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The Moraic Status of Consonants from Latin to Hispano-Romance: The Case of Obstruents

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1. Introduction

The central question that I address in this paper can be phrased as follows: What happened to consonant length from Latin to Hispano-Romance? The principal claim for which I argue here is that the development of the vocalic system of Latin Spoken Latin had a profound impact on that of the consonantal system, with the loss of contrastively long vowels in effect initiating the gradual loss of long consonants. I argue below that this was mediated through ever-increasing restrictions on the sonority of moraic consonants and that this approach allows us to tie the development of intervocalic geminates to that of syllable-final consonants, which had not previously been treated as interrelated.¹

The structure of this paper is the following: section 2 presents the relevant data and makes several observations; section 3 offers a very brief discussion of previous approaches to the data; section 4 begins with several background assumptions and then discusses the evolution of the vocalic system, whose length distinctions collapsed prior to the developments in the consonantal system analyzed in this paper. Section 4 then proceeds to develop the intuition that the evolution of the two systems is related, and provides an analysis based on moraicity and its relation to sonority, and on the idea of resolution of conflicting requirements in a language. Section 5 advances a theoretical implementation under Optimality Theory; section 6 offers concluding remarks.

2. Data and observations

There are two sets of data that are at the core of analysis to be given in this paper, shown below. In (1) and (2) are data that show the Latin geminates /pp tt kk bb dd gg ff ss/, which simplified to /p t k b d g f s/. This process of simplification affected the obstruents first, then the sonorants. (3) gives representative data that shows that the velar consonants of velar-coronal clusters eventually vocalized to [j]:

(1) **Geminate obstruents in Spoken Latin:**

pp	CUPPA	‘wine glass’	(> MSp. <i>copa</i>)
	LIPPUS	‘bleary-eyed’	
tt	CATTUS	‘cat’	(> MSp. <i>gato</i>)
	GUTTA	‘drop’	(> MSp. <i>gota</i>)
	VITTA	‘ribbon, headband’	(> MSp. <i>veta</i>)
kk	BUCCA	‘mouth’	(> MSp. <i>boca</i>)
	SICCU	‘dry’	(> MSp. <i>seco</i>)
bb (rare)	ABBATE	‘abbot’	(> MSp. <i>abad</i>)
dd (rare)	ADDITUS	‘added’	
gg (rare)	AGGER	‘rampart’	
ff (rare)	AFFLARE	‘to blow’	
ss	CASSA	‘empty’	

Additionally, geminate /tt/ and /ss/ arose from prior assimilation in the clusters /ps, pt, rs/ (cited in Lloyd, p. 139; some documented as early as the time of Plautus (254(?)-184 B.C.)). Representative data are given in (2).²

(2) **Additional geminate obstruents in Spoken Latin from assimilation:**

	<i>Earlier Latin</i>	<i>Later Latin</i>	
/ps/ > /ss/	IPSE	ISSE	‘self’
	GYPSU	YESSO (MSp. <i>yeso</i>)	‘plaster’
/pt/ > /tt/	SEPTE	* <i>sette</i>	‘seven’
	CAPTARE	* <i>cattare</i>	‘to taste, try’
	CAPTUS	CATTUS	‘seized’
	SEPTEMBRE	SETEMBRE (A.D. 219)	‘September’
	SCRIPTUS	SCRITUS (A.D. 19)	‘written’

(< t > in the last two forms must represent /tt/, since it did not voice.)

/rs/ > /ss/	DORSUM	DOSSUM	‘back’
	URSUM	OSSO (> OSp., MSp. <i>oso</i>)	‘bear’
	PERSICA	PESSICA (Appendix Probi ³)	‘peach’

As stated above, the geminates all simplified: /pp tt kk bb dd gg ff ss/ > /p t k b d g f s/. (This is part of the series of changes collectively called *lenition*; the other changes are voicing of obstruents and fricativization of the originally voiced obstruents.)

