RESEARCH PAPER

An Optimality–theoretic Account of the Evolution of Intervocalic Sonorants from Latin to Spanish and Portuguese

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From Latin to Spanish and Portuguese, the natural class of sonorant consonants – laterals, rhotics, and nasals – often underwent drastic phonological changes. It is noteworthy that the tendency toward dissimilation, in accordance with Dispersion Theory (Flemming 1996; 1997; 2006), effected opposite changes in intervocalic /l/ and /n/. Portuguese favored geminate simplification and singleton lenition (Lief 2006; Malkiel & Alessandri Teixeira 1985), whereas Spanish tended toward geminate palatalization and singleton retention (Lloyd 1987). This study is an expansion of Holt (2007) and presents a diachronic and contrastive analysis of the evolution of intervocalic /l l: n n:/ from Latin to Spanish and Portuguese.

1 Introduction

In the course of the development of what are called today the Romance languages, consonants have retained similarities to Latin and also exhibited divergences from such, as well as among themselves. It is well attested that intervocalic consonants underwent lenition in Ibero-Romance, most famously in the case of the class of obstruents. Geminates from Latin, particularly -PP- /p:/, -TT- /t:/, and -CC- /k:/ reduced to singleton segments /p t k/ as distinctive consonant length was lost. Their singleton counterparts -P- /p/, -T- /t/, and -C- /k/ became voiced /b d g/. Additionally, the voiced obstruents -B- /b/, -D- /d/, and -G- /g/ were frequently lost when found in intervocalic position. It can be said that intervocalic position was an "unprivileged" position for stop consonants as Latin evolved to Ibero-Romance, in contrast to word-initial position being "privileged" as Martinet (1952) describes.

   Possibly as notable as the lenition of obstruents, the Latin sonorants /l/ and /n/ (represented orthographically as -L- and -N- respectively) often underwent peculiar phonological changes in intervocalic environments. It bears noting that some of these changes, such as lenition and dissimilation, were observed in some languages but not in others. Various linguists (Bergquist 1977; Lief 2006; Tsukada 1989; et al.) have documented how /l/ and /n/ have evolved from Latin to the modern languages, both in isolation and alongside their geminate counterparts /l:/ and /n:/ (Latin orthographic -LL- and -NN- respectively). What is of interest is that it is still unclear how two languages, such as Spanish and Portuguese, can undergo distinct phonological changes even though the areas where each language is spoken are in such close proximity. For example, what might be a difference in the underlying grammar of each language that caused intervocalic /l/ to be lost in Portuguese but not in Spanish?

This paper will address two issues. First, it shall delineate the most notable changes that these Latin phonemes underwent, the phonotactic rules that conditioned these changes, and, additionally, the similarities and differences between Spanish and Portuguese. Comparisons and parallels in other Romance languages will be drawn as needed. Second, following the example of Holt (2007), Optimality Theory principles will be applied in order to attempt to illustrate a governing force behind these distinct changes, treating the relationship between geminate-singleton phonemic pairs as one of codependence instead of one of disjunction.

2 Latin sonorants

Spoken Latin, being the primary predecessor (an earlier state) of all Romance languages, bequeathed to them a robust repertoire of consonantal phonemes. Almost all of these phonemes survived into Spanish and Portuguese. Latin also featured geminate counterparts of singleton consonants, representing them orthographically by the doubling of that consonant. Geminates, as consonants of longer duration, provided a coda to the preceding syllable (closing or "checking" the syllable) while at the same time forming the onset of the following syllable (Baker 2006; Holt 1997; 1999). These geminate segments, then, formed minimal pairs with singleton segments. The presence of minimal pairs is proof that geminates were not simply allophones of singleton phonemes but instead were distinctively phonemic in their own right, as noted in the following examples.

(1)   a. MALE 'bad' [ma.le]
        b. MALLE 'to prefer' [mal.le]

(2)   a. ANUS 'old woman' [a.nus]
        b. ANNUS 'year' [an.nus]

In examining the class of sonorants that persisted from Latin into Ibero-Romance, specifically Spanish and Portuguese, we see that /m n ɾ l/ remain as consonantal phonemes and that the glides [j w] remain as allophonic variants of the high vowels /i u/. For the purposes of this investigation, I shall pay specific attention only to intervocalic /l l: n n:/ for the following reasons:

- Latin -MM- uniformly reduced to (and merged with) singleton /m/ in Ibero-Romance: FLAMMA > Sp. *llama*, Pt. *chama* ('flame').
- Latin -R- and -RR- never reduced or lenited intervocalically, nor did they merge with one another: CURO > Sp., Pt. *curo* ('I cure'), CURRO > Sp., Pt. *corro* ('I run').

Phonemic length distinction, whether consonantal or vocalic, was lost in Spanish and Portuguese, and so the speakers of the earliest variants of these languages sought to maintain the former singleton-geminate contrast so as to avoid confusion. A possible explanation of the merger of -MM- and -M- can be found in Lloyd (1987: 243), who notes that occurrences of -MM- were very rare, as were those of -DD- and -GG-. The rarity of these geminates is further seen in the relative lack of minimal pairs involving -M- and -MM-, a fact not attributable to -L-/-LL- and -N-/-NN-. For these reasons, they being the higher frequency of -LL- and -NN- compared to other sonorant geminates and the relative robustness of minimal pairs between them and singleton -L- and -N-, -LL- and -NN- did not merge with their singleton counterparts -L- and -N- in the same manner as -MM- with -M- (Holt 2007).

3 Diachronic changes in Spanish and Portuguese

What shall follow is a survey of the distinctions that arose in Spanish and Portuguese. Though both Spanish and Portuguese maintain the Latin contrast, the evolution of said contrast diverged significantly. Portuguese tended more toward a pattern of simplification of geminates and elision of singletons, whereas Spanish exhibited retention of singletons and fortition of geminates by means of palatalization.

3.1 Latin -L- and -N-

This section focuses solely on singleton /l/ and /n/ found in intervocalic position and how these phonemes evolved in the development of Spanish and Portuguese. Of note is the special case of singleton /l n/ preceding a short front vowel /e i/ plus another vowel, represented in orthography as intervocalic -LI-, -LE- and -NI-, -NE-. The short front vowels evolved to the glide *yod* /j/. In both Spanish and Portuguese, these sequences of sonorant plus yod coalesced and evolved to become the lateral and nasal palatal phonemes /ʎ/ and /ɲ/. Due to the lack of contrast in the evolution of these phonemes (though Old Spanish /ʎ/ did further evolve to /x/; see Resnick 1981 and Penny 2008 for this process in greater detail), this change will not be discussed further.

