

A gestural account of Latin obstruent + lateral onset cluster realizations in Galego-Portuguese*

Benjamin Schmeiser
Illinois State University

Abstract

The current study offers a gestural account of the phonological process of rhotacization that occurs in the transmission of Latin words that contain obstruent + lateral onset clusters into Galego-Portuguese. The current study builds on previous work by offering a new analysis based on articulatory factors and formulated within a gestural approach; by doing so, we gain greater insight into a process that is unique to Galego-Portuguese and we are also able to view a diachronic process in a modern phonological framework.

Keywords: Galego-Portuguese, Latin, rhotacization, consonant cluster

Palavras-chave: Galego-Português, Latim, vibrantição, grupos consonânticos

1. Introduction

Galego-Portuguese¹ (henceforth, G-P) is quite unique² among Romance languages in that it is the only one in which a lateral, as a second member of an onset complex onset, undergoes rhotacization. This process occurs in the transmission of Latin words into G-P, as in Latin *e[kl]esia* > G-P *i[g ʒ]eja* ‘church’. In Latin transmissions into G-P, it is generally³ accepted that a patrimonial word results in palatalization (Jensen, 1999), with a semi-learned word resulting in maintenance of the first consonant and rhotacization of the lateral (Williams, 1968; Rodríguez Rodríguez & Davila Ventura,

* I would like to thank Marina Vigário and João Veloso for their insightful questions and comments.

¹ I employ the term ‘Galego-Portuguese’ to refer to one language family that underwent unitary development during the Middle Ages. One may also see the terms ‘Galaico-Portuguese’ and ‘Galician-Portuguese’, though all are understood to be synonymous.

² In the case of Sardinian, Jones (1988: 322) notes in all dialects a tendency toward neutralization of /l/ and /ʎ/ before and after consonants. Though present in all dialects, different realizations occur, as in Latin *plēnum* > Sardinian *prenu* ‘full’, but *pienu* in the Logudorese and Campidanese varieties. In addition, rhotacization also occurs in /lC/ heterosyllabic, as in Latin *altum* > Sardinian *artu* ‘tall’. In short, neutralization in Sardinian differs from the current study, given its use in the heterosyllabic environment and apparent dialectal variation in the tautosyllabic environment. See Frigeni (2003) and Bolognesi (1988) for Campidanian Sardinian.

³ Boyd-Boyman (1980) sees rhotacization occurring in both learned and semi-learned words.

2004), and a learned word resulting in complete faithfulness to the original cluster, with possible voicing of the first consonant (Lief, 2006; Williams, 1968).

That said, however, it is curious to note that rhotacization of these semi-learned words is a process that lasted across six centuries. It affected words from other languages that passed through Latin and finally into G-P and also, though very few, words from other languages that passed directly into G-P (e.g. French *flèche* > G-P *frecha* ‘arrow’). The current study revisits Latin obstruent + lateral onset realizations in G-P in terms of word transmission, with emphasis on those cases (i.e. semi-learned words) in which rhotacization occurs in G-P. The current study crucially builds on previous work by attempting to explain *why* rhotacization occurred in theoretical terms. More specifically, it is novel in that it is the first (known⁴) study to illustrate *how* rhotacization occurred in G-P semi-learned transmissions and does so using a gestural approach. It also considers in articulatory terms the transmissions in which rhotacization either never or very rarely occurs, namely the patrimonial and learned transmissions. In short, by viewing onset cluster realizations in a gestural approach, we go beyond simply stating when the changes to the onset cluster occurred in historical G-P and can now offer insight into how the phonological system of the language changed during that time.

The rest of the paper is organized as follows: §2 discusses consonant clusters as they pertain to Latin and how they were realized in Romance languages; §3 discusses the different realizations as they pertain specifically to G-P; §4 offers an analysis of the realizations, using a gestural approach, and §5 concludes.

2. Latin consonant clusters

Complex onsets⁵ in Latin comprise a relatively restricted environment. Consonant clusters in onset position are generally made up of an obstruent and a liquid. With regard to an obstruent + rhotic construction, the voiced stops /b, d, g/ (and their voiceless counterparts /p, t, k/), along with the voiceless labiodental fricative, /f/ comprise the possible obstruents. In terms of the obstruent + lateral construction, the same obstruents apply, minus the dental stops /t, d/. The following table offers the possible obstruents for the word-initial complex onset in Latin, along with an example in Latin of each one:

⁴ See Holt (1997) for a historical analysis of Portuguese consonant clusters in OT.