(3) Remaining syllable-final consonants:

/-kt-/	OCTO	‘eight’	(Hispano-Romance <i>oito</i>)
	NOCTE	‘night’	(<i>noite</i>)
	FACTU	‘fact’	
	LACTE	‘milk’	
	STRICTU	‘narrow’	
/-ks-/	MAXILLA	‘jaw (bone)’	(*[majsiɫa]; MSp. <i>mejilla</i>)
	DIXI	‘I said’	
	TAXU	‘yew’	
	MATAXA	‘skein’	
/-lC-/	MULTU	‘much’	(<i>muito</i>)
	CULTELLU	‘knife’	
	TALPA	‘mole’	
	ALTARIU	‘hill’	
/-gr-/	INTEGRU	‘whole’	(<i>enteiro</i>)
[/-gn-/	AGNUS	‘lamb’	(MPtg. <i>anho</i>)
	PUGNA	‘fight’	
	PUGNUS	‘fist’]	

Again as stated above, these data show that velars vocalized to [j] in syllable-final position. (This probably occurred through a stage [x] first, and then probably [ç]; I return to the precise evolution of the velars below.)

3. Past accounts

To the best of my knowledge, scholars have only treated these sets of data separately as data whose historical evolution is unrelated. (See Lloyd 1987, Penny 1991, e.g.) However, I believe that a more fully satisfying understanding of these data requires that they be considered jointly, as interconnected

manifestations of the same phenomenon. This intuition is developed in the remainder of the paper.

4. The present approach

It is my contention that the above data *are* related and that the development of both geminate and syllable-final segments is driven by the loss of contrastive vowel length in Late Spoken Latin. In this section I explain why this should be the case.

4.1 Background assumptions and additional data

Below are given the phonological and phonetic representations that I assume for both vowels and consonants:

(4) Underlying and surface moraic status of vowels and consonants:

Short vowel	/V _μ /	[V _μ]
Long vowel	/V _{μμ} /	[V _{μμ}]
Short consonant	/C/	[C] (onset only)
Short consonant	/C/	[C _μ] (if in coda position)
Geminate consonant	/C _μ /	[C _μ] (coda and onset)

Following Hayes (1989), Zec (1995) and many others, I assume here that segment length is mediated via the mora, a unit of syllabic weight. In such a system, a short vowel is a one associated to a single mora and a long vowel is one associated to two moras. A short consonant is usually monomoraic, but may bear one if it is found in syllable-final position. Geminate consonants (that is, long consonants) are single segments associated to both the end of one syllable and the beginning of the next.

In (5) is a graphic representation of the ten-vowel system of Latin that developed into those of Late Spoken Latin, Hispano-Romance and the modern Romance languages.

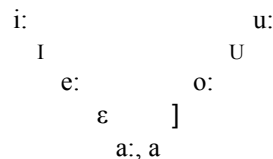
(5) The vowels of Classical Latin:

i:	i	u:	u	MĪSĪ	BIBIT	TŪ	BUCCAM
e:	e	o:	o	SĒTA	PEDEM	SŌLEM	ROTAM
a:	a				MĀTER	PATER	

4.2 Proposed evolution of vowel length

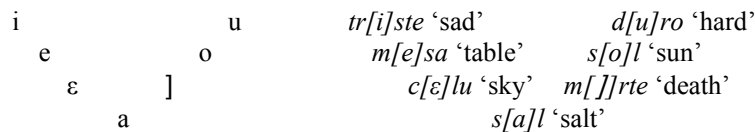
It appears that at the earliest period of Latin, phonological length was realized by means of longer or shorter duration, with articulatory differences being negligible. However, the phonetic manifestation of length also came to include differences in tongue height and tension, and quite early on, Latin long /i:/, u:/ began to differ from short /i, u/ articulatorily, as did the mid vowels /e:/, o:/ from short /e, o/. While the long vowels were stable, the short vowels became somewhat lower and laxer. The result is that /i/ and /u/ opened to [ɪ, ʊ], e.g., BIBIT > [bɪbɪ(t)] ('drink, 3p.sg.'), BUCCAM > [buka(m)] ('mouth'), and /e/ and /o/ opened to [ɛ, ɔ], e.g., PEDEM > [pɛdɛ(m)] ('foot'), ROTAM > [rɔda(m)] ('wheel'). (Summarized from Lloyd, 71-75.) This stage of the evolution of the vocalic system of Late Spoken Latin is represented graphically below:

