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ROMANCING THE VOWELS: AN OPTIMALITY-THEORETIC ACCOUNT OF VOWEL LOSS FROM VULGAR LATIN TO EARLY WESTERN ROMANCE*

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After a brief examination of metrical changes that distinguished Vulgar Latin from Classical Latin, this paper proposes an Optimality-Theoretic (Correspondence version) account of the somewhat divergent patterns of vowel loss in the development of Old Spanish and Old French from VL. The approach utilizes a maximally general anti-vowel constraint, *V. Some cursory attention is given as well to the important role of vowel reduction in French. Also, this work argues for breaking down the MAX-IO-V constraint into a family of constraints calibrated to the sonority of the input Vs.

1. Introduction

The present study is part of a broader examination of cross-linguistic cases of vowel loss, both diachronic and synchronic, which I am presently undertaking from an Optimality Theory, Correspondence version, perspective (see Prince & Smolensky 1993, McCarthy & Prince 1995, McCarthy 1995). My approach relies crucially on a maximally general constraint *V, which bans vowel segments in output forms. From a teleological standpoint, the constraint may be regarded as embodying a type of economy principle in human speech. Of course, the key opposing principle in language systems is the preservation of important underlying contrasts, and so it will not be surprising to find that different languages will balance off the two values of effort minimization and contrast preservation (i.e. faithfulness to the underlying form) in different manners. Naturally, some language grammars will be seen to rate the economy principle more highly than others do, with *V thus highly ranked in the constraint hierarchy. Evaluation of output candidates on this anti-vowel constraint operates as in (1).

(1) *V: Each instance of a V segment in the output string constitutes a violation of the constraint *V.

Clearly *V is never an undominated constraint in any language. This constraint interacts crucially with MAX-IO and a number of other constraints requiring the presence of a V segment in the output string, constraints which curb considerably the scope of *V.

There exists, thus, a functional tension between *V, which militates against V segments in the output string, and these other constraints, most of them of a syllable-structure type, which demand a surface V segment.

In this paper I apply this approach to some diachronic data in early Romance and attempt to illustrate the approach by demonstrating how it captures the variable nature of the syncope phenomena, i.e., how the competing demands of these different constraints determined that in the diachronic development of the main W. Romance languages, Spanish and French, from Vulgar Latin (VL), in some cases the output string with fewer V segments (a syncopated/apocopated form) was the optimal candidate, and in some cases the unsyncopated string was deemed optimal. In Section 5 I also argue for breaking down the constraint MAX-IO into a family of more specific component constraints. In (2) below I lay out, for purposes of reference, the key constraints to which I will appeal in my analysis.

(2) Constraint definitions/functions:

*V	Penalizes instances of V segments in outputs.
MAX-IO-V	Every V segment of the input string must have a V correspondent in the output. (MAX-IO in McCarthy & Prince 1995)
IDENT-IO	Requires identity of features borne by input and output segments in a correspondence relation. (McCarthy & Prince 1995)
IDENT-IO/HEAD	Requires identity of features borne by input and output correspondents which are in metrically prominent position.
HEAD-MAX	Requires prosodic-head correspondents in the output for all prosodic heads in the input. (McCarthy 1995)
HEAD-DEP	Requires prosodic-head correspondents in the input for all prosodic heads in the output. (Alderete 1995; McCarthy 1995)
ANCHOR-RT	Any element at the right edge of the input string has a correspondent at the right edge of the output string. (McCarthy & Prince 1995)
SON-CON	Complex onsets rise in sonority; complex codas fall in sonority. (Benua 1995)
*COMPLEX CODA	Penalizes instances of codas with more than one segment.
*V[F]/NON-HEAD	Penalizes V place features in unstressed σ.
*ə	Rules out featureless V realizations.

2. Background: Classical Latin & changes that arose in the transition from CL to VL

In Classical Latin (CL), there was a length distinction in Vs, with lexical constrasts such as those in (3) (from Penny 1991:37):

(3) CL vowel-length contrast: some minimal pairs:

hīc	'here'	hic	'this' (m.sg. nom.)
līber	'free'	liber	'book'
lēvis	'smooth'	levis	'light (in weight)'
vēnit	'he came'	venit	'he comes'
mālum	'apple'	malum	'evil, misfortune'

Metrically, the system was quantity-sensitive, with heavy and light syllables. A syllable containing a diphthong or a long V, or else a short vowel plus a coda C counted as heavy, while a short-vowelled open syllable was light. Thus, *cae.lō* and *noc.tem* (4) had all heavy syllables, while *ca.ne* had light syllables. In CL, final-syllable stress was only possible on monosyllables like *rē* or *nox*; on disyllables, the stress fell by default on the penultimate syllable; on words of more than two syllables, stress fell on the penult if that syllable was heavy (e.g., *con.tac.tus, ha.bē.re*) (4) and on the antepenult if the penult was light (e.g., *a.ni.mus*). Obstruent-liquid clusters counted as complex onsets in CL, so that the penult was light (and stress consequently on the antepenult) in CL words in which a short V was followed by such an obstruent-liquid cluster in the final syllable; thus: *in.te.grum* and *mul.ti.plex*. For the most part, then, CL was characterized by paroxytones (words with penultimate stress) and proparoxytones (words with antepenultimate stress), with a relatively small number of monosyllabic oxytones (with final stress).