⁵ Recall that the current study restricts itself to only obstruent + liquid onsets. Latin allows an obstruent + obstruent + liquid complex cluster if the first obstruent is /s/, as in *strēna* ‘a New Year’s gift’. In addition, I note that the liquid is almost always a rhotic. I only found one example in which the liquid was a lateral, namely an archaic spelling of the word *lis*: *stlis* ‘a legal controversy’.

For /r/-:			For /l/-:		
Obstruent	Example	English gloss	Obstruent	Example	English gloss
/b/	bracchiu	‘arm’	/b/	blandu	‘bland’
/d/	drāco	‘dragon’	/d/	-	
/g/	grössu	‘large’	/g/	glüten	‘glue’
/p/	prātu(m)	‘meadow’	/p/	plānu	‘flat’
/t/	trahēre	‘to bring’	/t/	-	-
/k/	crēdēre	‘to believe’	/k/	clamāre	‘to call’
/f/	frōnte	‘front’	/f/	flamma	‘flame’

Table 1 – Possible Obstruents in Latin Word-Initial Complex Onsets

Note that I include /dr/ in Table 1, though these words are of Greek origin and not native to Latin. Take note as well a word-initial dental stop + lateral cluster is unattested in the language.

As words were transmitted from Latin to Romance, these clusters often underwent categorical changes in patrimonial words that have been well-documented (for example, Penny, 1991). As concerns the word-medial environment, the obstruent before the rhotic is a stop /b, d, g, p, t, k/ and the one before a lateral is either a voiceless stop /p, t, k/, a voiced stop /b, g/, or the voiceless labiodental fricative, /f/. The following table offers the possible obstruents for the word-medial complex onset in Latin, along with an example of each one:

For /r̥/-:			For /l/-:		
Obstruent	Example	English gloss	Obstruent	Example	English gloss
-/b/	lībra	‘pound’	-/b/	nōbīle	‘noble’
-/d/	quādrū	‘frame’	-/d/	-	-
-/g/	nīgrū	‘black’	-/g/	tēgūla	‘roof-tile’
-/p/	caprā	‘goat’	-/p/	dūplū	‘double’
-/t/	pētra	‘stone’	-/t/	vētūlus	‘old’
-/k/	lacrimā	‘tear’	-/k/	ecclēsīa	‘church’
-/f/	-	-	-/f/	sūfflāre	‘to blow’

Table 2 – Possible Obstruents in Latin Word-Medial Complex Onsets

In Table 2, take note that there are no examples of /f̥r̥/ word-medial in Latin and no /dl/ word-medial cluster; observe that the word-medial -t'l- cluster is obligatorily a result of syncope.

From Latin to Romance, obstruent + rhotic clusters remain relatively faithful to Latin in that word-initial clusters do not evidence any changes and word-medial cases include lenition of the consonant, but the rhotic is not affected. The effect is quite different for obstruent + lateral clusters which may either be realized faithfully, exhibit obstruent deletion, palatalization, or one of the consonants is substituted by a vocoid. The following table offers the different realizations by language for both the Latin word-initial and word-medial obstruent + lateral environments:

Word-initial	Cl-					Word-medial	-cl-					
	pl	bl	fl	cl	gl		pl	bl	fl	cl	gl	t'l
Latin	pl	bl	fl	cl	gl	Latin	pl	bl	fl	cl	gl	t'l
Rumanian	pl	bl	fl	ki ^l	gi ^l	Rumanian	pl	ul	fl	ki ^l	gi ^l	ki ^l
Italian	pi ^l	bi ^l	fi ^l	ki ^l	gi ^l	Italian	ppi ^l	bbi ^l	ffi ^l	kki ^l	ggi ^l	kki ^l
Spanish	◊	bl	◊	◊	◊	Spanish	ʎl	ʎl	◊	ʎ	ʎ	ʎ
G-P	●	br	●	●	◊	G-P	br	br (or 'l')	●	◊	◊	◊
Catalan	pl	bl	fl	fl	gl	Catalan	bl	u ^l l or bl	fl	◊	◊	l
Occitan	pl	bl	fl	fl	gl	Occitan	bl	u ^l l or bl	fl	◊	◊	l
French	pl	bl	fl	fl	gl	French	bl	bl	fl	i ^l	i ^l	l