(6) Stage leading to the elimination of vowel length in Late Spoken Latin:



Phonological length is now also phonetically realized with distinct vowel quality, and this quality distinction would be sufficient to maintain contrast. (In fact, Pulgram 1975 even posits that quantity distinctions were actually secondary for most Latin speakers.) The result is the merger of Latin short /i, u/ ([ɪ, ʊ]) with long /e:/, o:/, yielding the vowel triangle shown here:

(7) The vowels of Late Spoken Latin, Hispano-Romance:



The course of this series of phonetic and phonological changes is summarized below:

(8) Summary of steps in the loss of contrastive vowel length:

(a) Stage 1:

$$\begin{aligned} /V_{\mu}/ &\rightarrow [V_{\mu}] \\ /V_{\mu\mu}/ &\rightarrow [V_{\mu\mu}] \end{aligned}$$

(only duration distinguishes long and short vowels)

(b) Stage 2:

$$\begin{aligned} /V_{\mu}/ &\rightarrow [V'_{\mu}] \\ /V_{\mu\mu}/ &\rightarrow [V_{\mu\mu}] \end{aligned}$$

(short vowels are now laxer and lower, and so now differentiated by both quantity and quality)

(c) Stage 3:

$$/V'_{\mu}/ \leftarrow [V'_{\mu}]$$

(lexicalization of new quality of short vowels)

$$/V_{\mu}/ \leftarrow [V_{\mu\mu}] (< /V_{\mu\mu}/)$$

(quantity eliminated: formerly long vowels shortened because quality alone now distinguishes them; lexicalization of this. System reanalyzed.)

I would like to very briefly discuss the role of children in their acquisition of the language in the process of lexicalization of the new system advanced here. As children are learning a language, in this case Late Latin, they will now have no need to posit contrastively long vowels because there is a simpler system that retains contrast that is based solely on vowel quality. That is, a redundant system is simplified in the emerging grammar of the new generation of speakers.

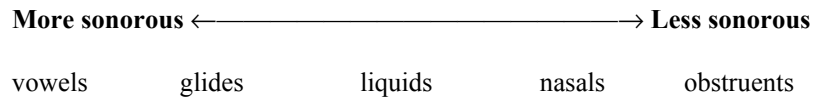
4.3 Insight to explore here

The core of my analysis rests on the following assumption: the loss of contrastive vowel length initiated the loss of contrastive consonant length. Why should the former have had an effect on the latter? I suggest that it was to reestablish systemic parity: the elimination of phonologically long vowels suggests that geminate consonants should not exist in the language. The next

question to ask is, then, How did such parity come to be reestablished? I argue that it occurred via the gradual elimination of the moraic status of consonants, a process that took place according to the sonority of the segments in question.

The sonority hierarchy and segmental structure and the relation of these to moraicity are discussed below after first establishing additional theoretical foundation.

(9) **The sonority hierarchy:**



(10) **Major class features of segments:** (from Zec 1995)

	[consonantal]	[sonorant]
vowels	-	+
sonorants	+	+
obstruents	+	-

Several observations are appropriate. First, the above implies that vowels can always bear a mora—they are the best or “prototypical” weight-bearing segments; obstruents are the worst. Further, if vowels may not be long, this suggests that long consonants will be disfavored. (However, I cannot make the statement that this is impossible or exceptionless, even within Romance: vid. Italian and Sardinian, which has geminates but no distinctive vowel length.) Considering the data, we see that in Late Spoken Latin there are no longer any contrastively long vowels, but there are indeed long consonants.