3.1.1 Portuguese

The phoneme /l/ in intervocalic position was lost during the Proto-Historical Era, which lasted from the end of the 9th century until the beginning of the 13th (Tsukada 1989). Before this period and during the era of Vulgar Latin (VL), however, the phoneme /l/ which was articulated [dental] in Classical Latin (CL) had already taken on a velarized place of articulation [ɫ]. The loss of intervocalic /l/, then was a continuation of the process of lenition (gradual weakening of consonantal phonemes) that had already begun.[1] The cline of this process is as follows:

(3)   Lat. -L- [l̪] > *[l] > [ɫ] > [w] > Ø

Complete loss of the segment was observed during Galician-Portuguese; Lief (2006) cites Williams (1962) in remarking that this loss can be traced to between the 9th and 10th centuries. Additionally, Lipski (1973b) notes that the earliest documents that could be considered proper Galician already reflected the loss of these segments. The results of this process can be observed in modern Portuguese as well as modern Galician (Brea 1985), disregarding orthographic differences:

(4)   a.   DOLORE > *do-or* [do.óɾ] > *dor* [doʁ] 'pain'
         b.   DOLERE > *do-er* > *doer* [du.eʁ] 'to hurt, ache'

(5)   FILU > *fi-o* [fí.o] > *fio* [fi.u] 'thread'

(6)   SOLO > *so-o* [só.o] > *só* [sɔ] 'only'

(7)   CAELUM > *ce-o* [cé.o] > *céu* [sɛ.u] 'sky, heaven'

(8)   SALIRE > *sa-ir* [sa.íɾ] > *sair* [sa.iʁ] 'to leave'

It is worth mentioning that the loss of intervocalic /l/ in Galician-Portuguese produced hiatuses between the vowels, marked in orthography by the hyphens. It was during what is known as *o Periodo Arcaico 1* (PA1) (Tsukada 1989), from the beginning of the 13th century until the middle of the 14th century, that the hyphens disappeared, signifying that one of two phenomena had occurred:

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[1] See Holt (2002) for discussion of the weakening of /l/ in coda position in Romance as well as in other language families.

a. If the vowels were different, either they remained in hiatus (cf. *fio*) or formed diphthongs in the modern language, e.g., *mau* [maw] < MALUM 'bad (masc.)'.

b. If the vowels were identical, they fused, e.g., *má* [ma] < MALA 'bad (fem.)', *dor* < DOLORE).

Interestingly, although loss of intervocalic /l/ is observed regularly, derivations of such words still maintain the /l/ from the root. Some of these words may be considered to be semilearnèd and therefore seem not to have followed the pattern of their root words.

(9)   DOLORE > *dor* 'pain' >> *doloroso* < DOLORŌSUS 'painful'

(10)   SALIRE > *sair* 'to leave' >> ModPtg *saliente* /salĩẽ(n)ti/ < SALIĒNS 'salient'
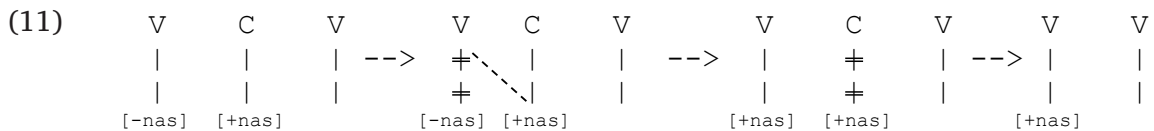
A possible explanation for this might be the fact that /l/ is pretonic in the adjectival derivations and therefore may not be subject to the same influences as the root words. However, there exists a counterexample in Galician: *saír >> *saínte* < SALIĒNS << SALIRE.

In Galician-Portuguese, there were two possible results for intervocalic /n/:

a. nasalization of the preceding vowel and loss of consonantal features of /n/;

b. nasalization of the preceding vowel that no longer exists today.

Like the loss of intervocalic /l/, the loss of /n/ occurred during the Proto-Historical Era. This raises the question as to the possibility of a parameter that disallowed intervocalic coronal sonorants with feature [+cont] during this period; we will investigate this later in section 5. Furthermore, since nasalization and subsequent loss occurred in both scenarios listed above (irrespective of whether the vowel remains nasalized in the modern variant), we will disregard the divergent final result and focus solely on the synchronic nasalization.

This pattern, then, of nasalization followed by loss of /n/ was observed almost universally in Galician-Portuguese. Moreover, a similar phenomenon (possibly the exact same process) took place in the history of French. Using autosegmental notation, the changes can be modeled in the following manner, assuming that the nasal consonant is coronal:

(11)

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      V     C     V       V   C     V       V    C      V     V     V
      |     |     |  -->  ╪╲  |     |  -->  |    ╪      |  -->|     |
      |     |     |       ╪  ╲ |     |       |    ╪      |     |     |
    [-nas] [+nas]         [-nas][+nas]      [+nas][+nas]        [+nas]
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The first stage is the initial condition: a nasal consonant between two vowels, the first vowel having the feature value [-nas] (meaning, oral and not nasal). Next, the vowel preceding the consonant assimilates the feature [+nas] (meaning, nasal and not oral) from the following vowel. In the third stage, the nasal consonant loses its consonantal features and is lost upon "sharing" its nasality with that previous vowel – or, a bit more formally, once the vowel has assimilated the [+nas] feature from the subsequent consonant – culminating in the fourth and final stage.[2] This process is evidenced in the following examples, among many others:

(12)   MANU > Gal-Pt *mãno* > *mã-o* > ModPt *mão* [mɐ̃u] 'hand'

(13)   PANE > Gal-Pt *pane* > *pã-e* > *pã* > ModPt *pão* [pɐ̃u] 'bread'

(14)   BONU > Gal-Pt *bõno* > *bõ-o* > ModPt *bom* [bõ] 'good'

Note that nasalization of the vowel frequently remains if that vowel bears primary stress (i.e., is the tonic vowel). Nevertheless, there are still exceptions in which the vowel

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[2] See Morales-Front and Holt (1997) for an OT analysis of this phenomenon.

denasalized. If the previously nasalized vowel was a front vowel [–back], the "slot" that previously contained /n/ now contains the glide [j]. If the previously nasalized vowel was [u] [-back +high], the hiatus remained:

(15)   ARENA > Gal-Pt *arẽ-a* > *are-a* > ModPt *areia* [aɾejɐ] 'sand'

(16)   LUNAM > Gal-Pt *lũna* > *lũ-a* > OPt *lũa* > ModPt *lua* [luɐ] 'moon'

(17)   PLENU > Gal-Pt *chẽ-o* > *che-o* > ModPt *cheio* [ʃeju] 'full'

Another curious case was observed during Galician-Portuguese and is possibly the equivalent of what has been observed in French. The procession from Latin BONU > Pt. *bom* has been shown. French shows an identical phonetic end result: *bon* /bɔ̃/. Curiously, neither Portuguese nor French maintained the nasality of the tonic vowel in the feminine form of the word:

(18)   BONA > *bõ-a* > ModPt *boa* [bɔɐ], cf. ModFr *bonne* [bɔn] 'good (fem.)'