(4) heavy syllables: *cae.lō, noc.tem*
light syllables: *ca.ne*

final-syllable stress on monosyllables: *rē, nox*
default penultimate stress on disyllables: *ca.do, cae.lum*
words of more than 2 syllables: *con.tac.tus, ha.bē.re, a.ni.mus*

obstruent-liquid onset clusters: *in.te.grum* (not **in.teg.rum*)
mul.ti.plex (not **mul.tip.lex*)

I will assume that in CL the input forms for minimal pairs like *malum* 'evil' vs. *mālum* 'apple' would be as in (5):

(5)

m	a	l	u	m	'evil'	vs.	m	ā	l	u m 'apple'
|	|					/\	|		
μ	μ						μ	μ	μ	

In like manner, the input forms for a contrasting pair like *animus* ('soul, character') vs. *amīcus* ('friend') would be underlyingly as shown in (6), with moraic structure underlyingly specified.

(6)

inputs:	a	n	i	m	u	s	vs.	a	m	ī c u s
	|	|		|				|	/\ |
	μ	μ		μ				μ	μ	μ μ
outputs:	(á.ni.)mus							a.(mí:).cus		

A set of OT metrical constraints, including among others NONFINALITY, FOOT BINARITY, RHTYPE = T, and the WSP (weight-to-stress principle) would then interact to determine the predictable stress in the optimal output candidate (see Prince & Smolensky 1993, chap. 4 for some discussion of an OT account of CL accentuation and the above-mentioned constraints, and Mester 1994 for further particulars of Latin metrics). In the examples in (6), the optimal output for the first item would be (á.ni.)mus, and for the second a.(mí:).cus (via NONFINALITY and constraints requiring moraic trochees aligned to the right).

In general terms, surface stress position in CL was quite predictable, and so its specification in the lexical representation (input form) was unnecessary, although, in contrast, the *moraic structure* would have to have been obligatorily specified in the input representation.

The eventual loss of distinctive vowel length in VL had a tremendous impact on metrical structure. Although the older contrast marked by length was, in a manner of speaking, preserved, in the sense that it was translated in VL into a V *quality* distinction--with, however, subsequent vowel mergers (Cf. Penny 1991:37-39, Lausberg 1965:208-211, Meyer-Lübke 1890:53-56, Lapesa 1986:76, Väänänen 1981:29-30), there was an even more drastic repercussion. With the loss of the length contrast, the position of stress in a contrastive pair like *á.ni.mu / a.mí.cu* (< *animu / ami:cu*) (see 7) became, in terms of the overall system, idiosyncratic and unpredictable, since the earlier vowel length that conditioned stress on the penult of *a.mí.cu* was no longer present.

(7) after loss of CL vowel length, idiosyncratic stress position:
CL ánimu / amí:cu -→ VL á.ni.mu / a.mí.cu

The conclusion seems obvious: at this stage of later VL, stress would have to be regarded as lexically marked in the input form. In such a metrical system, the Correspondence constraint HEAD-MAX, requiring prosodic-head correspondents in the output for all prosodic heads in the input, becomes especially relevant. This constraint assures that stress in the output candidate remains on the same vowel which bears it in the input. Generalizing over all the surviving Romance languages, it is remarkable, on the whole, how stable stress position, overall, has remained over the centuries, from the Latin spoken at the time of the Roman Empire down to the present-day Romance descendants.[1]

In the late VL system, then, *moraic* structure no longer needs to be marked in the input representations, although stressed Vs do. I assume that at this stage, in contrast to what was the case in the earlier system of CL, the input form is simply a segmental representation now reflecting the new V qualities which resulted from the earlier length contrasts and the subsequent mergers, and with the stressed vowels now lexically marked (and still largely faithful to their earlier CL weight-determined position). It is precisely through the high ranking of HEAD-MAX that the stress position in the VL forms (and the later Romance languages) remained faithful diachronically, in most cases, to that in the earlier CL forms (8).

(8) In VL system, high-ranking HEAD-MAX serves to preserve earlier CL stress position:

VL /cómolo/ < CL (cúmu)lu 'heap, mass'

candidates	HEAD-MAX	...
☞ cómolo		
comólo	* !	
comoló	* !	