Table 3 – Different realizations of complex onsets in Romance – Obstruent + lateral (adapted from Jensen (1999): 175-220)

What is of particular interest here is that G-P is the only language that evidences a rhotic *in place of* a lateral. Observe that rhotacization occurs in word-initial *bl-*, word-medial *-bl-*, and word-medial *-pl-* in G-P. It should be noted that word-initial */bl/* words in Latin are generally not considered in analyses (e.g. Boyd-Bowman, 1980) as they are of Greek origin. Whereas Jensen (1999) considers this the default in word-medial */bl/* clusters (237), others (Williams, 1962) either do not mention it or note that it is a semi-learned transmission. Finally, I presume that Jensen's (1999) list above represents his view of patrimonial and semi-learned transmissions, given that there is no option for faithfulness to the original Latin cluster. In what follows, we take a closer look at G-P to see in which environments rhotacization occurs in any transmission.

3. Galego-Portuguese (G-P)

In G-P, consonant clusters represent a restricted environment. As Veloso (2006:130) notes, there are five main categories:

- (1) a. Obstruent /b/ + obstruent word-medial cluster: *fe**st**a* ‘party’
- b. liquid + obstruent word-medial cluster: *fa**lt**a* ‘lack’ (n.)
- c. obstruent other than /b/ + obstruent word-initial or medial cluster: *ca**z**ar* ‘czar’
- d. obstruent other than /b/ + nasal word-initial or medial cluster: *agn**o**st**i**co* ‘agnostic’
- e. obstruent other than /b/ + liquid word-initial or medial cluster: *fr**u**ta* ‘fruit’

Veloso (2006) points out that only the last environment (1e) is tautosyllabic. Given that consonant clusters are fairly restricted in Latin and that the majority (1a-d) of the clusters in G-P are heterosyllabic, the tautosyllabic environment merits careful investigation. As previously stated, it is generally accepted that in patrimonial transmissions from Latin words containing an obstruent + lateral onset cluster to G-P, the cluster either palatalizes or the obstruent is deleted and in semi-learned words, rhotacization occurs; this applies both word-internally and word-medially, as in the following two tables:

Patrimonial CI-			Semi-learned CI-		
Obstruent	Example	G-P gloss	Obstruent	Example	G-P gloss
/b/	-	-	/b/	blasfemar ‘to blaspheme’	brasfemar
/d/	-	-	/d/	-	-
/g/	glande ‘acorn’	lande	/g/	glüten ‘glue’	grude
/p/	pluvia ‘rain’	chuva	/p/	plaga ‘beach’	praia
/t/	-	-	/t/	-	-
/k/	clave ‘key’	chave	/k/	clavu ‘nail’	cravo
/f/	flamma ‘flame’	chama	/f/	flaccu ‘weak’	fraco

Table 4 – Patrimonial and semi-learned transmissions from Latin word-initial obstruent + lateral words into G-P

In the above table, we observe that there are no /dl/ or /tl/ word-initial clusters and only very few /bl/ clusters, which are all of Greek origin. With regard to /pl/, /kl/ and /fl/ word initial clusters, the patrimonial words undergo palatalization, [b], whereas their semi-learned counterparts undergo rhotacization.

As concerns the word-medial clusters involving the Latin lateral, the following table offers data on G-P obstruent + liquid realizations:

Patrimonial -cl-			Semi-learned -cl-		
Obstruent	Example	G-P gloss	Obstruent	Example	G-P gloss
/b/	fābulāre ‘to speak’	falar	/b/	nōbile ‘noble’	nobre
/d/	-	-	/d/	-	-
/g/	tēgŭla ‘roof-tile’	telha	/g/	glŭten ‘glue’	grude
/p/	-	-	/p/	complēre ‘to complete’	cumprir
/t/	vētŭlus ‘old’	velho	/t/	-	-
/k/	oculus ‘eye’	olho	/k/	ecclēsĭa ‘church’	igreja/ igrexa
/f/	afflāre ‘to believe’	achar	/f/	sŭfflāre ‘to blow’	soprar

