The role of comprehension, reinterpretation and the Uniformity Condition in historical change: the case of the development of $Cl$ clusters from Latin to Hispano-Romance

D. Eric Holt
Georgetown University

0. Introduction.* As shown in (1), clusters of voiceless consonant and /l/ /k, p, f + l/ undergo a series of changes from Latin to Hispano-Romance:

0.1 Data:

<table>
<thead>
<tr>
<th></th>
<th>Latin</th>
<th>Spanish</th>
<th>Galician/Portuguese</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) initial</td>
<td><strong>CL</strong></td>
<td>CLAVE</td>
<td>llave ($\bar{\lambda}$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLAMARE</td>
<td>llamar</td>
</tr>
<tr>
<td></td>
<td><strong>PL</strong></td>
<td>PLUVIA</td>
<td>lluvia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLANCTU</td>
<td>llanto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLORARE</td>
<td>llorar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLAGA</td>
<td>llaga</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plicare</td>
<td>llegar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLENU</td>
<td>lleno</td>
</tr>
<tr>
<td></td>
<td><strong>FL</strong></td>
<td>FLAMMA</td>
<td>llama</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FLACCIDU</td>
<td>llacio</td>
</tr>
<tr>
<td>(b) medial</td>
<td><strong>CL</strong></td>
<td><em>mancla</em></td>
<td>mancha (tʃ)</td>
</tr>
<tr>
<td></td>
<td>CONCHULA</td>
<td>concha</td>
<td>concha</td>
</tr>
<tr>
<td></td>
<td>TRUNCULU</td>
<td>troncho</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HINNIT-**ULARE</td>
<td>reinchar</td>
<td>r(el)inchar</td>
</tr>
<tr>
<td></td>
<td><strong>PL</strong></td>
<td>IMPLARE</td>
<td>(h)enchir</td>
</tr>
<tr>
<td></td>
<td><strong>FL</strong></td>
<td>INFLARE</td>
<td>(h)inchar</td>
</tr>
<tr>
<td></td>
<td><em>masclo</em></td>
<td>macho</td>
<td>macho</td>
</tr>
<tr>
<td></td>
<td>CICERCULA</td>
<td>cizercha</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SARCULARE</td>
<td>sachar</td>
<td>sachar</td>
</tr>
<tr>
<td></td>
<td>AFFLARE</td>
<td>hallar</td>
<td>achar</td>
</tr>
</tbody>
</table>

(For exceptions, see Malkiel 1963-4)
The data can be summarized as follows: In both Spanish and Galician/Portuguese in medial position the result is /tʃ/, while in initial position the two languages differ, with Galician/Portuguese showing /tʃ/ (later /ʃ/), but Spanish showing a different outcome, /ʃ/. Previous authors’ proposed derivations are in (2).

0.2 Previous accounts. Other researchers have addressed these changes:

(2) Williams (1938): Cl > Cj > tʃ (only Galician/Portuguese treated)
Bourciez (1967): Cl > ll > ʃ > tʃ
Lloyd (1987): Cl > Cʃ > ʃ (> tʃ medially; later generalized to initial position in Galician/Portuguese)

The first two authors fail to consider that Upper Aragonese shows /Cʃ/ (where ‘C’ represents /k, p, f/), and fail to treat Galician/Portuguese as having once shared a stage with Spanish. Lloyd, however, recognizes the importance of the Modern Upper Aragonese data, shown in (3), which allows him to develop a more unified approach:

(3) Latin Upper Aragonese

| CL | PL | FL | CLAVE | clau | clau [kʃ] ‘key’ |
| PL | PLOVERE | plover [pʃ] ‘to rain’ |
| FL | FLAMMA | fllama [ʃʃ] ‘flame’ |

Nonetheless, all previous researchers assume some sort of ‘magic leap’ from /*Cʃ/, /*ʃ/ or /*Cj/ to /tʃ/. That is, it is assumed that a voiceless consonant + front semivowel (in the case of Williams), a voiceless consonant + /*ʃ/ (in the case of Lloyd), or just the /*ʃ/ (in the case of Bourciez) develops directly to /tʃ/. However, these are very different sounds, and none of these authors proffers an analysis as to how or why the situation and change should be as they are. Phonetically, many of these proposed changes are just plain hard to justify given that they assume some kind of articulatory or acoustic gap for which they do not account.

