra (2009a: 58, 2009b: 671) follows Michelena (2011 [1977]: 41-42) in not considering /ʦ̲/ an inhibitory segment. Following Bichakjian's (1974) proposal for French /u/-fronting, Oñederra (2009a: 62) reconstructs a multi-stage pathway involving diphthongization and monophthongization (*u* > *uw* > *iw* > *y*) for Zuberoan

/u/ > /y/. Though she suggests that it was diphthongization that was inhibited, not fronting, invoking opaque prosodic factors as potential triggers, she presents no evidence to support this proposal (Oñederra 2009a: 63, 2009b: 676). Oñederra's (2009a) proposal is similar to earlier accounts in invoking contact with Gallo-Romance, however, in a more recent paper, Oñederra (2009b: 675) leaves contact aside.

The present analysis builds on the description of Zuberoan /u/-fronting first presented by Uhlenbeck and Gavel and later refined by Lafon and Michelena. It adds another inhibitory segment (/t͡s/) as observed in the oldest attestations. In contrast to Oñederra (2009b), a central role for contact is acknowledged (§3.2), and a phonetic explanation grounded in typological and articulatory studies is proposed (§3.3).

3.2 The role of contact

Our analysis of Zuberoan involves a general shift of u > y with a closed class of post-vocalic consonants or consonant clusters inhibiting the shift (7). Languages with a context-free high back vowel fronting include Gallo-Romance languages such as French (Harris 1988: 210) and Occitan (Wheeler 1988: 247), the Gallo-Italic languages (Piedmontese, Lombard, Emilian, Romagnol, etc.) and Arpitan (Franco-Provençal). Outside of Romance, a similar sound change is described for Greek (Fortson 2010: 253), Albanian and the Lolo-Burmese language Akha (Labov et al. 1972). Some English dialects such as Standard Southern British English (Hawkeys & Midgley 2005; Henton 1983; McDougall & Nolan 2007; Harrington et al. 2008; Harrington 2012), Australian English (Cox & Palethorpe 2001), New Zealand English (Gordon et al. 2004) and Southern and General American English (Bailey 1997; Fridland 2008) have fronting of /u/, but it gave rise to /ʉ̟/ instead of /y/ and it did not create a new phonological contrast. /u/ > /ʉ̟/ fronting is also found in Swedish, Açorean and some varieties of European Portuguese (José Ignacio Hualde, personal communication). /u/-fronting is one of the sound changes involved in chain shifts as analyzed by Labov (1994: 116).

Though front rounded vowels are quite common in Western Europe, they are less so in other parts of the world, which might suggest that a catalyst for the Zuberoan u > y shift was contact with surrounding Romance languages with /y/. Only 6.6% of languages (37 out of 562) in the WALS database (Maddieson 2013) have front rounded vowels. In addition, 78% of the languages with front rounded vowels in the survey (29 out of 37) are found in the North-Central area of the Eurasian continent. Outside of this area, languages with front rounded vowels are scarce (cf.

Blevins, forthcoming).

As noted earlier, Basque front rounded vowels have not evolved in isolation. Zuberoan is spoken in an area adjacent to where Romance languages that also have front rounded vowels are spoken, and, indeed, this is part of a larger region where front rounded /y/ may be seen as an areal feature. Given this, it seems likely that contact has played a role in the development of a cross-linguistically uncommon sound pattern. However, determining to what extent this contact has influenced the evolution of areal /y/ is non-trivial. If /y/ evolves from /u/ in native vocabulary, how does the shift occur?

Evolutionary Phonology (Blevins 2004, 2015, forthcoming) highlights the evolution of regular sound change in the context of areal contact and may be useful in understanding how sound patterns like the /y/ vs. /u/ contrast may spread. Blevins (forthcoming) suggests that language experience in a multilingual environment alters phonetic perception via the 'perceptual magnet effect' (cf. Kuhl 1991, 2000; Kuhl & Iverson 1995). The central idea is that 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 in the first. Blevins (forthcoming) argues that in situations of long-term bilingualism, an external phonetic prototype may be internalized and act as a perceptual magnet in the first (or other) language of the infant.