Table 5 – Patrimonial and semi-learned transmissions from Latin word-medial obstruent + lateral into G-P

In the above table, the environments (/g, p, t, k, f/) evidence the expected palatalization in patrimonial words and rhotacization in the semi-learned counterparts. In the case of /b/, the patrimonial transmission is obstruent deletion, with rhotacization in the semi-learned form. Word-medial /t/ clusters evidence the expected palatalization for patrimonial words, but no semi-learned counterparts; the opposite holds true for /p/ in that though the semi-learned examples exhibit rhotacization and the word-medial environment for patrimonial words elicits no examples.

I conclude this section by offering a ‘master list’⁶ of many of the words in G-P that evidence rhotacization, language of origin and century in which they were transmitted:

Word	Language (family) of origin	Cent.	English gloss	Word	Language (family) of origin	Cent.	English gloss
branco	Germanic	XII	‘white’	brando	Latin	XIII	‘bland’
brasón	Germanic (by way of French)	XV	‘flame’	dobrar	Latin	XII	‘to bend’; ‘to fold’
nobre	Latin	XII	‘noble’	obrigar	Latin	XII	‘to oblige’
escravo	Germanic	XV	‘slave’	cravar	Latin	XII	‘to nail’
fraco	Latin	XII	‘thin’	*frauta	French	XIII	‘flute’
*frecha	French	XIV	‘arrow’	frouxo	Latin	XII	‘lacking energy’
igreja	Latin	IX	‘church’	aprazar	Latin	XII	‘to convene’
compra- -cer	Latin	XIV	‘to please’	empra- -zar	Latin	X	‘to locate’
pracer	Latin	XII	‘pleasure’	praga	Latin	XV	‘disaster’
praia	Greek	XIV	‘beach’	prata	Latin	XI	‘silver’
praza	Greek	XII	‘town square’	prazo	Latin	X	‘time-limit’
pregar	Greek	?	‘to fold’	preito	Latin	XI	‘judicial debate’

Table 6 – Vocabulary list of many of the words that evidence rhotacization in G-P (adapted from Rodríguez Rodríguez & Davila Ventura, 2004)

From the data in the above table, observe that the list is taken specifically from Galician, though that does not affect, obviously, the century in which the word was transmitted. In addition, note that the language of origin does not necessarily mean that it was transmitted directly from that language, but rather through Latin. One exception to this are the words of French-origin in Table 6 (‘flute’ and ‘arrow’ and marked with an ‘*’). I found apparent variation for these two words between Galician and

⁶ Though not truly a ‘master list’ of all of the words, it contains at least one example of each of the categories available. To create a true master list could be rather challenging if we are to include pertinent information about the word that was taken. For example, I found ‘cravuñar’ for Galician, but I was unable to find from which century it was taken, from which language, nor a concise definition in English.

Portuguese; that is, I found G *frauta* and P *flauta* for ‘flute’ and G *frecha* and P *flecha* for ‘arrow’. This apparent variation falls outside of the current study, given that the type of word transmission is not different for each language; that is, ‘flute’ is not semi-learned in one and learned in the other. That said, this possible liquid variation between the two languages might merit investigation in greater detail in future research.

4. Rhotacization in G-P in theoretical terms

4.1. A gestural approach

Thus far, we have observed that semi-learned transmissions of Latin words containing an obstruent + lateral onset cluster undergo rhotacization in G-P. In terms of patrimonial transmissions, the cluster undergoes neutralization, often times in the form of palatalization. In light of learned transmissions, faithfulness to the Latin cluster is maintained, with possible voicing of the obstruent. In what follows, I argue that the different realizations observed in G-P that result from the different transmissions of Latin words containing an obstruent + lateral onset cluster can best be explained in terms of inter-gestural timing of the cluster and restrictions that are imposed on it.