What’s to be done? What happened next? I argue here that the loss of vowel length begins to affect the long consonants by eliminating their mora, simplifying them. This begins with the least sonorous consonants, the obstruents, and progresses. This elimination of the mora results in simplification of the obstruent geminates. This accounts for the simplification of the data in (1) and (2) above.

At this stage in the development of Latin to Hispano-Romance, /rr, ll, nn/ are still licit, as they are not obstruents, but more sonorous segments whose mora is allowed. Thus, *anno* ‘year’, *bello* ‘pretty’, etc. still exist. These, too, eventually simplified (around the 10th or 11th century) and all long segments were finally eliminated, leaving Hispano-Romance with a system of only short segments.

We must still consider the data in (3) above, the velar-coronal sequences. If long segments are simplified, we might expect loss of already simple /-k, -g/, but we don’t find that. Instead, these “eroded” to become [x] (or [ɣ] in the case of /-g/) and later [j]: *noite*, *muito*, *enteiro*, etc.⁴

Why should this have happened, and why in just this way? I suggest that conflicting requirements in the language lead to the results posited here. Specifically, syllable-final consonants contribute weight and are counted in determining stress. The paradox is, then, the following: two conditions must obtain in the grammar of Late Hispanic Latin: “Obstruents may not be moraic” and “Syllable-final segments count for stress.” These constraints on the language do not come into conflict when the syllable-final segment is not an obstruent, as in *monte* or *bello*, where the syllable-final segment is a sonorant and may continue to count for stress without problem. However, when an obstruent occurs in coda position, it *must* be moraic to count for stress assignment, but *cannot* be moraic because obstruents are no longer valid segments to carry syllable weight.

Which of these two conditions gives in so that the other may be satisfied? Neither, I suggest. How is this situation resolved, then? I propose that syllable-final velars are modified to be able to bear weight, and therefore play role in the determination of stress. These segments become more vowel-like (higher on the sonority scale in (9)) by changing features: now from occlusive to continuant, later also from obstruent to sonorant. Such segments may still be moraic (for now): they have eliminated the features that made them “bad” segments to carry a mora. (Recall that /nn ll/ still exist in the language.)

To see how this works, consider the following, which shows features that contribute to sonority:

(11) Features that contribute to sonority:

(Zec, Inkelas & Cho 1995: 552-3, Martínez-Gil 1994: 13)

[continuant]	([+continuant] more sonorous than [-continuant])
[sonorant]	([+sonorant] more sonorous than [-sonorant])
[consonantal]	([-consonantal] more sonorous than [+consonantal])

Let me now trace the development of the segments /-k, -g, -l/, later attested as /-j/ in Hispano-Romance documents. While it is certainly possible that the syllable-final velars vocalized directly to [-j],⁵ there are attested Romance forms that show a more gradual, and thus more likely, evolution. These are the Mozarabic data cited below:⁶

(12) **Mozarabic data that support the evolution of /-k/ to /-x/ first:**

(Zamora Vicente 1989: 48)

truhta ‘trout’ (< TRUCTA) (Ben Joliol, 10th c.)

laxtayra ‘species of plant’ (base LACTE ‘milk’) (Ben Joliol, 10th c.)

laxtayrwéla (Ben Buclárix)

noxte ‘night’ (< NOCTE) (Ben Cuzmán, *Cancionero*)

(There are also forms cited with [-jt-]: *leyte*, *leyterola*.)

This is a smoother evolution, as the change is more gradual and minimal at each stage:

(13) **Hypothesized stages in the gradual evolution of /-k/ to /-j/:**

- a. $k > x$ [-cont] > [+cont]; all other features remain the same; sonority modified minimally.
- b. $x > \varsigma$ point of articulation becomes palatal as velar fricative assimilates to following coronal consonant. (See note 6.)
- c. $\varsigma > j$ [-son] > [+son]; sonority modified minimally; (still palatal).