0.3 Principal issues of this paper. The present account provides a unified approach to the various Hispano-Romance dialects, and provides an explanation for the ‘magic leap’ previously stipulated. In addition, the present account also raises a number of theoretical issues, some of which have not been addressed in Optimality Theory:
(4)  
(a) Phonetics → phonology → lexicon (then repeat the cycle)  
(b) The Uniformity Condition played a role in this varied  
development (in OT via conjunction of constraints and  
ranking of conjoined constraints)  
(c) The role of the listener in historical change (cf. Ohala,  
Janson, Jonasson, etc.): Perception and comprehension lead  
to reinterpretation (here via acoustic equivalence, emergence  
of the unmarked and lexicon optimization)  
(d) Certain similarity of historical change to child language  
acquisition and learning algorithms  

1. Analysis. Here I wish to maintain the unity of Spanish and Galician- 
Portuguese, and follow Lloyd in assuming that Upper Aragonese shows an  
intermediate stage in the development from Lat. C{l} to OSp., Gal./Ptg. ch. I  
further motivate this change for both Spanish and Galician/Portuguese in  
medial position, and for Galician/Portuguese in initial position, rather than  
having [tʃ] be generalized from medial to initial position.  

    I now offer my analysis of the series of changes that occurred.  
    The first stage is the assimilation of /l/ to /k/, yielding [*kʎ]. The  
ariculation of /l/ is drawn toward the velar region where /k/ is  
pronounced. The data from Rumanian (where only the /kl/ clusters  
palatalized, leaving /pl, fl/ as is; see Tuttle 1975, Lloyd 1987, others) are  
generally taken as supporting the assumption that this is the first step.  

(5)  First proposed historical stage: Assimilation. /kl/ > [*kʎ]  
    (Hispano-Romance, medial position; later also initial position in  
    pre-Old Spanish)  

<table>
<thead>
<tr>
<th>/kl/ &gt; [*kʎ]</th>
<th>ASSIMILATE[PA]</th>
<th>IDENT[PA]</th>
</tr>
</thead>
<tbody>
<tr>
<td>kl</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>☑ kʎ</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Hispano-Romance forms:  
*MACULA > [*maɲkla] > [*maɲkʎa]  
AURICULA > [*orekla] > [*orekʎa]  
CLAME > [klamar] > [*kʎamar]  
CLAVE > [klave] > [*kʎave]  

This begins as a phonetic process, but is then phonologized and  
lexicalized by the listener.4  
However, since not only CL but also PL and FL developed to /tʃ/ or  
/kʎ/, the next stage in this development is the extension of /ʎ/ to /pl, fl/. For  
these clusters the initial consonant is produced with the lips, not the hard
palate, and therefore there is no phonetic factor that would cause /l/ to become palatal [ʎ]:

(6) **Second proposed historical stage: ‘Allophonic unification’.**


/*kʎ/ was the most frequent Cl cluster, and as such it could have served as a robust model for analogical change: [/*ʎ] is thus extended to //*pʎ, *fʎ/, as in Modern Upper Aragonese _pllover, fillama._

The predominant source of //*kʎ/ was by reduction of the diminutive suffix _-ICULUS > -CLO, OCULUS > [*okʎo]. Additional examples are given below (I show the complete historical derivation for only the first example):

(7) //*kʎ/ as model for ‘allophonic unification’ of /pl/, /fl/ to //*pʎ/, /*fʎ/:

- **AURICULA (for AURIS) > [orek’la] > [orekʎa]** ‘ear’
- **OVICULA (for OVIS) > [ovekʎa]** ‘sheep’
- **APICULA (for APIS) > [abekʎa]** ‘bee’
- **CLAVICULA (from CLAVE) > [k(l)avekʎa]** ‘peg, pin’
- **OCULUS > [*okʎo]** ‘eye’
- **SPECULUM > SPECLUM > [espekʎo]** ‘mirror’
- **VETULUS > VECLUS > [*vekʎo]** ‘old’
- **LENTICULA > [*lentekʎa]** ‘lentil’
- **VERMICULU ‘little worm’ > [bermekʎo]** ‘red’
- **COAGULU > [*koagʎo]** ‘curds’
- **REGULA ‘metal bar’ > [r:egʎa]** ‘plowshare’
- **TEGULA > [tegʎa]** ‘roof tile’

I tentatively suggest that ‘allophonic unification’ may be considered to aid in the economy of lexical representations, and that this kind of sequential constraint is a kind of lexicon optimization. Due to limitations of space, I will have to leave it at that for the present discussion. (I explore this further in Holt in preparation.)