Crucial to this model are the notions that the establishment of a phonetic prototype requires perceptual saliency of the segment involved, as well as intense language contact spanning multiple generations. An interesting prediction of the model is that "sound change will appear to be natural and phonetically motivated and indistinguishable from internal developments" (Blevins forthcoming). In general terms, the model demonstrates how sound patterns can spread via contact independent of lexical borrowing, phoneme borrowing or borrowing of specific sound patterns or sound changes.

Turning back to Zuberoan, we see that all of the ingredients for a u > y shift are present. Zuberoan has /u/, and speakers of the language have had long-term intense contact with Gascon, a language with a /u/ vs. /y/ contrast. The vowel /y/, like other front rounded vowels, is, arguably, perceptually salient. If it were to act as a perceptual magnet as understood by Blevins (forthcoming), it would draw tokens of the phonetically close /u/ even closer to its prototype when speakers of a language which lack /y/ are in close and continued contact with speakers of a language that has /y/ in its phonological inventory.[12]

[12] The model developed in Harrington & Schiel (forthcoming) makes the same prediction based on different

This is the scenario I propose for speakers of Zuberoan and Mixean Basque in contact with speakers of Bearnese Gascon. Recall that Zuberoa was part of Béarn in the Middle Ages (Haase 1992: 19) and Bearnese Gascon was the only written language in use in Zuberoa until the 17th century (Séguy 1952: 385), as well as being the official language of the region and the language of scholarly communication (Gavel 1920: 47). Thus, many Zuberoan speakers were bilingual in Gascon for centuries (Lafon 1999 [1962a]: 108). This has resulted in a great number of Gascon loanwords in the two dialects (for instance, see the long list of borrowings with a stressed nasalized vowel in Egurtzegi 2014a: 156, example 6.9) and many shared sound patterns including loss of intervocalic *n, development of nasalized vowels, similar stress systems, /o/-raising and /u/-fronting (cf. Egurtzegi 2014a). However, it should be clear that /u/-fronting is not the result of Romance loan words coming into the language. Fronting of /u/ takes place in inherited Basque words and is sensitive to properties of inherited Basque consonants that follow the target vowels. Loanwords or borrowed morphemes (e.g., Romance /-yra/) may constitute exceptions to the general pattern. The inhibiting segments described in (7) are specific to Zuberoan, and there is no known language in the world that has a sound change with these conditions from which the Basque pattern could be directly borrowed. In sum, Zuberoan fronting is a unique sound change integrating an external stimulus with internal phonetic and phonological conditions. In the next section, I suggest phonetic factors underlying the unique inhibitory contexts.

3.3 The phonetic basis of inhibited fronting

Why do seemingly context-free vowel shifts occur so often in the world's languages? The pronunciation of a vowel is variable, and the extent of this variability may be limited by the division of the vocalic perceptual space in each language (Bradlow 1995). The perception of a given vowel is not categorical. Instead, some exemplars (prototypes) are judged to be more typical than others. Prototypes make the perceptual distance between them and the exemplars that surround them smaller than psychophysically expected, warping these exemplars into the same category. This is known as the 'perceptual magnet effect' (Kuhl 1991, 1995; Kuhl & Iverson 1995; see also Blevins 2004: 286).

In addition, according to the exemplar theory of speech (Johnson 1997; Pierrehumbert 2001), "a new token which is well positioned with respect to a category can actually provide a better example of that category (in being recognized quickly and rated highly) than any actual

assumptions.

example of that category that has been previously experienced" (Pierrehumbert 2001: 143). If no phonological category is assigned to a neighboring psychoacoustic space, prototypes may move over time, effectively dragging all non-prototypical exemplars with them. Thus, context-free vowel shifts may be expected when acoustic space is available.