A case still more curious is Latin VINU ('wine'). Its expected result, based on the pattern of (15–17) would be **vio* /vi.u/; however, the Portuguese descendant is *vinho* /viɲu/ with a palatal nasal that, on the surface, appears to have no diachronic reason for appearing in this context. One seemingly self-evident postulation would be that the palatal nasal appeared via analogy with the related word VINEA > *vinha* /viɲa/, but this is not the case; the evolutionary path was distinct but nonetheless purely phonologically motivated. According to Lipski (1973a) and Tsukada (1989), nasalization of tonic [i] played a prominent role in the appearance of this "unexpected" [ɲ]. Like in other cases, the loss of [n] after nasalizing the preceding tonic vowel left behind a hiatus [ĩ.o] (or alternatively [ĩ.a]). Lipski postulates that once high vowels lost phonemic nasality, though, the nasal segment [ɲ] appeared in order to break the hiatus (also see Holt 1993). This process can also be observed in the Portuguese diminutive suffix *inho/inha*, derived from the Latin -INUS/-INA (paralleled in Galician *-iño/-iña*).

(19)   VINU > Gal-Pt *vĩ-o* > ModPt *vinho* [viɲu] (cf. Sp, It *vino* /bino, vino/) 'wine'

(20)   PINUS > Gal-Pt *pĩ-o* > ModPt *pinho* [piɲu] (cf. Sp, It *pino* /pino/) 'pine'

(21)   PATRINUS > Gal-Pt *padrĩ-o* > ModPt *padrinho* [padɾĩɲu] (cf. Sp *padrino* / padɾino/) 'godfather'

In contrast to (19–21) above which involved tonic vowels, pretonic vowels that became nasalized by way of the process in (11) are no longer nasal in Modern Portuguese. Examples (22–23) show this:

(22)   VENĪRE > Gal-Pt *vẽ-ir* ~ *vĩ-ir* > *vir* [viʁ] 'to come'

(23)   TENĒRE > Gal-Pt *tẽ-er* > *ter* [teʁ] 'to have'

It appears that phonemic nasality of pretonic vowels disappeared prior to the formation of what we now know as Modern Portuguese.

3.1.2 Spanish

In contrast to Portuguese, the evolution of intervocalic /l/ was relatively unremarkable in the majority of cases. While /l/ was lost in Portuguese, this consonant was preserved in Spanish.

(24)   a. DOLŌRE > *dolor* [doloɾ] 'pain'
         b. DOLĒRE > *doler* [doleɾ] 'to ache'

(25)   CAELUM > *cielo* [sjelo ~ θjelo][3] 'sky, heaven'

(26)   SALĪRE > *salir* [saliɾ] 'to leave'

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[3] The alternation here is geographically conditioned. Latin American Spanish speakers universally pronounce <c> as [s] before front vowels /i e/. In Peninsular Spanish, however, <c> is produced as [θ] in the same environment.

As intervocalic /l/ was preserved uniformly from Latin to Spanish, the same was observed of -N- /n/.

(27)   VENĪRE > *venir* [beniɾ] 'to come'
(28)   TENĒRE > *tener* [teneɾ] 'to have'
(29)   ARĒNA > *arena* [aɾena] 'sand'
(30)   LUNAM > *luna* [luna] 'moon'
(31)   PLĒNU > *lleno* [ʎeno]⁴ 'full'

To conclude this section, elision of intervocalic singleton /l n/ was the order of the day in old varieties of Portuguese, which along with Galician remains the only Romance language to have undergone this change diachronically. Though close to Portuguese in many aspects of historical phonological change, Spanish maintains intervocalic /l n/ from Latin. This retention of these consonants, in conjunction with the loss of the same consonants in Portuguese, possibly may have conditioned the treatment of their geminate analogues. We investigate this in the next section.

3.2 Latin -LL- and -NN-

Geminates, in contrast with singleton consonants in Latin that were observed in both intervocalic and post-consonantal position, almost always appeared intervocalically. The sequence -LL- was no exception, as sequences such as *PLL, *CLL, and *HLL were never attested in Latin. Spanish and Galician-Portuguese showed evolutionary divergences even in antiquity, and these divergences remain in the modern variants.

3.2.1 Galician and Portuguese

It has been shown that intervocalic /l/ was lost almost categorically prior to the 13th century. As with the elision process /l/ > Ø that showed a reduction in duration, the geminate -LL- /l:/ was reduced to singleton /l/ (Bergquist 1977; Holt 2016; Tsukada 1989).

(32)   BELLUS > ModGal, ModPtg *belo* [bɛlo, bɛlu] 'beautiful'
(33)   CASTELLUM > ModGal, ModPtg *castelo* [kastɛlo, kaʃtɛlu] 'castle'
(34)   SELLA > ModGal, MotPtg *sela* [sɛlɐ] 'saddle'

In line with the pattern of -LL-, in Galician-Portuguese the geminate sequence -NN- /n:/ reduced to singleton /n/. The sequence -MN- often reduced to the singleton /n/ as well, by way of a place assimilation: /mn/ > /nn ~ n:/ > /n/.

(35)   ANNUM > ModPtg *ano* [anu], ModGal *ano* [ano] 'year'
(36)   AUTUMNUS > ModPtg *outono* [otonu], ModGal *outono* [otono] 'autumn'
(37)   CANNA > ModGal, ModPtg *cana* [kanɐ], ModGal *cana* [kana] 'cane'
(38)   DAMNUM > ModPtg *dano* [danu], ModGal *dano* [dano] 'damage'
(39)   NINNO > ModGal *neno* [neno] (but ModPtg *menino*) 'young boy'

Bergquist (1977) states that Portuguese words containing Latin geminates converted into palatals were generally loanwords from Spanish: e.g., PENNA > ModPtg *penha*, ModGal *peña* < ModSp *peña* 'rock'.