This assimilation applied only word-internally in Hispano-Romance at first, but its application spread to initial position, and did so more quickly in Old Spanish than in Old Portuguese. This is supported by the fact that there is much more variability of outcome in initial position, particularly in Portuguese. (See Wireback 1996 for discussion of the...
factors involved in the spread of this sound change. For the ‘conservatism’ of Galician-Portuguese, see Lloyd 1987, Repetti and Tuttle 1987, Holt in preparation, others.)

However, the articulation of this cluster is quite complex, and it is subsequently reduced. An appropriately-modified version of the following constraint is active:

(8) *COMPLEX:
No more than one consonant or vowel may associate to any syllable position node.
(Prince and Smolensky 1993:87, Hargus 1995)

The interaction of this constraint with MAX determines the simplification of these clusters. This is the third stage in the historical development treated here:

(9) Third proposed historical stage: Simplification. /*Cʎ/ > /ʎ/
(Hispano-Romance, most positions; that is, all positions where there were Cʎ clusters)

<table>
<thead>
<tr>
<th>/*Cʎ/ &gt; /ʎ/</th>
<th>*COMPLEX (ONSET)</th>
<th>MAX (SONORANT)</th>
<th>MAX (OBSTRUENT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cʎ</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cø</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>oʎ</td>
<td>✅</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

This occurred medially for both pre-Old Spanish and Galician/Portuguese, as well as for the initial /*Cʎ/ clusters of pre-Old Spanish:

(10) Hispano-Romance

<table>
<thead>
<tr>
<th>OCULO</th>
<th>[*okʎo]</th>
<th>[oʎo]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLAMARE</td>
<td>[*kʎamar]</td>
<td>llamar</td>
</tr>
<tr>
<td>COAGULU</td>
<td>[*koagʎo]</td>
<td>[koaʎo]</td>
</tr>
<tr>
<td>PLUVIA</td>
<td>[*pʎuvja]</td>
<td>lluvia</td>
</tr>
</tbody>
</table>

| (MPtg. olho, coalho) | FLAMMA | [*fʎama] | llama |

The loss of the first rather than the second consonant is determined by the ranking of MAX(SONORANT) >> MAX(OBSTRUENT). This ranking is consistent not only with the data described here but also with the general pattern of simplification observed from Latin to Hispano-Romance; another instance of this simplification via loss of the initial obstruent is GL- > l-, BL- > l-.
Simplification of /bl/ and /gl/ to /l-/ in Hispano-Romance:

<table>
<thead>
<tr>
<th>Latin</th>
<th>Romance</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLASPHEMARE</td>
<td>lastimar</td>
<td>‘to damage’</td>
</tr>
<tr>
<td>BLATTA</td>
<td>OSp. lad-illa</td>
<td>‘crab louse’</td>
</tr>
<tr>
<td>GLATTIRE</td>
<td>latir</td>
<td>‘to beat’</td>
</tr>
<tr>
<td>GLANDINE</td>
<td>OSp. landre</td>
<td>‘tumor’</td>
</tr>
<tr>
<td>GLIRE</td>
<td>OSp. lir (MSp. lirón)</td>
<td>‘dormouse’</td>
</tr>
<tr>
<td>GLOBELLU</td>
<td>OSp. loviello (MSp. ovillo)</td>
<td>‘ball [of yarn]’</td>
</tr>
<tr>
<td>FABULARE</td>
<td>Ptg. falar</td>
<td>‘to speak’</td>
</tr>
</tbody>
</table>

To recapitulate the discussion thus far: What begins in Late Latin as assimilatory palatalization of /kl/ to /*kʎ/ is extended by analogy to the medial clusters /pl, fl/ to /*pʎ,*fʎ/ (and to initial position in pre-Old Spanish), and these articulatorily complex clusters are simplified from /*Cʎ/ to /ʎ/.

Here is where we reenter the written record. Written documentation goes from Lat. -Cl- to OSp. -ll-, OPtg. -lh- (= [ʎ]), and from Lat. #Cl- > OSp. ll-. Also at this historical stage, ch ([tʃ]) now appears in medial position in both Old Spanish and Old Portuguese.

To the best of my knowledge, no previous analysis has adequately, if at all, explained why medial position should have developed differently than in initial position. This difference has been observed, but not explained. The question is what the difference is between the two cases (i.e., initial vs. medial position, (1a) vs. (1b)).