In Gallo-Romance, systematic /u/-fronting has been attributed to a push-chain (cf. Labov 1994: 116). The raising of the mid back vowel /o/ to /u/ would have overcrowded the high back vowel space, and that would have triggered the fronting of /u/ to /y/ (Haudricourt & Juilland 1970: 114).

Harrington (2012) argues that context-free fronting of /u/ starts from coarticulatory contexts. Coarticulation can be a source of various kinds of sound changes (Ohala 1981, 1993), like vowel harmony (Beddor et al. 2002) or vowel nasalization (Hajek 1993).

According to Harrington (2012: 104), perception-production relationships tend to be aligned in coarticulatory patterns (Fowler 2005) and it is only during a sound change in progress that production and perception are misaligned. In this scenario, the actual sound change would occur 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).

Under this account, both perception and production may be involved in the source of the change: contextual coarticulation is no longer compensated by the listener (a case of hypocorrection, cf. Ohala 1993) and the outcome of fronting environments is then phonologized in other phonological contexts (Harrington 2012: 116), given a shift of the variants in non-fronting contexts toward the variants found in fronting contexts. This analysis is consistent with Harrington's observation that the context-less /u/ in younger generations of speakers of English is similar to the /u/ produced in fronting contexts by older generations of speakers of the same variety.

The most usual consonantal coarticulatory situations where a back vowel is fronted are environments involving alveolar consonants (Flemming 2003; Öhman 1966). Harrington et al. (2011) looked for the predisposition towards the fronting of /u/ in German in T$_{_}$uT$_{_}$ context (where T is a voiceless stop) and found that both the onset and offset of /u/ in /tut/ as well as the onset of /u/ in /kuk/ were well into the /y/ space (Harrington 2012: 106). Further, high back vowels are more prone to diachronic fronting than high front vowels are to retraction, as empirically tested by Harrington (2012: 115-116).[13] Given that coronals seem to trigger /u/-fronting, the class of inhibiting

13 Centralization is known in lax vowels: /ɪ/ in New Zealand English (Maclagan & Hay 2007, also Moon & Lindblom 1994).

segments specified in (7), all coronals, is surprising. However, when articulatory properties of these sequences are considered, a unified explanation may be possible.

From the typological parallels mentioned above, the case of the context-free fronting of American English /u/ is of special interest. This was a southern feature but now is described as covering most of the North American continent (Labov 2008: 27). In the American case, a following dark [ɬ] inhibits the process when following the target /u/, parallel to inhibition of fronting before /ɾ, s̻, t̻s̻, rtʰ, rt, rd/ in Zuberoan Basque. However, this constraint does not occur in Southern American varieties, although it does exist in most non-Southern varieties (cf. Labov et al. 2006: 152).

It may be hypothesized that the inhibition before [ɬ] was active when the sound pattern began to spread northwards but it is not active anymore. Alternatively, both sound patterns, although clearly areal, may have developed independently. Koops (2010: 113) weighs both possibilities and concludes that these sound patterns represent two processes.[14] Inhibition before [ɬ] is still active in non-Southern dialects, where the degree of fronting is even greater than in the Southern dialects (cf. Labov et al. 2006: 153), although this sound change is described as being already complete there (cf. Baranowski 2008).

The inhibition of English /u/ > /ʉ/ by a following dark [ɬ] may be attributed to the degree of shared gesture of the consonant and the affected vowel. The degree of coarticulation in tautosyllabic /ul/ sequences is extreme, and this, coupled with the 'back' specification for the lateral, is ultimately inhibitory.