At each step, the change is minimal: the segment is gradually modified, becoming progressively more sonorous. Importantly, this allows the segment to retain its mora and still play a role in accentuation. Each stage is argued to be the result of an increasingly dominant restriction on the type of segment that may be moraic, and these are steps in the gradual elimination of consonantal length as a result of the loss of vowel length.

This development thus allows for the satisfaction of the conflicting requirements of the language, as obstruent geminates are simplified (stops first) and syllable-final segments are modified to be able to bear weight and therefore play a role in the determination of stress.⁷

5. Implementation in Optimality Theory

In this section I provide an Optimality-Theoretic implementation of the above analysis and treat several issues of theoretical import that arise in the discussion. See Holt (1997) for a fuller OT account of these data.

The relevant constraints are the following:

(14) **Faithfulness constraints** (abbreviated ‘FAITH’; Correspondence version, see, e.g., McCarthy 1995):

- (a) MAX (‘no deletion’; formerly PARSE, ‘the surface form should maximally retain underlying features or segments’)
- (b) IDENT(ITY)-[F] (‘input and output segments have identical values for feature [F]’, e.g., [place of articulation], [consonantal], [voice])
- (c) DEP(ENDENCY) (‘no insertion or epenthesis’; formerly FILL, ‘output specifications should depend on underlying specifications’)

(15) **Additional constraints employed:**

- (a) STRESS-TO-WEIGHT (abbreviated ‘STW’; ‘a stressed syllable is bimoraic’; this is also called the Strong Rhyme Condition)
- (b) *LONG-VOWEL (abbreviated ‘*LONG-V’; ‘no long vowels’; ‘long vowels are disfavored’) (See Holt 1998 for detailed discussion of the proper formulation of this constraint.)
- (c) *C_μ (‘no moraic (long or syllable-final) consonants’; ‘long or syllable-final consonants are disfavored’)

(16) **One conception of the sonority hierarchy in Optimality Theory:**

*O_μ >> *N_μ >> *L_μ >> *G_μ >> *V_μ (See, e.g., Holt 1997)

(17) **Stages in the progressive reranking of MAX in the sonority hierarchy from Latin to Spanish and Portuguese:**

MAX			Latin
↓	MAX		Late Spoken Latin, Hispano-Romance
	↓	MAX	Modern Spanish, Galician, Portuguese
		↓	
			*O _μ >> *N _μ >> *L _μ >> *G _μ >> *V _μ (Sonority hierarchy)

(18) **Initial rise of *C_μ, eliminating moraic obstruents:** (Preliminary version)

/k _μ / /n _μ / /l _μ /	*O _μ	FAITHFULNESS (MAX)	*N _μ , *L _μ , *G _μ
k _μ	*!		
k ☒		* <μ>	
n _μ ☒			*
n		*! <μ>	
l _μ ☒			*
l		*! <μ>	

At this first stage, obstruents lose their mora, and these geminates are simplified. The more sonorous nasal and liquid geminates are still allowed (i.e., are optimal) because their mora is still allowed.

However, this does not take into account what happened to obstruents in syllable-final position. (19) below offers a refinement of the preliminary analysis given just above: the sonority hierarchy is not a hierarchy of segments, per se, but one of features that contribute to sonority.

(19) **Decomposition of *O_μ and its role in the vocalization of velars**
(/-k, -g/) and in the reduction of geminate obstruents: (Final version)

/-k, -g/	*[-sonorant] _μ	MAX/IDENT	*[+consonantal] _μ
-k _μ , -g _μ	*!		*
-j _μ ☒		* <+cons> * <-son>	
/k _μ , g _μ /			
k _μ , g _μ	*!		*
k, g ☒		* <μ>	
j _μ		* <+cons> *! <-son>	

As the tableau shows, syllable-final /-k, -g/ will vocalize (by assuming the opposite values for [consonantal] and [sonorant]) to maintain their moraic status. Changing the values of features that may not be moraic to those that may, then, yields the acceptable status of the weight-bearing segment. The same ranking still accounts for loss of geminate obstruents, as shown in the lower portion of tableau (19).