   Holt (2003; 2016) and Penny (2008) state that certain natural classes of consonants underwent a uniform lenition process from Latin to Ibero-Romance, particularly Spanish and Galician-Portuguese. If we consider the class of obstruents, the tendency of these consonants to weaken in intervocalic position in Ibero-Romance is extremely clear. Consider

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⁴ The Old Spanish palatal lateral /ʎ/ has disappeared from almost all dialects of Modern Spanish in favor of the prescriptive standard voiced palatal fricative /ʝ/. Other realizations of this phoneme are the fricatives [ʃ ~ ʒ] in Southern Cone Spanish, as well as the approximant [j].

the following four evolutions from Latin to Old Spanish and Galician-Portuguese (all example words are cognates unless specified):

(40)   Geminate voiceless stops > singleton voiceless stops
        a.   -PP- /p:/ > /p/ (e.g., CUPPA > *copa* 'cup')
        b.   -TT- /t:/ > /t/ (e.g., GUTTA > *gota* 'drop')
        c.   -CC- /k:/ > /k/ (e.g., SICCU > *seco* 'dry')

(41)   Singleton voiceless stops > singleton voiced stops
        a.   -P- /p/ > /b/ (e.g., CAPO > *cabo* 'cape')
        b.   -T- /t/ > /d/ (e.g., AMATUS > *amado* 'loved')
        c.   -C- /k/ > /g/ (e.g., PERICULU > Sp *peligro*, Pt *perigo* 'danger')

(42)   Singleton voiced stops[5] > either voiced fricatives or loss
        a.   -B- /b/ > /v/ (e.g., HABĒRE > OSp, OPt *aver* 'to have')
        b.   -D- /d/ > Ø (e.g., FIDE > Sp *fe*, Pt *fé* 'faith')
        c.   -G- /g/ > Ø (e.g., QUADRAGINTA > Sp *cuarenta*, Pt *quarenta* 'forty')

Both Holt and Penny attribute this universal lenition of obstruents to the loss of segment length as distinctive in Ibero-Romance. If we extend the phenomena of obstruent lenition due to loss of length distinction to /l l: n n:/, then it is possible that the simplification of geminate /l: n:/ to singleton /l n/ was a related process. Indeed, Holt (1997; 2016) and Ferreira and Holt (2014) postulate that /l: n:/ were able to simplify without causing confusion, which implies that geminate simplification in Galician-Portuguese was a later development than the loss of intervocalic /l n/.

3.2.2 Spanish

The Latin geminate -LL-, instead of reducing to a singleton segment, underwent fortition and became a palatal consonant. Linguists such as Lloyd (1987) and Holt (2003) maintain that palatalization was a dissimilating change that appeared in order to maintain the Latinate distinction between singleton and geminate consonants, a distinction which had been lost in Old Spanish. For this reason, it was more likely for this change to be observed in Castilian than in Galician-Portuguese, the latter of which maintained the phonemic distinction of singleton and geminate laterals through elision of intervocalic singleton /l/. That is to say, where in Latin contrast was manifested in consonant length, presence or absence of a phoneme provided this same contrast in Galician-Portuguese. Moreover, according to Lloyd (1987) and Holt (2003) once more, articulatory effort was a salient factor in geminate palatalization. In order to pronounce these particular geminates, the tongue remained against the alveoli for a longer duration than it did for singletons. Upon releasing the long consonant, the tongue left the hard palate, creating the palatalized consonant as a result (see Baker 2006 for a more phonetic analysis of this phenomenon).
   Palatalization of -LL- (/l:/ > /ʎ/), then, was almost universally realized in Old Spanish.

(43)   BELLUS > *bello* [beʎo] 'beautiful'
(44)   CASTELLUM > *castillo* [kastiʎo] 'castle'
(45)   SELLA > *silla* [siʎa] 'chair, saddle'

In the same fashion that Galician-Portuguese reduced the geminate to a singleton consonant, Spanish saw the fortition of the geminate -NN- to the palatal nasal /ɲ/, following the pattern of simplification observed in -LL-.

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[5] It is presumed that all voiced intervocalic stops were produced as fricatives or spirants in Latin, especially in Ibero-Romance (Lloyd 1987).

(46)   ANNUM > *año* [aɲo] 'year'
(47)   AUTUMNUS > *otoño* [otoɲo] 'autumn'
(48)   CANNA > *caña* [kaɲa] 'cane'
(49)   DAMNUM > *daño* [daɲo] 'damage'
(50)   NINNO > *niño* [niɲo] 'young boy'

It should be noted that, according to Penny (2008), geminate -LL- and -NN- that appeared before word-final vowels that later underwent apocope (-E in particular) were instead reduced to singleton /l/ and /n/ in Spanish, as in the following examples:

(51)   JOHANNE > *Juan* [xwan] 'John'
(52)   MĪLLE > *mil* [mil] 'thousand'

The reason for this is that palatal consonants are phonotactically restricted from appearing in coda position in Spanish. Examples such as these will continue to be excluded from the analysis.

3.3 Summary

To conclude, the divergent evolution of intervocalic sonorants resulted in complete loss in Portuguese and Galician but preservation in Spanish. Similarly, reduction of geminate sonorants was normal in Portuguese and Galician, whereas these segments became palatal sonorants in Spanish. As mentioned in section 2, speakers of Old Spanish and Portuguese need to continue to disambiguate words which were distinguished only by consonant length in Latin. The changes named above allowed for minimal pairs inherited from Latin to remain distinct in Spanish and Portuguese, as in the following examples:

(53)   CANA 'gray', CANNA 'cane'
    a. Sp *cana* [kana], *caña* [kaɲa]
    b. Pt *cã* [kɐ̃], *cana* [kɐ̃nɐ]

(54)   CŌLARE 'to sift', COLLARE 'of the neck'
    a. OSp *colar* [kolaɾ], *collar* [koʎaɾ] 'necklace'
    b. Pt *coar* [koaʁ], *colar* [kolaʁ]

Though this is an extremely salient change, as has been noted above, what has not been answered is the question of modeling the parameters to account for sound change across both languages. In lieu of modification of phonological rules, this study will employ Optimality Theory (OT) to account for the phonological changes that took place.

4 Optimality Theory and sound change: background

Previous studies by Jacobs (1994; 1995), who investigated sound change in French, and Holt (1997; 1999; 2003; 2007), whose work involved change from Latin to Hispano-Romance, have given OT accounts for said evolutionary changes. In each study, the aforementioned authors claimed that the re-ranking of constraints in the language's grammar accounted for diachronic phonological evolution in the respective languages. Jacobs' works showed various parametric changes in syllable structure and consonant clustering between Latin, Gallo-Romance, and Old French, as well as accounting for the loss of enclisis.

   Of particular interest to the current study are Holt's (2003; 2007) analyses of /l n/ preservation and /lː nː/ palatalization in Hispano-Romance. Holt's position is that the change in consonants between Latin and Hispano-Romance – as well as Galician-Portuguese – is primarily due to the loss of segmental length distinction in Latin. This loss of distinction of length (as well as vowel quality) caused long mid vowels in Latin to persist as closed vowels in Spanish and short mid vowels in Latin to become open vowels in Old Spanish and diphthongs in Modern Spanish when in tonic position. Similarly, almost all geminates

simplified to singletons and retained their articulatory features. Geminate sonorants, how-ever, evolved in the manners mentioned in the previous section. Portuguese, through the simplification of its geminate sonorants, avoided phonemic merger due to the fact that intervocalic /l n/ were lost in prior stages. This reasoning is based on Flemming's (1996; 1997; 2006) Dispersion Theory, which explains that maximizing contrast with the least amount of articulatory effort is paramount in language.