The consonants that inhibit /u/-fronting in Zuberoan do not appear to share gross articulatory gestures with the preceding vowel. However, Recasens & Pallarès (2001) suggest reasons for the resistance to coarticulatory processes in a combination of place and manner that may illuminate the nature of inhibition of fronting. As Recasens & Pallarès (2001: 274) point out, tongue dorsum coarticulation data show that highly constrained consonants have large coarticulatory effects in contiguous vowels and can inhibit vowel dependent effects (Fowler & Saltzman 1993). According to them, 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:

> It thus appears that consonants involving demanding manner requirements (and little dorsopalatal contact) block consonantal and vocalic effects at the palatal zone, i.e.,

14 Koops discerns two different kinds of 'fronted u' in the speech of Houston Anglos, which "differ in a number of fine phonetic details" (2010: 119). According to him, these two types of /u/ show the properties of Southern fronted /u/ and the general American palatalized back vowel.

apical vibration for r, frication for s and, less so, laterality and the formation of a secondary lingual constriction for dark ɬ (Recasens & Pallarès 2001: 288).

Thus, this secondary placement of the tongue dorsum may play a role in inhibiting u > y in Zuberoan Basque. 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. Recall that the group of segments or clusters that inhibit the process include precisely the expected segments: the apical rhotic /ɾ/ and the apical sibilants /s̻/ and /ʦ̻/ but not the laminal sibilants /ʂ/ and /ʧ/, which deviate from the other sibilants precisely in being produced with the blade of the tongue instead of the tip and thus do not require a back placement of the tongue dorsum. Interestingly, the only rhotic-obstruent clusters included /rtʰ, rt, rd/ are those involving activity of the tip of the tongue in both consonants. The production of [t] in neutral contexts like /ata/ is lamino-dental, i.e., [at̪a], the realization of the /t/ after a rhotic is more retracted than in intervocalic contexts and may also involve less of the tongue blade. This can shed light on why these clusters inhibit fronting, while sequences like /tut/ favor it. The other rhotic-obstruent clusters do not inhibit fronting, since they involve non-coronal segments as second members.

The segments that inhibit fronting in Mixean Low Navarrese, namely /k/ and /ɡ/, are also produced with a back placement of the tongue dorsum, so that they could potentially create the same coarticulatory effect that the segments that inhibit the process in Zuberoan Basque produce. It is worth mentioning that, as stated above, productions of the sequence /kuk/ by speakers of German show instances of /u/ into the /y/ space but, crucially, only in the onset, while in the case of /tut/ the coarticulation occurs in the offset as well as the onset (Harrington et al. 2011; Harrington 2012: 106). Thus, the VC coarticulation of the sequence /uk/ seems to result in a back vowel, which is consistent with its status as an inhibiting segment in Mixean Low Navarrese.

In short, inhibition of u > y as analyzed here is a consequence of coarticulatory effects due to the tongue dorsum lowering and backing required for the production of the set of coronal segments and clusters /ɾ, s̻, ʦ̻, rtʰ, rt, rd/, which demand precise movements of the tip of the tongue.

4. A revised Zuberoan chronology based on u-fronting in neighboring Romance languages

In this section I briefly describe the u-fronting processes found in the Romance languages that have been in contact with Zuberoan Basque, Gascon and French, before discussing the chronology of the processes in these languages in order to propose an approximate chronology for Zuberoan u-

fronting. Vulgar Latin long *ū* (/u:/) was regularly fronted to /y/ in French (Bourciez 1967: 94) and Gascon (Rohlfs 1977: 124).[15] Examples in (10) show this fronting in both Gascon and French with Latin forms for comparison. The examples of Bearnese Gascon are taken from Lespy & Raymond (1998 [1887]) and Palay (1980 [1932-1934]). The transcriptions of Donzacese Gascon are taken from Kelly (1973).[16]

(10) /u/ fronting in Gascon and French

Bearnese Gascon	**Donzacese Gascon**	**French**	**IPA**	**Latin**	**Gloss**
utile	/y'tile/	*utile*	/ytil/	*ūtĭlis*	"useful, helpful"
lue, *lu*[17]	/'lyno/[18]	*lune*	/lyn/	*lūnam*	"moon"
ue, *u*	/'yno/	*une*	/yn/	*ūnam*	"a, one (F)"
lèytugue	/lɛj'tyɡo/	*laitue*	/lety/	*lactūcam*	"lettuce"
dur	/dyr/	*dur*	/dyʁ/	*durum*	"hard"
cuu, *cu*	/kyw/	*cul*	/ky/	*cūlum*	"ass"

Given the widespread presence of u-fronting in the Gallo-Romance languages, one might think that this sound pattern developed during an older, common period of these languages, as in Gallo-Romance, for instance, which is usually placed from the end of the 5th century until the middle of the 9th century. However, Hall (1976) does not reflect this sound change in his transcriptions of Early Old French.