At this early stage of VL, crucially before the onset of large-scale syncopation, the high ranking of MAX-IO-V, dominating *V, also meant that optimal output candidates differed little from their input forms, just as in CL. E.g. in (9), the input *ásino* from CL *ásinu(m)* would yield the unsyncopated optimal output candidate *ásino*. Vowel deletion at this stage would not have been widely active, given the ranking MAX-IO-V >> *V, as shown in (9).

(9) Early stage of VL: MAX-IO-V >> *V
No V syncope

/ásino/ < CL (ási)nu

candidates	HEAD-MAX	MAX-IO-V	*V
☞ ásino			***
ásno		* !	**
ásin		* !	**

A number of scholars agree that in the transition from CL to VL, along with the loss of the old quantitative V system, the nature of the prominence system also shifted in the direction of a more predominantly 'stress accent' (Väänänen 1981: 32, Penny 1991:34-35, Lapesa 1986:76). In such a system, considerably more energy (and duration) is expended in articulating the stressed syllable, and proportionately less for the adjacent non-prominent syllable(s) (Penny 1991:35). When this disproportion between stressed and unstressed vowels reaches a certain threshold, the perceptual weakness of the unstressed vowel can lead, through generations of new speakers, to its eventual loss.

These developments may be captured in an abstract way within an OT framework by claiming that over time in the late VL period, the constraint *V, which in CL had generally been ranked below MAX-IO-V (accounting for the relatively low frequency of vowel deletion at that stage), came to rank above MAX-IO-V, making widespread syncope a real possibility.[2] Of course, as always, other important constraints (among others, HEAD-MAX) would still be ranked above *V to curb its effects, but surely the late VL and early Romance periods, at least in certain speech areas, witnessed this important relative reranking of *V and MAX-IO-V. At the same time, it is highly likely that by this stage the medial atonic *i* in *ásino* had already undergone considerable reduction, at least in the speech of some individuals, resulting in an indistinct vowel quality, represented in the tableau and below as ə. (See (10); compare with (9).)

(10) Later stage of VL: *V >> MAX-IO-V
Incidences of V syncope arise

/ásəno/

candidates	HEAD-MAX	*V	MAX-IO-V
☞ ásno		**	*
ásəno		*** !	
sə́no	* !	**	*

The candidate *ásən*, not shown in tableau (10), would be ruled out by the constraint ANCHOR-RT, discussed in the following section.

At this boundary stage between the earlier nonsyncopating period and the subsequent period of large-scale vowel loss, it would be reasonable to claim that for a particular speech area, there probably was, as J.I. Hualde (p.c.) suggests, a stage at which several spoken variants of a given form like original VL */ásino/* simultaneously coexisted. We might speculate that forms differing in the degree of reduction of the medial vowel (e.g., *ásino*, *ásɪno*, *ásəno*...) were in simultaneous currency in a given speech area, probably as stylistic variants, just as in present-day English one hears variations ranging across [i], [ɪ], and [ə] for the second vowel in *antibiotic*. Given an input form like */ásəno/*, the newly reranked constraints, at least in the grammar of some speakers at this stage, would choose *ásno* as optimal output, over the unsyncopated *ásəno*. At a somewhat later stage in this development, after which the syncope for this particular lexical item had been essentially completed in the given speech area (i.e., there was no longer a synchronic alternation between syncopated and unsyncopated outputs), it would seem more natural and in accordance with the notion of Lexicon Optimization (Prince & Smolensky 1993:192ff) to consider that thenceforth for contemporary speakers, the input form was actually *ásno*, and not *ásəno*, even though the representation *ásəno*, if posited, would still yield *ásno* as optimal output, given the constraint ranking.

3. Some important constraints crucially involved in vowel loss

HEAD-MAX, as we have seen, keeps stress on the same V in the output as in the input, thus requiring in the output the presence of the stressed V, and thereby restricting to some extent the power of *V. Furthermore, HEAD-DEP, by legislating against output candidates which have stressed Vs lacking stressed correspondents in the input, serve to prevent the shifting of stress to a different V and thus maintain stress position stability, as illustrated by candidates 3 and 4 in the tableau in (11), which shows the optimal output for VL *péra* at a stage even after the reranking of *V over MAX-IO-V.

(11) later VL stage: syncope blocked by undominated constraints HEAD-MAX and HEAD-DEP

VL /péra/ 'pear' < CL pira

candidates	HEAD-MAX	HEAD-DEP	*V	MAX-IO-V
☞ péra			**	
pra	* !		*	*
prá	* !	*	*	*
perá	* !	*	**	

Another constraint which can be crucially involved in syncope scenarios is ANCHOR-RT. It requires that any element at the right edge of the input string have a correspondent at the right edge of the output string. In forms which are V-final, ANCHOR-RT can play a role in preventing apocope, when ANCHOR-RT >> *V, as shown in (12).