To account for the maintaining of contrast between the geminate and singleton sono-rants, Holt defines the following OT constraints and the associated hierarchy:

(55) NMS   'No moraic sonorants'
      *MERGE   'Maintain contrast'
      MAX/IDENT/DEP   'No deletion/changing of features/epenthesis'
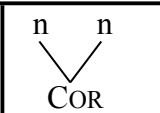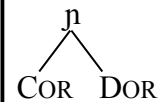(56) NMS >> *MERGE >> MAX/IDENT/DEP

Hereafter, my analysis is based on the following assumptions of the moraicity of conso-nants from Holt (1999), which I briefly summarize here:

  a. Short consonants are non-moraic in onset position: /C/ > [C-]
  b. Short consonants are moraic in coda position: /-C/ > [-C$_\mu$]
  c. Long (geminate) consonants are moraic and fill the coda of a preceding syllable
      and the onset of the subsequent syllable: /C$_\mu$/ > [C$_\mu$]

Given the two positions in syllable structure that a geminate occupies, in my own tran-scriptions I will present geminates in phonological form as /C:/ and in phonetic form as [C.C] for reasons of clarity regarding syllable structure. It can also be understood that both /C:/ and [C.C] imply the presence of a mora.

A hierarchy such as in (56), states Holt, causes geminates to be lost and merger to be avoided, while allowing features of phonemes to be changed. Below is the associated tab-leau, from Holt, showing these constraints in effect:

(57) Merger avoidance in Old Spanish of /nn, n/ by palatalization of /nn/ (Holt
      2007: 387, example 6)

		/nn n/	NMS	*MERGE	MAX/IDENT/DEP
a)		n n n ∨ COR	*!		
b)		n n		*!	*<μ>
c)	☞	n n ⁄\ COR DOR			*<μ> *+DOR

In Holt's tableau, candidate (a) represents the status quo, or the latest stage of Latin (and possibly an early stage of Ibero-Romance) during which moraic sonorants were still per-missible. This faithful candidate is rejected due to /n:/ bearing a mora, as it is in coda position of one syllable while in onset position of the next. Candidate (b) is rejected in that it fails to maintain contrast between the geminate and singleton consonants. Therefore, candidate (c) is selected by way of only violating the low-ranking faithfulness constraints.

While the proposed constraint hierarchy does give the desired result in Holt's analysis, the use of NMS as a high-ranking constraint is not without its faults. The purpose of the constraints in an OT analysis is to represent universal parameters as hierarchical arrangements unique to

a particular language. For example, a language that does not allow codas would have a constraint such as *CODA as strictly undominated in any constraint ranking. Holt presents NMS as an inviolable constraint in this particular analysis of Old Spanish, one of several defined as a "conspiracy" against coda moraicity. However, the problem with this particular analysis is that sonorants are frequently found in coda position in Spanish (cf. *canta*r, *perni*l, *colchó*n), thus possibly granting them moraic status due to this position (Holt 2003; following Hayes 1989).[6] It appears that Holt is using NMS specifically for his analysis of geminates versus singletons, but its lack of universality must be accounted for in light of the examples above.

Another possible issue with Holt's constraint hierarchy is the positioning of MAX, IDENT, and DEP as tantamount in violability. If, for instance, we posit a candidate (d) alongside the previous candidates (a–c) that shows the observed outcome from Galician-Portuguese as a possibility in Old Spanish – that is, Latin /nn/ > /n/ and Latin /n/ > Ø – but leave the rankings the same, the result of an OT analysis is a tie:

(58)　　Holt's (2007) constraint ranking with additional candidate reflecting Galician-Portuguese output candidate in Spanish (with Latin as input)

		/nn　　　n/	NMS	*MERGE	MAX/IDENT/DEP
c)	?	ɲ　　　n COR　DOR			*<μ> *+DOR
d)	?	n　　　<n>			*<μ> *<n>

Here, proposed candidate (d) incurs two low-ranked violations of MAX, which under the same constraint ranking is equal to candidate (c) incurring one violation each of MAX and IDENT. This analysis would have the outcomes from Spanish and Portuguese equally valid and thus predicting variation, though historical data do not bear this out. What this outcome proves is that, in order for the desired outcome to surface in Spanish, prohibition of deletion (MAX) must be superior to prohibition of feature change (IDENT) instead of equal to it.

5　Current analysis

Based on Holt's premises, the current study will restate geminate simplification and merger avoidance from Latin to Old Spanish to Spanish. This study also aims to analyze the evolution from Latin to Portuguese by way of OT. More particularly, the goals are twofold:

- To include the treatment of singleton segments in both Spanish and Portuguese, and comparison of the two.
- To include the treatment of geminate segments in both Spanish and Portuguese, and comparison of the two.

The working hypothesis is that the diachronic changes from Latin to Spanish and from Latin to Portuguese can be conditioned with the same set of constraints but reordered in order to accurately reflect said changes and differences – in essence, the very purpose of Optimality Theory (Archangeli 1999).

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[6] Holt (2003) describes coda sonorants as being moraic during the period of Hispano-Romance, but no further. However, studies by Piñeros (1998; 2001) and Martínez-Paricio (2013) adopt Hayes' (1989) analysis of Weight-by-Position in order to suggest that a coda consonant in modern Spanish may bear a mora if the syllable in which it is found bears primary stress. Following these, I argue that in the case of words such as cantar, pernil, and colchón, the coda consonants in the final syllables bear morae, whereas those found in the unstressed penult do not.

Though Holt's (2007) study is the baseline, crucial to the current study is the avoidance of the markedness constraint NMS in favor of other constraints that more accurately reflect the phonology of the languages in question. Finally, the possibility of a single set of constraints conditioning both geminates and singletons in either language will be considered.

5.1 Preliminary analysis of singletons

It has been shown that while Spanish retained intervocalic /l n/, Portuguese lost both phonemes in a very early stage. With this divergence, there exists the possibility of a common set of constraints between both languages, yet reordered in order to reflect the reality of each language. The possible constraints are below:

(59)   *Positional markedness*
        *V/l n/V   'No intervocalic /l/ or /n/'

(60)   *Context-free faithfulness*
        MAX   'No deletion (of segments, features, or morae)'
        IDENT-IO(PLACE)   'Don't change articulatory place of a segment'
        IDENT-IO(MANNER)   'Don't change articulatory manner of a segment'

For the moment, I introduce a "brute-force" constraint of *V/l n/V as an outright prohibition of intervocalic /l n/, as this was the result observed in Portuguese while it was not seen in Spanish. I showed at the end of the previous section that the prohibition of deletion was superior to prohibition of feature change in Spanish, and that the opposite was true of Portuguese.