These segments, like all syllable-final consonants in Late Spoken Latin, were moraic, and as such the addition of a mora would be sanctioned by a high ranked constraint akin to Weight-by-Position (Hayes 1989). (Here I have omitted candidates from this tableau with syllable-final nonmoraic [-k, -g], which would violate Weight-by-Position, as well as *APPENDIX; see Sherer (1994). For a discussion of the syllable- and word-final consonant clusters that were allowed in Latin, see Lloyd, pp. 82-6.) I ignore here as a tangential matter why /-k, -g/ become [-j], though the fact that the following segment is coronal (/n, s, t/) surely is relevant. In the case where it is not, as in TALPA, /l/ became [w]. ([aw] monophthongized to [o], as in MSp. *topo*.)

Returning to the discussion of the Mozarabic data in (12), if these forms do indeed reflect the intermediate stage in the vocalization of the velars, the decomposition of the sonority hierarchy shown here would need to be continued by further adding the constraint *[-continuant]_μ. Placement of MAX/IDENT above *[-continuant]_μ will yield [truxta] from /trukta/, and still eliminate the geminate obstruents and not yield the glide [-j]. The next minimal step in vocalization is the reranking of MAX/IDENT to its position in (19), below *[-sonorant]_μ.

Finally, I now briefly address one of the theoretical issues that arises from the above analysis. While it may appear unusual to not separate MAX from IDENT, with the ranking MAX >> IDENT to encode the fact that erosion of the offending segment is better than total loss (here, by loss of the mora, therefore erasing the unlicensed consonant), the ranking of MAX/IDENT with respect to the sonority hierarchy achieves the same result. The current approach has the benefit of relating vocalization to reduction of geminates, both being the result of the rise of *C_μ.

6. Summary and concluding remarks

The reduction of obstruent geminates is directly related to the vocalization of syllable-final velar consonants, and both are a consequence of the loss of vowel length in Late Spoken Latin. Both of these assertions are new but find (formal and theoretical) explanation in moraic theory and its relation to sonority, and in an approach to historical evolution that allows for the resolution of conflicting constraints in a language by minimal change.

Closer consideration of the relation of moraicity to sonority allows for explanation and unification: loss of moraic status affects not segments, per se,

but features that contribute to sonority. For geminate obstruents, simplification is the minimal change, while for syllable-final velars the minimal modification results first in spirantization (as the Mozarabic forms attest, and Welsh and other data support), and later vocalization. The more sonorous segment at each stage ensures the segment's moraic status against the ever-encroaching elimination of length in all consonants, which has been argued here to be the result of the loss of contrastive vowel length from Latin to Hispano-Romance.

Notes

* I thank the audience at the Second Hispanic Linguistics Symposium for their helpful comments and questions, particularly from Steven Dworkin, Fernando Martínez-Gil, Ellen Kaisse, Holly Nibert, Joel Rini, Tom Walsh and Dieter Wanner. I would also like to thank Don Cooper, Dorothy Disterheft, Kurt Goblirsch and other members of the Historical Linguistics Research Group at the University of South Carolina, who provided valuable comments and questions at a presentation of a preliminary version of this work.

1. While in this paper I will be able to treat only the case of the development of obstruents, the fundamental arguments advanced here also apply to the subsequent development of the sonorants. See Holt (1997) for a theoretical treatment. This paper, while couched in non-theoretical terms (except for section 5), borrows freely from the argumentation presented in that work.

2. Evidence suggesting that this assimilation predated the loss of vowel length comes from reduction of nasal-fricative sequences, which reduced to a simple fricative, with lengthening of the vowel. See, e.g., Allen (1978: 28), who cites *forēsia*, *hortēsia* and *Megalēsia* for original FORENSIA, HORTENSIA and MEGALENSIA (Cicero, 106-43 B.C.). We would not expect this to be able to happen if contrastive vowel length had been eliminated.