(12) later VL stage: ANCHOR-RT >> *V
No V apocope

/péra/ 'pear' < CL pira

candidates	ANCHOR-RT	*V	MAX-IO-V
☞ péra		**	
pér	* !	*	*

ANCHOR-RT has also perhaps a higher morphological motivation, since in VL the final V often indicated gender, and to a limited extent, case.

The generally undominated HEAD-MAX in all Romance languages, then, rules out any loss of *stressed* Vs. As we will see later, with respect to OSp., the crucial ranking ANCHOR-RT >> *V blocks loss of unstressed word-final Vs, as well. For OSp., these two restrictions (no loss of stressed Vs, implemented by the ranking HEAD-MAX >> *V, and no loss of word-final Vs, implemented by the ranking ANCHOR-RT >> *V) leave only word-internal unstressed Vs susceptible to loss. With respect to OFr., the rankings *V >> ANCHOR-RT and *V >> *COMPLEX CODA, as we will see below, expose even more Vs to deletion.

4. The split into E. and W. Romance speech areas.

After a period of VL during which innovations in the form of syncopated lexical items were widely shared throughout the Empire, in both the East and the West, regular communication within the Latin-speaking realm was gradually reduced or broken off. At this point, a gradual geographical-linguistic split occurred (13), in the sense that the syncopating trend was carried on and even magnified in the Western areas, but eventually petered out in the East.

(13) Two distinct Romance areal groups:
syncopating vs. nonsyncopating languages

Western Romance:	Ibero-Romance, Gallo-Romance, Rhaeto-Romance, N. Italian dialects
frequent vowel syncope:	*V >> MAX-IO-V
Eastern Romance:	Central & S. Italian, Sardinian, Romanian, (Dalmatian)
little vowel syncope:	MAX-IO-V >> *V

In OT terms, what this split means is that the constraint reranking *V >> MAX-IO-V, which had enabled and initiated the syncopating trend in later VL, became predominant in W. areas, whereas the older CL ranking MAX-IO-V >> *V

was preserved (or perhaps more accurately, was reverted to after a brief period of the Pan-Romance syncopating innovation). See contrastive examples of some typical W. vs. E. Romance outcomes in (14).

(14) Syncopating and nonsyncopating Romance outcomes:

VL lépore 'hare' >	
W: sync:	Sp. liebre, Fr. lièvre, Cat. llebre, Pg. lebre
E: nonsync:	Sard. leppore, Rum. iepure
líttera 'letter' >	
W: sync:	Sp. letra, Fr. lettre, Cat. lletra, Pg. lêtra
E: nonsync:	It. lettera, Sard. littera, Rum. literă
téneru 'tender' >	
W: sync:	Fr./Cat. tendre, OSp. tienro > tierno
E: nonsync:	It. tenero, Rum. tânar(u)
mánica 'sleeve' >	
W: sync:	Sp./Pg. manga, Fr. manche
E: nonsync:	It. manica, Rum. mânecă
ásinu 'ass, donkey' >	
W: sync:	Sp. asno, OFr. asne > âne
E: nonsync:	It. asino, Sard. asinu
ópera 'works' >	
W: sync:	Sp./Cat. obra, Fr. oeuvre
E: nonsync:	It./Sard. opera, Rum. operă
ánchora 'anchor' >	
W: sync:	Sp. ancla, Fr. ancre
E: nonsync:	It. ancora, Rum. ancoră, Sard. ankara

5. Motivation for exploding the MAX-IO constraint.

Within OT the Correspondence theory approach (cf. McCarthy & Prince 1994, 1995) has separated out two discrete constraints which are central to accounts of vowel reduction and vowel deletion:

1) MAX-IO, which requires an output correspondent segment for a given input segment. Note that this constraint has nothing to say about the *features* borne on the two segments in the correspondence relation. It simply requires an output segment standing in correspondence with the input segment.

2) IDENT-IO, which enforces identity between the features on any input and output segments which are in a correspondence relation.

In a sense, then, MAX-IO is the more primary of these two faithfulness constraints, since the evaluation of identity can only proceed when an actual output correspondent exists for a given input correspondent. When no output correspondent for an input segment exists, the IDENT-IO constraint has nothing to say (i.e., it is neither met nor violated). Vowel reduction and positional

neutralization facts (e.g., the loss of vowel features--or the loss of marked vowel features--in unstressed syllables) can be captured handily in a Correspondence approach through various constraint interactions involving IDENT-IO (see Alderete 1995 and Beckman 1995).

Correspondence theory, however, is in need of a mechanism to capture the facts of differential vowel deletability, i.e., whether an input V of a given quality/sonority requires an output correspondent or not (15).