(61)   Spanish hierarchy: MAX >> IDENT-IO(MANNER) >> IDENT-IO(PLACE) >> *V/l n/V

(62)   Portuguese hierarchy: *V/l n/V >> IDENT-IO(MANNER) >> IDENT-IO(PLACE) >> MAX

With these constraints in place, the tableaux for singleton /l n/ in Spanish and Portuguese are as follows.

(63)   *Spanish singleton preservation*

        a. /l/ > /l/

		CAELUM /kɛlum/[7]	MAX	IDENT-IO(MANNER)	IDENT-IO(PLACE)	*V/l/V
a)	☞	sje.lo				*
b)		sje.o	*!			
c)		sje.do		*!		
d)		sje.ʎo			*!	

        b. /n/ > /n/

		LUNAM /lunam/	MAX	IDENT-IO(MANNER)	IDENT-IO(PLACE)	*V/n/V
a)	☞	lu.na				*
b)		lu.a	*!			
c)		lu.da		*!		
d)		lu.ɲa			*!	

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[7] The analysis ignores vocalic changes such as neutralization [ae] > [ɛ] in Ibero-Romance, diphthongization of tonic open mid vowels [ɛ] > [we] in Spanish, and lowering of final high vowels [u] > [o]. Also, consonantal changes such as the loss of Latin final /-m/ are disregarded.

(64)   *Portuguese singleton lenition*

a.   /l/ > Ø

	CAELUM /kɛlum/	*V/l/V	IDENT-IO(MANNER)	IDENT-IO(PLACE)	MAX
a)		sɛ.lu	*!			
b) ☞		sɛw				*
c)		sɛ.du		*!		
d)		sɛ.ʎu			*!	

b.   /n/ > Ø

	LUNA /luna/	*V/n/V	IDENT-IO(MANNER)	IDENT-IO(PLACE)	MAX
a)		lu.nɐ	*!			
b) ☞		lu.ɐ				*
c)		lu.dɐ		*!		
d)		lu.ɲɐ			*!	

The main difference between the two tableaux is the position of *V/l/V and MAX. In Spanish, MAX is strictly undominated as the segment was not historically lost, and *V/l/V must be violated in order for the winning candidate (a) to surface. Conversely, in Portuguese *V/l/V is the highest-ranking constraint, and MAX must be the necessarily violable constraint. The other faithfulness constraints – both IDENT – effectively prevent the segment in question from changing its manner of articulation (both candidates (c)) or place of articulation (both candidates (d)) from Latin to the modern language.

5.2 Preliminary analysis of geminates

As shown, Portuguese geminate sonorants /l: n:/ were reduced, becoming singletons, whereas these segments became palatal sonorants /ʎ ɲ/ in Old Spanish. As with the singleton analysis, there exists the possibility of a single set of constraints conditioning both Spanish and Portuguese evolutionary behaviors.

(65)   *Context-free markedness*
     *GEMINATE   'No long consonants' (Rose 2000; Pajak 2009)

(66)   *Context-free faithfulness*

     *MERGE   'Maintain phonemic contrast'
     MAX   'No deletion (of segments, features, or morae)'
     IDENT-IO(MANNER)   'Don't change articulatory manner of a segment'
     IDENT-IO(PLACE)   'Don't change articulatory place of a segment'

(67)   *Preliminary hierarchy ranking for Old Spanish*
     *GEMINATE, *MERGE >> MAX >> IDENT-IO(MANNER) >> IDENT-IO(PLACE)

(68)   *Preliminary hierarchy ranking for Portuguese*
     *GEMINATE, *MERGE >> IDENT-IO(MANNER) >> IDENT-IO(PLACE) >> MAX

I preface this discussion by noting that the highest-ranked two constraints, *GEMINATE and *MERGE, are equally inviolable in both languages but for distinct purposes. Geminates do not exist in the current stage of either language, and so the constraint prohibiting them should be undominated. While geminates were lost, in the majority of cases there was still no phonemic merger between singleton-geminate pairs (see section 3.2.1), and so *MERGE must be undominated as well. The following two tableaux show the interplay of these five constraints in Spanish and Portuguese as they condition the handling of Latin geminates in a word such as CANNA

> Sp *caña,* Ptg *cana* 'cane'. Note that the crucial distinction between the two languages lies in the three lowest-ranked constraints: MAX, IDENT-IO(MANNER) and IDENT-IO(PLACE).

(69)   *Ibero-Romance to Spanish palatalization*

     a.   /nː/ > /ɲ/

CANNA /kanːa/			*GEMINATE	*MERGE	MAX	IDENT-IO(MANNER)	IDENT-IO(PLACE)
a)		kan.na	*!				
b)		ka.na		*!	*		
c)	☞	ka.ɲa			*		*
d)		ka.a			**!		
e)		ka.da			*	*!	

     b.   /lː/ > /ʎ/

VĪLLA /viːla/			*GEMINATE	*MERGE	MAX	IDENT-IO(MANNER)	IDENT-IO(PLACE)
a)		vil.la	*!				
b)		vi.la		*!	*		
c)	☞	vi.ʎa			*		*
d)		vi.a			**!		
e)		vi.da			*	*!	

Regarding *MERGE, Spanish /nː/ could not simplify to singleton /n/ lest it converge upon already existing /n/ from Latin -N-. We observe that in Spanish /nː/ palatalized and thus changed its place of articulation, and thus IDENT-IO(PLACE) must have been the lowest-ranked constraint that was necessarily violated. It incurs one violation of MAX, which is permissible as candidate (d) incurs two violations in deleting the segment and the mora it bears. Candidate (e) also violates MAX once, but in changing its manner of articulation from nasal to plosive, it incurs a violation of IDENT-IO(MANNER) and is eliminated. Having already ruled out the faithful candidate (a) and the result of merger (b), candidate (c) emerges the winner in only violating MAX and the most inferior constraint IDENT-IO(PLACE).