I begin with the observation that what previous authors have called ‘medial position’ in most cases is more precisely ‘after a nasal consonant’. We know that nasals tend to assimilate to a following obstruent, and my explanation for the difference between initial and medial position lies there. That is, this linking of phonological structure increases resistance to the constraint favoring simplification of the marked cluster /Cʎ/. That is, the intuition is that loss affecting more than one segment is more costly than loss affecting a single segment. That is, /nCʎ/ is more resistant to reduction than simple (word-initial or intervocalic) /Cʎ/ because more segments would be affected.

How may this be formalized? I suggest that this may be handled via the OT instantiation of the Uniformity Condition, whose traditional formulation is given here:
The Uniformity Condition
In order to change the feature content of a segment [A], every skeletal slot linked to [A] must satisfy the rule. (Kenstowicz 1994:413)

How may this be captured in a constraint-based approach like OT? I suggest that the effect of this condition may be characterized via constraint conjunction and the formation of a power hierarchy of conjoined constraints with relation to other constraints (see Smolensky 1995). I call this conjoined constraint LINKEDMAX, which is ranked higher than both *COMPLEX and simple MAX (that is, deletion is thwarted because of the linking in [ŋk, mp, mʃ]).

Fourth proposed historical stage: Retention via Linking.
(Hispano-Romance, medial position)

‘Blocking’ of cluster reduction because of nasal assimilation

<table>
<thead>
<tr>
<th>/*nCʎ/ retained</th>
<th>LINKEDMAX (NEIGHBORHOOD)</th>
<th>*COMPLEX (ONSET)</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>ñ__ʎ</td>
<td>*!</td>
<td></td>
<td>(*)</td>
</tr>
<tr>
<td>m__ʎ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mʃ__ʎ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

I propose that the retention of this cluster via nasal assimilation allows other processes of assimilation to occur, in this case in voicing between the initial consonant and /*ʎ/. This should not be surprising given the analogous devoicing of liquids in English (truck, plane, etc.; Fromkin and Rodman 1988:99), French (sucre ‘sugar’, pourpre ‘purple’, pied ‘foot’, etc.; Carton 1974: 30-1, 85) and even many varieties of Modern American Spanish, where /tr/ takes on an acoustic similarity to ch (= [ʧ]), as in tronco ‘trunk’, often interpreted as chonco by the uninitiated (Canfield 1981:7, 13, and passim). Furthermore, these changes often go
unnoticed consciously, and so may never be recorded in writing. This is shown in the following tableau:

(14) Voicing assimilation prevails

<table>
<thead>
<tr>
<th>/*nÇ/ &gt; *[ncÇ]</th>
<th>LINKEDMAX (NEIGHBORHOOD)</th>
<th>*COMPLEX (ONSET)</th>
<th>MAX</th>
<th>ASSIMILATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>nÇ</td>
<td>*</td>
<td></td>
<td></td>
<td>*(vce, PA)</td>
</tr>
<tr>
<td>nÇ</td>
<td>*</td>
<td></td>
<td></td>
<td>*(PA)</td>
</tr>
<tr>
<td>nøÇ</td>
<td>*!</td>
<td></td>
<td></td>
<td>(*)</td>
</tr>
<tr>
<td>✓ ncÇ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Examples:  
MACULA > [*manjkÇ] > [*mançÇ]  
IMPLARE > [*empÇar] > [*ençÇír]  
INFLARE > [*imÇar] > [*inçÇar]

This leads to the next stage in the historical process, that of reinterpretation of [(n)çÇ] as [(n)tÇ] due to their high acoustic similarity:

(15) Fifth proposed historical stage: Reinterpretation. High acoustic similarity of [çÇ] to [tÇ]

This acoustic similarity leads to (mis)interpretation of [çÇ] by the listener as [tÇ], and then reanalysis as /tÇ/. This would be favored by markedness considerations because given the two very different articulations for what is acoustically quite similar, the listener-turned-speaker may choose the simpler of the two. This further optimizes the lexicon by maximizing the harmony of the system (i.e., what is perceived is what is mentally represented, thus reducing the work of the constraints in the grammar.)

Examples:  
[*mançÇa] perceived as [mantÇa], reanalyzed as /mantÇa/  
[*ençÇír] = [entÇír] → /entÇír/ henchir (encher in MPtg.)  
[*inçÇar] = [intÇar] → /intÇar/ hinchar (inchar in MPtg.)

(Additionally, /tÇ/ already exists in Old Spanish (< [jt], e.g., MULTU > H-R, MPtg. muito > OSp. mucho.))
Thus far I have given an account of the development of initial /l/- in Spanish, medial [-k] (lh) in Portuguese (which in Spanish then became [x]), and of medial -ch- for both Spanish and Portuguese. I have not yet presented an explanation of how Portuguese came to show initial ch-.