(15) Differential deletability of medial atonic Vs in VL development into Spanish:

(a) loss of medial atonic *high* Vs:

VL	púl̲ica	>	Sp.	pulga
	ás̲inu			asno
	pópu̲lu			pueblo
	tábu̲la			tabla

(b) loss of medial atonic *mid* Vs:

VL	ópe̲ra	>	Sp.	obra
	sóce̲ra			suegra
	lépo̲re			liebre
	ánchо̲ra			ancla

(c) *preservation* of medial atonic *low* Vs:

VL	ráph̲anu	>	Sp.	rábano
	órph̲anu			huérfano
	lámp̲ada			lámpara

In the effort to deal cross-linguistically with various systems manifesting vowel deletion (16), it becomes clear that some means is required of assuring that for an input V beyond a particular threshold of acoustic salience, a V segment must be present in the output string. Of course, the acoustic salience of this output V need not--but may--match that of its input correspondent, depending on the ranking of IDENT-IO in the given hierarchy.

(16) Various cross-linguistic vowel deletion cases:

(a) Sometimes only input [hi] Vs are deletable.
Examples: synchronically in N. dialects of Mod. Greek

(b) Sometimes only input [hi] and [np] (nonperipheral) Vs are deletable.
Examples: diachronically VL > OSp.;
diachronically in Cl. Greek (see Szemerényi 1964)

(c) Sometimes Vs of any input height/sonority are deletable.
Examples: synchronically in Tonkawa;
diachronically in Salacenco Basque

For the reasons outlined above, I favor splitting the MAX-IO constraint, as shown in (17), into a pair MAX-IO-C and MAX-IO-V, and then in turn exploding

MAX-IO-V into a family of related constraints[3] calibrated in terms of the inherent sonority level of the input V segments in the string.[4]

(17) split MAX-IO ---> MAX-IO-C, MAX-IO-V

then explode MAX-IO-V ---> MAX-IO-V[lo] high sonority
MAX-IO-V[np] |
MAX-IO-V[hi] low sonority

Under an analysis of this sort, the implied rankings for the three cases outlined in (16) will be as in (18).

(18) (a) only input [hi] Vs are deletable
implied ranking: MAX-IO-V[lo],[np] >> *V >> MAX-IO-V[hi]

(b) only input [hi] and [np] Vs are deletable
implied ranking: MAX-IO-V[lo] >> *V >> MAX-IO-V[np],[hi]

(c) Vs of any input height/sonority are deletable
implied ranking: *V >> MAX-IO-V

Although my investigation of this question requires considerable further research, the implication would seem to be that the constraints may demonstrate cross-linguistically the metaranking in (19).

(19) possible metaranking?:

MAX-IO-V[lo] >> MAX-IO-V[np] >> MAX-IO-V[hi]

6. Contrasting cases of vowel loss in OFr. and OSp.

I would claim that in W. areas of Proto-Romance there was a shift in the earlier Latin constraint ranking involving MAX-IO-V and *V, with *V coming to dominate MAX-IO-V, so that vowel deletion became prevalent. Yet the conditions on posttonic vowel loss differed somewhat in OFr. and OSp. (see 20). In OSp., posttonic vowel loss was generally limited to penultimate syllables (VL mánica > manga, but VL dúru > duro), at least up until the 10th/11th century apocope affecting forms ending in /e/ preceded by a single coronal C.[5] By contrast, in OFr. loss of atonic penultimate Vs (VL mánica > manche) as well as atonic final non-low Vs (VL dúru > dur) was common.

(20) Contrasting patterns of V syncope in OSp. and OFr.:

OSp. *(before 10th/11th-century apocope):*
posttonic vowel loss in penultimate syllables: VL mánica > manga
retention of atonic final Vs: VL dúru > duro

OFr.:
posttonic vowel loss in penultimate syllables: VL mánica > manche
loss of atonic final non-low Vs: VL dúru > dur

These differences in vowel loss are reflected illustratively in contrasts between OFr. and OSp. cognates, as shown in (21).

(21) The greater V-deleting tendency of OFr. as compared to OSp.:

(a)	VL	parte	OFr.	part	OSp.	parte
		centu		cent		ciento
		siccu		sec		seco
		duru		dur		duro
		liberare		livrer		librare
		muros		murs		muros
		illos		els/eus		ellos
	VL	fortes	OFr.	forz, 'z' = [ts]	OSp.	fuertes

But when VL /a/ is involved:

porta	port[ə]	puerta
cantas	chant[ə]s	cantas

(b) Contrast in outcome of VL penultimate atonic /a/ in Sp. and Fr.:

VL		Sp.	/	OFr.
bálsa̲mu	>	bálsa̲mo	/	balme (> NFr. baume)
scándа̲lu	>	escándа̲lo	/	escandle (> NFr. esclandre)
týmpa̲nu	>	témpa̲no	/	timbne (> NFr. timbre)

7. Syncope in Old Spanish

In Spanish the earlier VL atonic /a/ resisted deletion, as exemplified by the data above in (15c), (21b), and further examples in (22) below.