In the current study, I argue against an analysis based on the distinctive feature [±continuant]⁷, which posits that modern G-P contains a restriction in the tautosyllabic cluster of only [+continuant] consonants; the lateral was historically [-continuant], but eventually gained [+continuant] status over time and thus the lateral no longer breaks the rule of only [+continuant] consonants in the cluster. Though an analysis using the distinctive feature [±continuant] admittedly would explain both the semi-learned transmissions into G-P and later learned transmissions quite concisely, I argue for an articulatory approach because, by doing so, we are able to succinctly discuss *all* realizations of the Latin /Cl/ cluster (i.e. palatalization, rhotacization, and faithfulness) as they pertain to each type of word transmission using the same approach; if we were to only use [±continuant], this assumes both consonants are still present and, as such, we are not able to discuss patrimonial cases, for example, which evidence the expected palatalization. Moreover, recall that some linguists (Jensen, 1999, see Table 3) consider rhotacization to be limited to only occurring after the bilabials, /b/ and /p/, which is another reason why solely considering a change in the [continuant] distinctive feature of the lateral might not best capture the different G-P cluster realizations of Latin obstruent + lateral onsets according to type of word transmission.

By utilizing an approach that allows us to illustrate inter-gestural timing (and restrictions on it), we further our understanding of how words were transmitted phonologically into G-P over time. In addition, we can illustrate in spatio-temporal terms three important considerations for this language: first, we can see how the timing relationship of patrimonial transmissions induces neutralization of the cluster (i.e. palatalization) in G-P, which is relatively uncommon in Romance languages in that,

⁷ I thank Marina Vigário for calling this to my attention. I also thank an anonymous reviewer of a previous draft who correctly pointed out deficiencies in my explanation of an analysis based on distinctive features.

other than G-P, it only occurs in Spanish and Catalan; second, we can see how an inter-gestural timing restriction (i.e. Phase Window) on semi-learned transmissions results in rhotacization of the lateral, a phenomenon unique to G-P as it pertains specifically to the type of word transmission and the tautosyllabic environment; finally, we are able to illustrate the resulting effect of Phase Window restrictions on learned words and see why liquid variation exists in this type of word transmission.

In short, by discussing the tautosyllabic cluster in terms of inter-gestural phasing, we gain insight into how a particular language, G-P, processes a cluster in a very specific environment, namely the tautosyllabic one. We need, then, a model that specifically treats consonant clusters in terms of their syllabic position; a gestural approach that employs Gafos's (2002) notion of the syllable, coupled with Byrd's (1994, 1996b) notion of a Phase Window allows us to do precisely that.

Articulatory Phonology (AP) (Browman & Goldstein, 1989, et seq.) is an approach rooted in units called 'gestures', which represent the smallest unit of phonological representation; major articulators produce constrictions in the vocal tract, varying in their constriction degree and exact location to form a gesture. The following figure illustrates a gesture with Gafos's (2002) proposed 'landmarks':

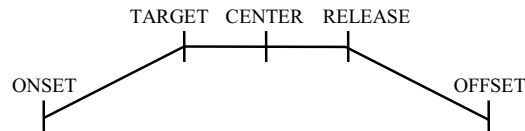


Figure 1 – An illustration of a gesture with Gafos's (2002) 'landmarks'

These landmarks are particularly beneficial to the current argument in that we can discuss tautosyllabic consonant cluster realizations in G-P in terms of inter-gestural phasing; that is, we focus on the timing relationship between the two consonants. To better understand this relationship, I turn to Gafos's (2002) notion of a syllable:

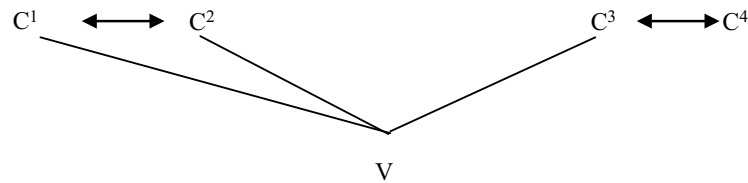


Figure 2 – Gestural phasing relationships within a syllable (adapted from Gafos, 2002, p. 316)

Observe in the figure above that it is the tautosyllabic environment in which each consonant has a timing relationship with the nucleic vowel (unlike the heterosyllabic environment) and also has a timing relationship with the adjacent consonant. Also important to the current discussion is Byrd's (1996) finding that tautosyllabic consonant clusters evidence a tighter gestural constriction (i.e. less timing variability) than their

heterosyllabic counterpart. To limit the *disassociation of gestures* (in any environment, but we are restricted to consonant-to-consonant in the current study), Byrd (1994, 1996b) employs a Phase Window, which is lexically-specified and quite useful for capturing the timing variability of two gestures. As such, I posit that a Phase Window is employed in G-P for both semi-learned and learned transmissions to ensure this disassociation of gestures. In what follows, I offer different inter-gestural phasing relationships between the two consonants and thus illustrate how patrimonial, semi-learned, and learned words were transmitted from Latin to G-P.