The /u/-fronting sound change was systematic in French and has been accounted for by means of a push-chain (cf. Labov 1994: 116). It has been proposed that the raising of the mid back vowel /o/ to /u/ overcrowded the high back vowel space, which subsequently triggered the second

15 Gascon is usually considered an Occitan dialect (although not necessarily, cf. Chambon & Greub 2002) but deviates from the other Occitan dialects to some extent.

16 Examples of the fronting in Occitan include *un* /yn/ "one (M)", *tu* /ty/ "you (SG)", *segur* /segyr/ "safe, sure".

17 Intervocalic /n/ is dropped in Gascon (Anglade 1921: 185) as in Gascon *lüa* /'lya/ < Latin *lūnam* "moon", Gascon *üa* /'ya/ < Latin *ūnam* "a, one (F)", Gascon *prüa* /'prya/ < Latin *prūnam* "coal" or Gascon *fiestra* /fi'estra/ < Latin *fĕnestram* "window".

18 Latin word-final *-a* is maintained as /a/ in Bearnese, raised to /o/ in most Gascon dialects, including the Donzacese variety in Example (10) – as well as in Occitan – and raised to /e/ in Landes and in the Bayonne-Orthez region (cf. Rohlfs: 1977: 125). In addition, the Bayonnese variety drops this final *-e* after a stressed /y/ or /i/: *lu* /ly/ "moon" (< Latin *lūnam*), *u* /y/ "a, one (F)" (< Latin *ūnam*), *hari* /ha'ri/ "flour" (< Latin *farīnam*), *gari* /ga'ri/ "hen" (< Latin *gallīnam*).

step in the chain-shift (Haudricourt & Juilland 1970: 114). This explanation separates the fronting of /y/ from that of /æ/ (/'a/, /a:/ > /a:/ > /æ:/ > /ɛ/), which is one of the vowels triggering the second (or Gallo-Romance) palatalization. In fact, /u/ > /y/ fronting took place after the so-called second palatalization, which is taken as the crucial process in the separation between northern and southern Gallo-Romance, i.e., Old French and Old Occitan (cf. Buckley 2009: 32).[19] The second palatalization began around the end of the 5th century or the beginning of the 6th (apud Meyer-Lübke 1890: 354ff.), but /k/-palatalization did not develop until much later, being usually placed around the 7th century (Fouché 1958: 203ff.; Bourciez 1967: 94-95; Matte 1982: 102; Buckley 2009: 38-39). Examples such as Latin *curam* > Old French *cure* /kyr/ "cure" (and not **/ʧyr/) or Latin *cūpam* > French *cuve* /kyv/ "barrel" (and not **/ʧyv/) provide the evidence for placing French u-fronting after Gallo-Romance palatalization (Bourciez 1967: 95; Buckley 2009: 39). Thus, /u/-fronting in French may be placed in the period when the first Old French texts were written, i.e., around the 9th century (Bourciez 1967: 94-95).

Given that u-fronting developed after the division of the languages of Oïl and Oc (Old French and Old Occitan), the time frame in Occitan might be different. Latin /u:/ being maintained orthographically after u-fronting makes establishing a chronology in Old Occitan more complicated than in Old French (cf. Anglade 1921: 82). Nevertheless, Anglade (1921: 84) finds instances of palatalization of /l/ before front vowels in medieval texts from the end of the 13th century, and these include fronting before graphic <u>. This evidences the fronted status of /y/ in Occitan by the end of the 13th century but does not give us a clear date.