(22) VL atonic /a/ resists deletion in Sp.:

VL	cántharu	>	Sp.	cántaro	'pitcher'
	aspáragu	>		espárrago	'asparagus'
	stómachu	>		estómago	'stomach'

The OSp. syncope facts can be accounted for by the key rankings shown in (23). The domination of MAX-IO-V[lo] over *V means that [lo] Vs are not susceptible to loss, and the other rankings *V >> MAX-IO-V[np] and *V >> MAX-IO-V[hi] mean that nonperipheral (mid) and high Vs, under appropriate conditions, are susceptible to loss.

(23) Key rankings for OSp. syncope:

MAX-IO-V[lo] >> *V >> MAX-IO-V[np], MAX-IO-V[hi]

In (24) the tableau shows the OSp. outcome from original L /mánica/ — with loss of a non-low atonic V, after the above-mentioned splitting of the MAX-IO-V constraint and the reranking of some of its component constraints w.r.t. *V.

(24)

/mániga/ < L mánica 'sleeve'

candidates	MAX-IO-V[lo]	*V	MAX-IO-V[np] MAX-IO-V[hi]
☞ mánga		**	*
mániga		***!	

Tableau (25) shows how the proposed analysis accounts for the undeletability of the atonic low vowel /a/ in Spanish.

(25) Undeletability of atonic low vowel /a/ in Spanish:

MAX-IO-V[lo] >> *V

VL /cántaro/ < L cantharu

candidates	MAX-IO-V[lo]	*V	MAX-IO-V[hi] MAX-IO-V[np]
☞ cántaro		***	
cántro	* !	**	

We turn our attention now to the *quality* of the surface atonic V that survives into OSp. Tableau (26) indicates how an undominated or very high-ranking IDENT-IO[lo] constraint accounts for the unsusceptibility of the atonic low V in Sp. to undergoing reduction or change in quality, as it does in OFr.

(26) Irreducibility of low vowel /a/:
undominated or very high-ranking IDENT-IO[lo]

/cántaro/

candidates	IDENT-IO[lo]	. . .
☞ cántaro		
cántero	* !	
cántəro	* !	

We noted above that final Vs were not lost in early OSp. Tableau (27) below illustrates the role of ANCHOR-RT, discussed earlier, in preventing apocope in early OSp.

(27) Resistance to apocope (in early OSp.): ANCHOR-RT >> *V

VL /duro/ < L duru

candidates	ANCHOR-RT	*V
☞ dúro		**
dúr	* !	*

8. Syncope/apocope in Old French

In the development from VL to OFr., all unstressed Vs except original VL /a/ are potentially deletable, as long as the string resulting from the vowel loss is well-formed in terms of usual syllable structure constraints (28).

(28) Syncope/apocope in OFr.:

VL		OFr.
	líttera	lettrə
	árbore	arbrə
	pérdere	perdrə
	pórtu	port

fónte	font
múros	murs

syncope/apocope blocked when V loss would leave a configuration with problematic sonority sequencing:

VL	nóstru	OFr.	nostrə, not *nostr
	ásinu		asnə, not *asn

The precise details of the development of atonic VL /a/ into early OFr. are rather complicated and obscure. The account in Pope (1973) states that VL /a/ > OFr. /ə/ word-finally, and medially when a vowel was needed for syllabic well-formedness; but apparently an original VL /a/ usually deleted in penultimate syllables when the VL stress was on the antepenult, e.g., VL *týmpano* > Fr. *timbre* (see 29), although Pope notes that this medial /a/ went through an intermediate stage of vowel reduction, presumably as /ə/.

(29) Outcomes of VL atonic /a/:

(a) word-finally: retained as /ə/:

VL	dúra	>	OFr.	durə
	úna	>		unə

(b) word-medially when a vowel was needed for syllabic well-formedness: retained as /ə/:

VL ornaménto > OFr. ornəment

(c) in the penult of proparoxytones: usually lost:

VL	bálsamo	>	OFr. balme	>	MFr. baume	
	scándalo	>	escandle	>	esclandre	
	týmpano	>	timbne	>	timbre	

What complicates the picture further is that VL /a/ played a very significant role in morphological markers, whether verbal, nominal, or adjectival. It is likely that in many cases, loss of /ə/ was often blocked for morphological reasons.