(70)   *Ibero-Romance to Galician-Portuguese degemination*

     a.   /nː/ > /n/

CANNA /kanːa/			*GEMINATE	*MERGE	IDENT-IO(MANNER)	IDENT-IO(PLACE)	MAX
a)		kan.na	*!				
b)	☞	ka.na					*
c)		ka.ɲa				*!	*
d)		ka.a		*!			**
e)		ka.da			*!		*

     b.   /lː/ > /l/

VĪLLA /viːla/			*GEMINATE	*MERGE	IDENT-IO(MANNER)	IDENT-IO(PLACE)	MAX
a)		vil.la	*!				
b)	☞	vi.la					*
c)		vi.ʎa				*!	*
d)		vi.a		*!			**
e)		vi.da			*!		*

Again in Portuguese, the faithful candidate (a) is eliminated. Deletion of the geminate /nː/ would cause convergence upon singleton -N- that was already lost, and so candidate (d), besides incurring two violations of Max, violates the higher-ranked *Merge. There is no evidence of intervocalic /n/ (or /l/) changing its place of articulation, and so the constraint Ident-IO(Place) can be considered inviolable as well in order to rule out candidate (c). The victorious candidate is (b) which only incurs a single violation of the least-inviolable constraint Max.

The question remains why the rankings differ so widely between Spanish and Portuguese, and the argument that I put forth to address this question is the following. My analysis is of phonological divergence of the two languages based on a common historical underlying representation – in this case, Latin. Historical and modern data show that these particular segments in Latin evolved to be different in Spanish and Portuguese; these final states represent the output state of each language. In order for the outputs to differ, the constraints *must* be re-ranked. Otherwise, the analysis would yield identical resultant states of Spanish and Portuguese, which was not observed.

The constraint hierarchies in each language reflect the evolutionary tendencies of the languages, from least attested (strictly undominated constraint) to most salient (most violable constraint) and points in between. In Spanish we see a much stronger tendency toward feature change of the segments instead of outright deletion, and the opposite is true of Portuguese.

6 Synthesizing the evolution of geminates and singletons in the two languages: Holt's constraints revisited

There remains the question of whether constraints for geminates and singletons can be harmonized in order to motivate the correct outcomes for both Spanish and Portuguese from a Latin input. The purpose behind proposing a model that includes both geminate and singleton segments is that the observed changes of geminates were a direct result of how singleton /l n/ were treated in each language. On the surface, it appears that such a harmony would be relatively straightforward to attain, given the similarities between the two languages. Both Spanish and Portuguese, for example, abandoned geminates in favor of singleton consonants that functioned only as onsets of syllables instead of being both onsets and codas. So it would seem that an evolution from Latin to either present day language would involve a change in parameters that disallowed codas. Yet while in Portuguese sonorant consonantal codas were frequently eliminated or at least weakened – as evidenced by the velarization of [l] > [ɫ] (and, one step further, vocalization to [w]) in coda position (Ferreira & Holt 2014) as well as the loss of final [n] resulting in nasalization of the previous vowel – the case was not the same in Spanish, in which consonantal codas at the phonemic level are much more readily tolerated.[8]

(71)   CANTARE > ModSp *cantar* /kan.taɾ/, ModPtg *cantar* /kã.taʀ/ 'to sing'

(72)   ASSALTUS > ModSp *asalto* /a.sal.to/, ModPtg *assalto* /a.saw.tu/ 'assault'

Thus a common constraint set to condition the desired outcomes in both languages becomes difficult to devise. Therefore, a reworking of Holt's (1997; 2007) analysis may be the best course.

Instead of retaining NMS from Holt's analyses, there is a need to use a different context-free phonological constraint suitable for both languages. More specifically, this high-ranking

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[8] Many varieties of modern Spanish show patterns of /s/-aspiration and deletion in coda position, as well as fricativization of final /r/ as also observed in Brazilian Portuguese. These occurrences are understood to be allophonic variations and not phonemic changes.

constraint will militate against geminates in both Spanish and Portuguese. For this analysis, I will once again use Rose's (2000) NO-GEM constraint, to be styled as *GEMINATE in this paper in line with Pajak (2009), and define our constraint hierarchies below:

(73)   *Context-free markedness constraint*
         *GEMINATE   'No long consonants'

(74)   *Positional markedness constraint*
         M(AXIMAL) O(NSET) P(RINCIPLE)   'Consonants are onsets, not codas, where
                                                      possible' (cf. Uffmann 2010)

(75)   *Context-free faithfulness constraints*
         *MERGE   'Maintain phonemic contrast'
         IDENT-IO(PLACE)   'No changing of articulatory place of a
                                                      segment'
         MAX(μ)   'No deletion of morae'

(76)   *Positional faithfulness constraint*
         MAX(ONSET[+son])   'No deletion of sonorant onsets'[9]

Reiterating and expounding upon a point from section (5.2), I note that geminates did not exist in a phonemic fashion in Old Spanish or Galician-Portuguese. According to chronologies suggested by Resnick (1981) and Penny (2008), long consonants outlasted long vowels; whereas vowel length was lost in Late Spoken Latin, consonantal assimilation was still common during the same stage, yielding such developments from Classical to Late Latin as GYPSU(M) > *yesso* (surviving into Medieval Spanish), IPSŌS > *essos* (ibid.), and alumnus > *alunnos*. Findings such as these suggest that although loss of length distinction affected all segments in the path from Latin to Ibero-Romance, the link between vowel length loss and degemination may not be as strong as originally assumed or postulated.

Note that the positional markedness constraint MOP was added as well, in contrast to Holt's work. This is to avoid a degeminated consonant being assigned to a coda position versus an onset position in the output syllable.[10] In order to distinguish between segment deletion and mora deletion, I add MAX(μ) as a violable constraint. Finally, I include MAX(ONSET[+son]) as a positional faithfulness constraint in (76) which should be ranked higher in Spanish than Portuguese; intervocalic /l n/ are always onsets and were routinely lost in Portuguese but not Spanish.[11]

With the above considerations in mind, the appropriate constraint rankings for each language are below in (77–78). Both languages hold in common the strict dominance of *GEMINATE and *MERGE, as neither language continued to permit geminates, nor did they allow geminates to merge with their singleton pairs in most cases. Where the languages diverge is in the next level of constraints. Since in Spanish no sonorant onsets elided as

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[9] About positional faithfulness constraints that are contingent upon syllabification, Beckman (1998: 212fn) states the following: "For example, MAX-ONSET … will require that any segment which has an onset syllabification in S1 retain that onset syllabification in S2. …While positional MAX constraints … are unexceptional in cases of output-output correspondence in which syllabification is necessarily present in both strings, they are potentially problematic for input-output relations, as syllabification and prosodic structure cannot be assumed to be present in the input." In order for MAX(ONSET[+SON]) to be legitimized in this analysis, I assume that the input bears syllable structure from Latin instead of being a non-parsed underlying representation.

[10] Such a process is never observed in Romance as far as I am familiar, but see Hammond (1996) for an analysis of syllable assignment in English based on stress, as well as Baertsch (2010) for evidence of sonorants occupying coda positions before onset-less syllables in child Japanese and some pidgins of Russian. Their analyses suggest that this principle is not as universally strong as normally presumed. The constraint hierarchy leaves open the possibility of this phenomenon taking place in Spanish and/or Portuguese.