Dating the fronting is even more complicated within Gascon. Rohlfs (1977: 124) acknowledges this and proposes a rather recent time frame, without further temporal specification. Rohlfs (1977) proposes that the sound pattern extended gradually from one region to another and that it was already completed by the time /o/ raised to /u/ before a nasal, given that the latter was unaffected by u-fronting. According to Chambon & Greub (2002: 489), the processes that made Gascon distinct from Occitan began around the 5th century and were completed by ca. 600, so that Gascon was an independent language by the time u-fronting developed within French.

The fronting of Vulgar Latin /u/ (< Latin /u:/) seems to have spread geographically from one Romance language to another and ultimately into Zuberoan; it does not appear to be an inherited innovation of all three Romance languages that Zuberoan took from them afterward. According to Buckley (2009: 39), u: > y can be placed around the 9th century for Old French, but, due to the

19 Northern Occitan – which is usually taken as a transition zone (Lafont 1971: 107) – shows Gallo-Romance fronting: *chevra*/*chavra* "goat", *cheira* "dear", *chen*/*chin* "dog", *chas*/*chies* "('s) house" (Buckley 2009: 57). In any case, Buckley (2009: 59) concludes that this sound-pattern is borrowed from French.

Occitan writing system not reflecting this sound change, the literature does not give any clear date for Occitan – it only states that /u/ produced consonant palatalization by the end of the 13th century – and even less for Gascon. If Old French were the source of the process, which seems plausible given the direction of the isoglosses, a somewhat later date for the fronting could be assumed in southern languages such as Occitan and Gascon, and even later for Zuberoan Basque. Thus, the only proposal that can be made is that Zuberoan developed the fronting some time after the 9th century, possibly closer in time to the first attestations of u-fronting in Occitan by the end of the 13th century. This makes the potential attestation of Zuberoan u-fronting mentioned by Orpustan (1999: 75) especially important, if it were indeed to be seen as an early attestation of this process in Basque.

5. Conclusions

I have analyzed the fronting of Common Basque /u/ to /y/ in Zuberoan. To that end, I have surveyed two corpora: one based on historical dictionaries and word lists and a second consisting of the oldest texts written in Zuberoan Basque. I have confirmed that the flap /ɾ/ and the rhotic-dental clusters /rtʰ, rt, rd/ systematically inhibited fronting, as did the apical sibilant fricative /s̻/. I have found old cases of inhibition of the fronting preceding the apical sibilant affricate /t̻s̻/, not listed by most previous authors, in words such as *huts* "mistake, empty", pronounced *hüts* in the modern language. I have also noted that palatals, which are often included in the class of coronal non-anterior segments, do not inhibit /u/-fronting. Taking everything into account, it is clear that not all coronal segments inhibited fronting of a preceding /u/: fronting of /u/ occurred systematically before /t/, /d/, /l/, /ʎ/, /s̪/, /t̪s̪/, /ʃ/, /ʧ/ and /r/.

I have proposed that the fronting of /u/ to /y/ was inhibited in these contexts due to coarticulatory effects: 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 tip involved in the production of inhibitory segments and clusters /ɾ, s̻, t̻s̻, rtʰ, rt, rd/.

The fronting of /u/ not only occurs in Zuberoan but also in the neighboring Mixean variety of Low Navarrese Basque. In most northern subvarieties within this variety, the fronting process has developed similarly to that of Zuberoan. The only difference is found in the group of segments that inhibit the process, which includes the velar obstruents /k/ and /g/, in addition to those found in Zuberoan. Articulatorily, these segments are produced with a back placement of the tongue dorsum,

so that they could create the same coarticulatory effect as the segments that inhibit the process in Zuberoan Basque.

The potential importance of contact between Zuberoan and Bearnese Gascon in the spread of this sound pattern has been addressed. Blevins (forthcoming) predicts that areal sound patterns may develop in one language when listeners are exposed to perceptually salient segments (or features) through significant, continued exposure to a second language. 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.