In view of Pope's observations on the OFr. development of VL /a/, I will assume that in the transition from VL to early OFr., *all* instances of unstressed VL /a/ in whatever position in the word, remained, for a time, as reduced ə's. Thus, for an item like *týmpano*, I posit an intermediate form *timb[ə]ne* prior to the OFr. form *timbne*. Later sound changes brought about the loss of these unstressed ə's word-medially, where they were not an essential part of desinences with a morphological function (such as marking feminine gender in nouns and adjectives, or person/mood/tense in verbs, etc.), while instances of this reduced V appearing in such morphological endings were preserved during later OFr. developments — at least for a time.

In (30) are indicated some of the important constraints and rankings that account for vowel loss (or lack thereof) and vowel reduction in OFr.

(30) Key constraints and rankings for OFr. syncope/apocope:

*V >> ANCHOR-RT:
final Vs are often lost

MAX-IO-V[lo] >> *V:
requires an output correspondent for the high-sonority input /a/; thus, as in OSp., VL atonic /a/ cannot directly disappear, although in OFr. it becomes reduced, the resultant /ə/ later disappearing.

*V[F]/NON-HD:
penalizes vowel place features in unstressed syllables, yielding atonic reduced Vs.

The third constraint listed in (30) determines that atonic Vs are realized as /ə/. Of course, this constraint is directly at odds with the constraint *ə, which in modern Spanish is undominated, making reduced Vs nonoptimal. Obviously, in French, *V[F]/NON-HD must dominate *ə, since reduced Vs are very common in that language.

Tableaux (31) and (32) demonstrate the constraints active in chosing candidates with loss of *final* atonic Vs and *final-syllable* atonic Vs in OFr.

(31) Loss of final atonic Vs in OFr.:
(Compare this tableau with (27) above for OSp. *duro*).

VL /dúro/ < L duru

candidates	MAX-IO-V [lo]	*V	MAX-IO-V [hi], [np]	ANCHOR-RT
☞ dúr		*	*	*
dúru		** !		

(32) Loss of final-syllable atonic Vs in OFr.:

/dúros/

candidates	MAX-IO-V[lo]	*V	MAX-IO-V [hi], [np]	ANCHOR-RT
☞ dúrs		*	*	
dúros		** !		

The optimal candidate *durs* in (32) demonstrates, as well, that in OFr. the constraint *COMPL CODA is ranked below *V. This crucial constraint interaction is illustrated in tableau (33).

(33) VL /dúros/ > OFr. durs: *V >> *COMPL CODA

candidates	*V	*COMPL CODA
☞ dúrs	*	*
dúros	** !	

The corresponding reflex in OSp. is *duros*, showing that in that language *COMPL CODA was highly ranked, specifically, above *V (34).

(34) VL /dúros/ > OSp. duros: *COMPL CODA >> *V

candidates	*COMPL CODA	*V
☞ dúros		**
dúrs	* !	*

In (35) we see a case of the outcome of VL /a/ as /ə/ word-finally in OFr. Here, MAX-IO-V[lo], the constraint requiring the presence of a V segment in the output string corresponding to the input /a/, dominates *V.

(35) VL /dúra/ > OFr. dúrə: MAX-IO-V[lo] >> *V

candidates	MAX-IO-V [lo]	*V	MAX-IO-V [hi], [np]	ANCHOR-RT
☞ dúrə		**		
dúr	* !	*		*

As regards the *quality* of the resulting atonic V in *dúrə*, it is *V[F]/NON-HD, dominating IDENT-IO, which determines that the original VL /a/ in atonic final position is realized in Fr. as /ə/ rather than as the original fully-featured /a/ (36).

(36) /dúra/

candidates	MAX-IO-V [lo]	*V	*V[F]/NON-HD	IDENT-IO
☞ dúrə		**		* [lo]
dúra		**	* !	
dúr	* !	*		

One further point needs to be mentioned in reference to the conditioning of vowel loss in OFr. When apocope of the final VL vowel would give rise to a word-final C cluster with increasing sonority, a final supporting V to provide a nucleus for the onset cluster was retained, becoming /ə/ in OFr. I make use in my analysis of these facts, of the constraint SON-CON ('sonority contour') (37) cited in Benua (1995:90).

(37) SON-CON: Complex onsets rise in sonority;
complex codas fall in sonority.

The tableau in (38) shows the crucial constraint interactions involved in choosing the optimal output candidates in such cases.

(38) Atonic V retained in OFr. as support V for C-cluster:
SON-CON >> *V

/nóstru/

candidates	SON-CON	MAX-IO-V[lo]	*V	*V[F]/ NON-HD	IDENT-IO	MAX-IO-V [hi], [np]
☞ nós.trə			**		* (hi)	
nós.tru			**	* !		
nós.tr	* !		*			* (hi)

Just for purposes of illustration and contrast, I provide in (39) a tableau showing the evaluation, at the OFr. stage, of the input /nóstra/. Note that the optimal output form is identical with that in (38), although by a slightly different interaction of constraints.