[11] Again, see Beckman (1998) for evidence of positional faithfulness as a viable OT category.

they did in Portuguese, MAX(ONSET[+son]) is higher-ranking in Spanish. Similarly, since no places of articulation changed in Portuguese, IDENT-IO(PLACE) is higher-ranking in Portuguese. The remaining constraints in Spanish – IDENT-IO(PLACE), MAX(μ), MOP – are low-ranking, as shown in (77), and have little effect on the outcome; however, they are included so that the evolutionary outcome of the segments in Spanish are properly modeled. In decreasing hierarchical importance, Portuguese tends toward open syllables, elision of sonorant onsets, and light syllables, which justifies the ranking below in (78).

(77)   *Spanish constraint hierarchy*
       *GEMINATE, *MERGE >> MAX(ONSET[+son]) >> IDENT-IO(PLACE) >>
       MAX(μ) >> MOP

(78)   *Portuguese constraint hierarchy*
       *GEMINATE, *MERGE >> IDENT-IO(PLACE) >> MOP >>
       MAX(ONSET[+son]) >> MAX(μ)

The tableaux are constructed following Holt's pattern, using the Latin geminate/singleton minimal pair as the input and the resultant Spanish/Portuguese evolutions as the output. Note that the five candidates (a–e) are identical so as to better illustrate the divergence of the two languages.

(79)   *Spanish tableaux of parallel geminate and singleton development*[12]

    a.   Evolutionary behavior of intervocalic /l:/ and /l/

V / l:		l/ V		*GEMINATE	*MERGE	MAX(ONSET [+son])	IDENT-IO (PLACE)	MAX (μ)	MOP
a)		l.l	l	*!					*
b)		\<l\>.l	l		*!			*	
c)	☞	ʎ	l				*	*	
d)		l.\<l\>	l			*!			*
e)		l	\<l\>			*!		*	

    b.   Evolutionary behavior of intervocalic /n:/ and /n/

V / n:		n/ V		*GEMINATE	*MERGE	MAX(ONSET [+son])	IDENT-IO (PLACE)	MAX (μ)	MOP
a)		n.n	n	*!					*
b)		\<n\>.n	n		*!			*	
c)	☞	ɲ	n				*	*	
d)		n.\<n\>	n			*!			*
e)		n	\<n\>			*!		*	

As expected, in each tableau the faithful candidate (a) fails due to conserving the geminate from Latin, which is an inviolable condition. The next candidate follows the pattern of geminate simplification found elsewhere in Spanish in that the long consonant becomes solely the onset of the following syllable, e.g., CUPPA [kup.pa] > *copa* [ko.pa] 'cup'. However, (b) results in phonemic merger, causing another violation.[13] Candidate (d) is discarded due to the geminate simplifying to remain a *coda* instead of an *onset*, which is the more privileged syllabic position in Spanish and Romance in general. Finally, candidate (e) results in two

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[12] The angled bracket notation henceforth indicates that a segment in the input is not realized in the output, following Jacobs' (1994; 1995) notations.

[13] While it is improper to say that an actual segment has been deleted, the view I take is that this represents the loss of ambisyllabicity of the segment due to degemination. The same can be said of candidate (d).

violations of deletion constraints: elision of the singleton consonant results in an onset-less syllable, and reduction of the geminate to a singleton deletes its mora. The winning candidate (c) is what is desired, as it is what was observed from Latin to Spanish.

Below are the tableaux with the constraints re-ranked according to observations from Portuguese.

(80)   *Portuguese tableaux of parallel geminate and singleton development*

a. Evolutionary behavior of intervocalic /lː/ and /l/

V /lː: l/ V			*Geminate	*Merge	Ident-IO (place)	MOP	Max(Onset [+son])	Max (μ)
a)		l.l	l	*!			*		
b)		<l>.l	l		*!				*
c)		ʎ	l			*!			*
d)		l.<l>	l				*!	*	
e)	☞	<l>.l	<l>					*	*

b. Evolutionary behavior of intervocalic /nː/ and /n/

V /nː: n/ V			*Geminate	*Merge	Ident-IO (place)	MOP	Max(Onset [+son])	Max (μ)
a)		n.n	n	*!			*		
b)		<n>.n	n		*!				*
c)		ɲ	n			*!			*
d)		n.<n>	n				*!	*	
e)	☞	<n>.n	<n>					*	*

In the case of Portuguese, candidates (a) and (b) fail for the same reasons as in Spanish: geminates neither remained viable nor merged with singletons. Since place of articulation of geminates never changed in Portuguese, candidate (c) is undesirable. Candidate (d) violates the pattern of Portuguese to assign intervocalic consonants to onset instead of coda positions. Finally, candidate (e), reflective of the reality of the evolution of the language, is the winning candidate.

Therefore, the six constraints listed above are sufficient to illustrate the variation in phonological evolution of Spanish and Portuguese from Latin as it pertains to the singleton-geminate pairs /l lː/ and /n nː/. As it is established that neither language tolerated geminates as Latin did, nor was phonemic merger a possibility, the parameters in force had to condition segment deletion and changing of place of articulation. Constraints against changes in place of articulation were weaker and more violable in Spanish than Portuguese, as evidenced not only here but also in instances of velarization of previously palatal sonorants (e.g., OCULU > [oʎo] > *ojo* [oxo] 'eye'). Conversely, constraints against sonorant deletion were weaker and more violable in Portuguese than Spanish, while articulatory features tended to remain in place (e.g., OCULU > *olho* [oʎo]). We see, as a result, that an identical set of constraints conditions divergent results in different languages if the hierarchy of said constraints is altered.

7 Conclusions

Via an optimality-theoretic approach to predicting and modeling diachronic change, it has been shown, by modifying Holt's (2007) work, how the complementary relationship between geminate and singleton consonants – particularly sonorants – can be maintained from Latin to modern Romance languages with one set of conditions. We see that from Latin

to Ibero-Romance, preservation of singleton sonorants as a general rule was preeminent in Spanish but not so in early varieties of Portuguese, in which these segments were lost. In a broad view of geminate simplification from Latin to Spanish and Portuguese, the principal motivating force was the loss of length distinction in the latter languages, which in turn caused formerly geminated segments to adapt in such a way as to avoid phonemic merger and confusion.

Overall, the change in grammar between two variants of the same language represents a change in underlying parameters from the old to the new in two languages. By similar virtue, changes in underlying parameters cause new, divergent languages to emerge from a common ancestor, especially in the case of the Ibero-Romance languages of Portuguese and Spanish.

Competing Interests

The author has no competing interests to declare.

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