French, Occitan and Gascon show evidence of a sound change where Latin /u:/ gave rise to /y/ in several modern Romance languages. In contrast to what is found in Zuberoan, the fronting has been described as context free and exceptionless in all Romance languages that developed the process. In the Gallo-Romance languages, the back vowel fronting affected all instances of Latin /u:/, which became Vulgar Latin /u/ around the 2nd century AD. In Zuberoan, in contrast, fronting of Common Basque /u/ was inhibited in specific phonological environments, conditions which do not seem to have a parallel in any of the Romance languages.

In addition to this, Zuberoan – as well as Roncalese – shows a different pattern of fronting for the falling diphthongs, /V̯u̯/ to /V̯i̯/. This fronting which, interestingly enough, shares some phonological conditions of the fronting of syllabic /u/, may have developed more recently. If Zuberoan texts such as Etxart (Lakarra et al. forthcoming) show an early stage in the development of this process, the fronting of back semivowels may have been a late sound pattern, unrelated to developments in Gascon, and later spreading to Roncalese.

The development of /y/ in Zuberoan is unique and highlights the potential complexity of contact-induced sound patterns. Existing texts allow for a more detailed description of the phenomenon, in particular of inhibitory contexts. Overall, Zuberoan /u/-fronting illustrates the importance of perception, production and contact in the analysis of historical developments and the importance of typological comparison in the study of language isolates such as Basque.

List of abbreviations

ABS absolutive
ALLOC allocutive
DET determined
ERG ergative
F feminine

FUT future

M masculine

SG singular

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Résumé

Tous les dialectes basques actuels ont au moins cinq voyelles contrastives: /i, e, a, o, u/. Le souletin, un dialecte basque, a développé une sixième voyelle contrastive : la voyelle haute antérieure arrondie /y/. On peut soutenir que ce développement est dû au contact prolongé avec les langues gallo-romanes voisines. Cet article défend empiriquement le développement historique de la distinction entre /u/ et /y/ et propose une analyse détaillée des contextes qui ont empêché le changement de /u/ en /y/. L'antériorisation a été empêchée quand la voyelle était suivie par la sibilante apicale, la battue /ɾ/, ou le groupe consonantique rT (r une rhotique, T une occlusive alvéolaire), probablement en raison des effets co-articulatoires. L'antériorisation apparaît quand /s̪/, /r/ ou les groupes rhotique-occlusive non-coronale suivent /u/. Cette antériorisation de la voyelle /u/ démontre l'importance du contact entre langues et de la phonétique dans l'analyse phonologique des développements historiques.

Zusammenfassung

Alle modernen baskischen Dialekte haben mindestens 5 kontrative Vokale /i, e, a, o, u/. Suletinisch, ein baskischer Dialekt, hat mit dem hohen, gerundeten Vorderzungenvokal /y/ einen sechsten kontrastiven Vokal entwickelt. Diese Entwicklung beruht vermutlich auf anhaltendem Kontakt mit den benachbarten gallo-romanischen Sprachen. Dieser Artikel präsentiert empirische Belege für die historische Entwicklung des /u/ vs. /y/ Kontrasts und bietet eine detaillierte Analyse der Kontexte, die den /u/ > /y/ Lautwandel unterbunden haben. Frontierung wurde unterbunden, wenn der Vokal von einem apikalen Sibilanten, einem Tap /ɾ/ oder einem rT-Cluster (r: ein Rhotic, T: ein alveolarer Obstruent) gefolgt wurde, vermutlich aufgrund von Koartikulation. Frontierung fand statt, wenn /s̪/, /r/ oder ein nicht-koronales Rhotic-Obstruenten-Cluster auf /u/ folgte. Die /u/-Frontierung im Zuberoanischen illustriert, wie wichtig Sprachkontakt und Phonetik in der phonologischen Analyse historischer Entwicklungen sind.

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