Recall that I and others have argued that Galician/Portuguese is a more conservative variety of the development of Late Latin. One manifestation of this is that the assimilation of /l/ to /k/ and the extension of /*k/ to /*p不对, *f不对/ was suggested not to have occurred at the same rate in pre-Old Spanish and Galician/Portuguese. Thus, the simplification of /*Ck/ to /k/ did not occur in initial position in Galician/Portuguese because this cluster existed only medially, not initially as in pre-Old Spanish. Once all the /*Ck/ clusters are simplified, the constraint *COMPLEX no longer has any candidates that it eliminates, and it fails to play any role in the continued development of these clusters. Given this, I suggest that it is demoted because it is ‘inactive’. This is the sixth historical change that I propose:

(16) Sixth proposed historical stage: Demotion. Once /*(n)Ck/ is reanalyzed in Hispano-Romance as /(n)t/ there will no longer be any input forms violating the constraint requiring simplification.

At this or a later historical stage, the tendency to assimilate /l/ to /k/ does indeed affect the initial Cl clusters of Galician/Portuguese, yielding [*Ck] (again, see Wireback 1996 for factors involved in retarded spread of change in Galician/Portuguese). The result is that simplification is no longer the optimal outcome, and more fully assimilated forms prevail:10

(17) Creation of ch- in Galician/Portuguese

<table>
<thead>
<tr>
<th>Gal./Ptg. /*Ck/ &gt; [*c̃k̃]</th>
<th>LINKED MAX</th>
<th>MAX (SON)</th>
<th>MAX (OBS)</th>
<th>*COMPLEX (ONSET)</th>
<th>ASSIMILATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CØ</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nCk</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ck</td>
<td>*</td>
<td><em>!</em>(vce, PA)</td>
<td><em>!</em>(PA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c̃k̃</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Examples:**

- CLAVE > [*k̃ave] > [*c̃̃ave]
- PLUVIA > [*p̃uvja] > [*c̃̃uvja]
FLAMMA > [*fXama] > [*cXama]

[cX] is perceived as [tS], and is reanalyzed as /tS/ (chave, chuva, chama).

This concludes the analysis of the changes of CL, PL, FL from Late to Old Spanish and Galician/Portuguese. In the next sections I elaborate on several of the theoretical points I raised in the previous discussion.

2. The listener as source of sound change. Given that different vocal tract arrangements may yield similar acoustic speech signals, for the listener there may be articulatory ambiguity. However, the listener aims to pronounce words as nearly as possible in the way she has heard them from others (or thinks she has heard them) (Ohala 1974a, b, 1981, Slobin 1977, Greenlee and Ohala 1980, and for related points, Inkelas 1995, Hale and Reiss 1996, Yip 96).

Given the acoustic similarity of [cX] to [tS], the listener reconstructs /tS/ (incorrectly). This is parallel to the learning systems proposed by Clark and Roberts (1993:301) and Pulleyblank and Turkel (1995a,b,c): Several alternate grammars may adequately account for the input. When this happens, other factors determine the optimal grammar, which in the case described by Pulleyblank and Turkel (1995b) evolves to a more unmarked system. This is ‘emergence of the unmarked’ (McCarthy and Prince 1993, Smolensky 1996, etc.).

To take the case of the linked clusters, in schematic graphic form we have the following, which shows the passage of phonetic processes to lexicon optimization and the emergence of the unmarked:

(18)

\[
\begin{align*}
/kl/ & \rightarrow [kX] & \text{Does not violate ASSIM(PA) (as much)} \\
/kX/ & \rightarrow [kX] & \text{Does not violate ASSIM(VOICE)} \\
(?)/kX/ & \rightarrow [cX] & \text{Does not violate ASSIM(PA)} \\
/tS/ & \rightarrow [tS] & \text{Does not violate MARKEDNESS(*X), IDENT}
\end{align*}
\]

3. Summary and conclusion. To summarize, I explain why Spanish shows different outcome for CL in initial and medial positions, and motivate the ‘magic leap’ others assumed for the passage of CL to [tS]. This was argued to follow from the increased resistance to simplification due to there being linked phonological structure. This was enforced by the OT version of the Uniformity Condition, which then allowed the common processes of voicing and place assimilation to continue. Here the role of the listener is important: there is reinterpretation based on acoustic similarity, markedness considerations and lexicon optimization.
In schematized form, the principal points of the paper are these:

**Data:** The historical order of changes is summarized below:

- palatal assimilation > analogy/allophonic unification > simplification vs. linking (UC) > assimilation and reinterpretation. (The spread of assimilation of #C1 to *C\varepsilon was slower in Galician/Portuguese than in Spanish; when it did occur, the constraint ranking had changed so that reduction was no longer the optimal outcome.)