Furthermore, theoretical considerations also support the argument that this assimilation must have occurred very early, in fact prior to the loss of vowel length distinctions. This is so because we would not expect the formation of obstruent geminates to take place if the moraic status of obstruents had already been eliminated. See sections 4 and 5, where this theory is developed.

Here I ignore the exact formulation of the historical process of assimilation and gemination observed in (2). I note, however, that it did not affect all syllable-final consonants, particularly the sequences /kt, ks, lt/ (and perhaps /gn/). I return to these cases below.

3. Of writings by Latin grammarians, the Appendix Probi is a sixth- or seventh-century list of 227 forms that should be avoided in writing. Each recommended word is accompanied by that to be corrected (e.g., AURIS NON ORICLA, PERSICA NON PESSICA). Writings of this sort are an invaluable source of information about Late Spoken Latin.

4. Romanian is interesting in this regard: it has no long vowels or consonants, but did not vocalize syllable-final /-k/ either, instead modifying it to /-p/, e.g., Lat. LACTE ‘milk’ > Rom. *lapte*. A complete analysis of this process and its relation to the vocalization treated here is beyond the scope of this paper.

5. Dialectal Chilean Spanish also shows alternations between /-k, -g/ and [-j] (or [-w]): *do[k]tor* ~ *do[j]tor*, *dogma* ~ *do[j]ma*, etc. (taken from Martínez-Gil 1994: 25, who cites Lenz 1940, Oroz 1966).

Ellen Kaisse (personal communication) also points out to me that Cypriot Greek shows an alternation [j] ~ [k], where [j] is realized as a voiceless palatal or velar stop after most consonants (Kaisse 1992: 316-7). These cases, and undoubtedly others, suggest that /-k, -g/ may have directly become [-j] in the change from Latin to Hispano-Romance. However, this is not a necessary assumption, and even some of the data that Kaisse cites suggests that [j] may be related to [ɣ]. In these cases, Kaisse states that [j] is an allophone of the voiced velar fricative [ɣ]; see her (7f) and fn. 3, p. 317.

See the following note for more related discussion.

6. Steven Dworkin (personal communication) points out that the Mozarabic data are hard to trust, as the linguistic status of Mozarabic is unclear and it was written in the Arabic script. However, data from other languages, even within Romance, show the development of [-k] > [-x]. For example, Proto-Indo-European /k(t)/ developed to [x(t)] in Common Celtic, and the conservative descendant Irish still preserves this stage, while the more progressive Welsh shows the more evolved [j]: Com. Celt. and Ir. *nocht* ‘night’, *ocht* ‘eight’, *lucht* ‘portion, load, people’, *recht* ‘law’ and *techt* ‘go’ vs. Wel. *noeth* ([nojθ]), *wyth*, *llywth*, *rhaith* and *taith* (Disterheft 1998, Lewis and Pedersen 1961).

Within Romance, early French inscriptions also show spirantization of coda /-k/ (Meyer-Lubke 1926: 340; Wartburg 1952: 50; Pope 1934: 134 and Bourciez 1946: 180, 1967: 144, all cited by Martínez-Gil 1994: 3).

Otero (1971: 297, 303), Agard (1984: 75) and Martínez-Gil (1994) all assume that [-x, -ɣ] (< [-k, -g]) preceded the formation of yod. Agard also hypothesizes that fricative [-x] semivocalized as voiceless yod, as I do in (13b) below, though he recognizes (as do I) that direct evidence is lacking.

7. There are several areas for future research, a more comprehensive understanding of which will undoubtedly shed additional light on the data treated in the present paper. Two such areas are the relation of the loss of vocalic length in Latin Spoken Latin to the change in its stress system, and the relationship between degemination (and vocalization, as analyzed here) and the other two steps in Romance lenition, voicing of obstruents and fricativization of the originally voiced obstruents.

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