4.2 Patrimonial transmissions

As illustrated in the current study, patrimonial transmission results in palatalization. In gestural terms, the two consonants overlap so much that neutralization of the gesture occurs, as in the following figure:



Figure 3 – A gestural representation of patrimonial transmission (i.e. palatalization)

In the above figure, observe that the two gestures greatly overlap, which crucially results in neutralization (in this case, palatalization) of the cluster. Said another way, without the Phase Window in place, no inter-gestural phasing restriction is imposed and the second consonant is allowed to overlap to the point of neutralization. An added benefit to this argument is that we are able to capture those patrimonial cases (in Jensen (1999) terms) in which the first consonant is elided (e.g. Latin *fab(u)lāre* > G-P *falar* ‘to speak’) in that the second consonant may overlap so much that complete overlap occurs and the first consonant is not longer perceived by the listener.

4.3. Semi-learned transmissions

Recall that for (semi-)learned transmissions (i.e. via written language), I posited above a Phase Window to limit inter-gestural timing variability. In the case of semi-learned transmissions, the cluster in G-P almost always undergoes rhotacization of the lateral. In gestural terms, the two gestures are restricted to intersecting within the imposed Phase Window, as in the following figure:

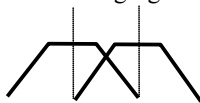


Figure 4 – A gestural representation of semi-learned transmission (i.e. rhotacization)

In the above figure, notice that the Phase Window (illustrated with two dotted, horizontal lines) aligns with the c-center of each gesture; what is important here is that the two gestures *must* intersect within the Phase Window to preserve the cluster and maintain optimal perceptibility by the listener of it. Greater disassociation of the gestures results in a tap. That is, the production of laterals involves an additional gesture whereby the sides of the tongue are lowered as to allow for lateral air release; taps lack this additional gesture and are shorter in duration. Diachronically, then, when a lateral loses the additional gesture, decreases in duration, and moves further away from the first consonant, it is reinterpreted as a rhotic tap. Note that G-P is unique to Romance languages in that it is the only language to articulatorily simplify the liquid (i.e. from a lateral to a rhotic tap). In gestural terms, G-P employs a Phase Window (i.e. timing restriction) on semi-learned transmissions to ensure an obstruent + liquid realization, but yet allow for the disassociation of the two gestures, along with liquid simplification.

4.4. Learned transmissions

Finally, in the case of learned transmissions, inter-gestural timing is such that the target of the Latin lateral is aligned with the release of the obstruent. In this way, the gestures are still intersecting within the Phase Window, but overlap more, as in:

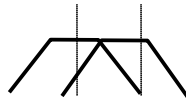


Figure 5 – A gestural representation of learned transmission (i.e. faithfulness to the Latin cluster)

Observe that the lateral does disassociate from the obstruent, given that faithfulness to the Latin cluster is the result in learned transmissions. A particular advantage of viewing the cluster this way is that diachronic variation that existed among learned words such as *blasfemar* ~ *brasfemar* ‘to blaspheme’ and *flauta* ~ *frauta* ‘flute’ is explained in terms of permissible inter-gestural timing and poses no problem or exception to the current analysis. In these examples that exhibit variation, though the goal for learned words is faithfulness to the Latin cluster, inter-gestural timing variability may occur, provided that the two gestures intersect within the Phase Window. As such, notice one may see variation between liquids, but no (known) variation exists between a liquid and palatalization of the cluster in G-P. It should be observed, however, that liquid variation is uncommon in the language, with only a few examples encountered (e.g. *blasfemar* ~ *brasfemar* ‘to blaspheme’, *flauta* ~ *frauta* ‘flute’, and *frecha* ~ *flecha* ‘arrow’). In the case of learned transmissions, such as *atleta* ‘athlete’, *ciclo* ‘circle’ and *aplaudir* ‘to applaud’, the overwhelming tendency is faithfulness to the Latin cluster and thus, no rhotacization occurs.