An additional advance of the proposed analysis is that the process of simplification of C\varepsilon clusters has now been related to the creation of /tʃ/, which had not connected before.

**Issues:** Phonetics > phonology > lexicon

- The role of the listener (acoustic equivalency, intent to repeat faithfully what heard)
- The Uniformity Condition (conjunction and hierarchization), which here prevented simplification from occurring
- Lexicon optimization and the emergence of the unmarked ([\varepsilon] vs. [tʃ], etc.)
- Similarity of historical change to child language acquisition and learning systems

**Notes**

* I’d like to thank Alfonso Morales-Front and Regina Morin for comments and suggestions for improvements. I remain responsible for any deficiencies.

1 In those Latin forms where the consonant and /l/ are not adjacent these two segments came into contact after syncope of the unstressed vowel that separates them. This is exemplified in (5), (7) and (10) below.

2 Here and throughout, a form that has an asterisk before it is not reflected in the written record, but is hypothesized to have existed as an (historically) intermediate stage. Italicized forms show orthography, and words written in small capital letters are Latin forms. Latin H = [\h].

3 Modern Upper Aragonese is spoken in the upper regions of the province of Aragon, in Spain (near Zaragoza). During the Middle Ages the area where Aragonese was spoken was much greater than that today.
4 This type of ‘lifecycle’ of a rule is explored in great detail in Janda (1987); I am indebted to Stuart Davis for making me aware of this work.

5 Later, Old Spanish [-ʌ-] was velarized to [x], as in oreja ‘ear’; Modern Portuguese maintains the final stage cited here. All examples of (7) undergo this change in Old Spanish, and Modern Portuguese maintains the simplified forms without further modification, written lh in Portuguese orthography.

6 However, the ranking is opposite that proposed for child language by Gnanadesikan (1995) (Eng. please /pliz/ → [piz]).

7 For reasons of space I must omit from consideration those cases where the consonant that precedes the Cl cluster is not a nasal. These are treated in Holt (in preparation).

8 This is quite similar in spirit to the constraint NEIGHBORHOOD proposed by Itô and Mester 1996 and earlier work by Joe Pater. This constraint penalizes processes that would affect structure on both sides of a given segment.

9 A very similar proposal is made in Ohala (1974a), where he refutes the purely phonological explanation given by Foley (1973) for the pronunciation in Norwegian of [oLo] for Oslo. He argues instead for the partial devoicing of [l] by [s]: he then shows that this [l] is acoustically similar to [ʃ], which he believes led to reinterpretation as /ʃ/. For fuller discussion of this and other similar data from Navajo, Algonquian and Itelman, see Holt (in preparation.).

10 Alternatively, the Galician/Portuguese reaction to *#Cʌ (or perhaps *#Cʌ) was different, with simplification to [ʌ-] in Spanish but reinterpretation as [ʃ-] in Galician/Portuguese. Since these changes happened in the preliterary period of both Old Spanish and Galician/Portuguese, it is impossible to rule out this alternative, but the proposal given in the text is more in line with the more conservative tendencies attributed to Galician/Portuguese.

Appendix: Other cases of the ‘Uniformity Condition’

In addition to the case mentioned in the text, I present here two other sets of data which appear to be amenable to a similarly-reformulated Uniformity Condition:
(a) Loss of stop element of Proto Indo-European *gʷ is blocked when a nasal consonant precedes it: e.g. PIE *gʷōu > CL VIVUS ‘living’ vs. *dŋhʷā > LINGUA ‘tongue’ (Ohala 1981).

(b) Vocalization-cum-palatalization in Old Spanish: e.g. OCTO ‘eight’ > *[oxto] > [ojto] > ocho

Thwarted when more than one consonant would be affected: e.g., VULTURE > buitre, not *[butʃr'e] (Penny 1991) (also FRAXINU, SEX, PECTINARE, PIGNORA, etc.)

In each case a conjoined constraint dominates a structural constraint (simplification or palatalization, respectively), which in turn dominates the relevant simple constraint.

References


Ohala, John J. 1981. The listener as a source of sound change. In M.F. Miller, et al., eds., Proceedings of CLS.