5. Conclusions

The current study treated a phenomenon in Romance languages, namely rhotacization of Latin tautosyllabic, obstruent + lateral clusters into G-P. I reviewed previous studies on the transmission of Latin obstruent + lateral onset clusters into G-P and presented formation of this cluster both in Latin and the different realizations into G-P. I added to the strong body of work on the topic by considering *how* the particular word was brought into the language. Word transmission into G-P was explained in gestural terms; that is, the analysis considered modifications in gestural timing and their consequent effect on the evolution of the consonant clusters into G-P. Though an argument based on the distinctive feature, [\pm continuant], can indeed explain the issue at hand, I argue for a gestural approach that allows us to optimally consider all of the different realizations for all three types of transmission in a single approach.

Future research should consider rhotacization in Sardinian in greater depth to ascertain exactly how prevalent the process is in the standard variety and also where the process occurs in different environments for non-standard varieties. In addition, this is the first (known) study to suggest that there might be variation in rhotacization between Galician and Portuguese, with the examples given of G *frauta* and P *flauta* for ‘flute’ and G *frecha* and P *flecha* for ‘arrow’. Though not within the objectives of the current study, future research should investigate these examples (and look for others) to detect any variation that might exist.

References

- Bolognesi, Roberto (1998) *The phonology of Campidanian Sardinian*. Ph. D. dissertation, University of Amsterdam.
- Boyd-Bowman (1980) *From Latin to Romance in Sound Charts*. Washington, D.C.: Georgetown University Press.
- Browman, Catherine & Louis Goldstein (1989) Articulatory Gestures as Phonological Units. *Phonology* 6, pp. 201-251.
- Browman, Catherine & Louis Goldstein (1990) Gestural specification using dynamically-defined articulatory structures. *Journal of Phonetics* 18, pp. 299-320.
- Browman, Catherine & Louis Goldstein (1991) Gestural structures: Distinctiveness, phonological processes, and historical change. In I. G. Mattingly & M. Studdert-Kennedy (eds.) *Modularity and the motor theory of speech perception*. Hillsdale, New Jersey: Lawrence Erlbaum, pp. 313-338.
- Browman, Catherine & Louis Goldstein (1992) Articulatory phonology: An overview. *Phonetica* 49, pp. 155-180.
- Browman, Catherine & Louis Goldstein (2001) Competing constraints on intergestural coordination and self-organization of phonological structures. *Bulletin de la Communication Parlée* 5, pp. 25-34.

- Byrd, Dani (1994) *Articulatory timing in English consonant sequence*. Ph.D. dissertation, University of California, Los Angeles, CA.
- Byrd, Dani (1996b) A phase window framework for articulatory timing. *Phonology* 13, pp. 139-169.
- Gafos, Adamantios (2002) A Grammar of Gestural Coordination. *Natural Language and Linguistic Theory* 20(2), pp. 269-337.
- Holt, D. Eric (1997) The Role of the Listener in the Historical Phonology of Spanish and Portuguese: An Optimality-Theoretic Account. Ph.D. dissertation, Georgetown University.
- Jensen, Frede (1999) *A comparative study of romance*. New York: Peter Lang Publishing, Inc.
- Jones, Michael (1988) Sardinian. In Martin Harris and Nigel Vincent (eds.) *The Romance Languages*. New York: Oxford University Press.
- Lief, Eric Adler (2006) Syncope in Spanish and Portuguese: The diachrony of Hispano-Romance phonotactics. Ph. D. dissertation, Cornell University.
- Penny, Ralph (1991) *A history of the Spanish language*. New York: Cambridge University Press.
- Rodríguez Rodríguez, Anaír & Montserrat Davila Ventura (2004) *Lingua galega: Dúbidas lingüísticas*. Vigo, Spain: Universidade de Vigo.
- Veloso, João (2006) Reavaliando o Estatuto Silábico das Sequências Obstruente + Lateral em Português Europeu. *DELTA – Revista de Estudos em Lingüística Teórica e Aplicada* 22 (1), pp. 127-158.
- Williams, Edwin (1962) *From Latin to Portuguese: Historical Phonological and Morphological of the Portuguese Language*. Second Edition. Philadelphia: University of Pennsylvania Press.