(39) /nóstra/

candidates	SON-CON	MAX-IO-V[lo]	*V	*V[F]/ NON-HD	IDENT-IO	MAX-IO-V [hi], [np]
☞ nós.trə			**		* (lo)	
nós.tra			**	* !		
nós.tr	* !	*	*			

A similar situation of syncope blocking is observed in OSp. In cases of particular lexical items where vowel deletion would entail problematic word-medial C clusters with syllable-structure violations, the optimal output was indeed generally the unsyncopated string. Thus, in (40) VL *lácrima* 'tear' becomes OSp. *lágrima,* and not **lagr.ma*, since this candidate involves a fatal SON-CON violation.

(40) VL /lácrima/ > Sp. lágrima: SON-CON >> *V

candidates	SON-CON	*V
☞ lá.gri.ma		***
lágr.ma	* !	**

9. Conclusion

An OT analysis of diachronic cases of V syncope, such as that attested in VL and early W. Romance, provides important insights into how constraints interact to determine an optimal output candidate. As we have seen, a set of particular constraints ranked in a particular order can, depending on the shape of the input string, determine that sometimes a syncopated output, and sometimes an unsyncopated output, is the optimal candidate. Identifying the finite set of constraints active and relevant in these cases of vowel loss, and observing how the constraints interact with each other in selecting the given attested output form enhance appreciably our understanding of the various motivations underlying the 'process' traditionally known as syncope. We have seen also how a reranking, over time, of *V over the constraint MAX-IO-V marked the onset of the syncopating trend which characterized the early W. Romance languages. Finally, in this paper I have argued for breaking down MAX-IO-V into a family of constraints calibrated to the sonority (or perhaps, the intrinsic duration) of the input Vs. It is to be hoped that further research into the details of vowel loss will further enlighten this fascinating area of phonology.

NOTES

* This paper has benefited from useful discussions with José Ignacio Hualde and helpful suggestions from an anonymous reviewer. Any remaining errors are, of course, my responsibility alone.

[1] French, Spanish, and Portuguese, the chief surviving representatives of W. Romance, in the overwhelming majority of cases still have the stress on the vowel (or diphthong) reflex of the original Latin vowel which bore the stress. Nevertheless, J.I. Hualde (p.c.) has brought to my attention some exceptions to this generalization in French, Provençal, and Aragonese. However, French exceptions like *fra.gile, fa.cile, mo.bile,* and *fa.brique* from original Lat. *fra.gi.lis, fa.ci.lis, mo.bi.lis,* and *fa.bri.ca* (and presumably other forms like *mu.sique, do.mes.tique,* etc.) are to be explained, according to Pope (1973:232), as a case of imposing the OFr. stress pattern onto Latin learned loanwords adopted after the Gallo-Romance period of early phonological developments in popular speech. By the time of the adoption of these loanwords, argues Pope, 'the unstressed vowels had disappeared and accentuation of the final full syllable had become habitual in the vernacular,' and so Latin loanwords came to be pronounced in accordance with the resultant OFr. pattern, i.e. all words are oxytones except those ending in ə, which are paroxytones. On the other hand, developments like Prov. *perséga, lagréma, manéga* from Lat. *pérsica, lácrima, mánica*, and Aragonese *aguíla, comódo, esparrágo, medíco, tabáno, vibóra* (cf. Sp. *águila, cómodo, espárrago, médico, tábano, víbora*) are clearly cases of genuine stress shifts that arose over time in the popular speech of particular regions, and so these examples constitute bona fide exceptions to the generalization regarding stress position stability over the centuries. It would appear that these stress shifts were due to a constraint working against antepenultimate stress configurations and bringing the anomalous words into the more usual paroxytone shape for Prov. and Aragonese. In these cases, as in that of the French 'stress shifts', HEAD-MAX is clearly dominated by a metrical constraint of some sort, so that retention of stress on the vowel that historically bore it becomes suboptimal. These exceptions notwithstanding, the generalization stated here still seems to be statistically quite valid: there were relatively few cases of stress shift in the development of the Romance languages from Lat., and if we limit ourselves to consideration of the *principal* varieties of W. Romance (French, Spanish, and Portuguese), the overall instances of stress shift from VL down to the present day are rare indeed.

[2] For further relevant discussion of diachronic constraint reranking within an OT framework, see Bermúdez-Otero (1996).

[3] Hyeon-Seok Kang (p.c.) has independently proposed a similar explosion of MAX-IO-V in work on phonological change and variation in Seoul Korean. In Kang (1996) he proposes the constraints MAX(V[+hi]) and MAX(V[-hi]) to account for facts related to the loss of surface [w], which he takes to be underlyingly a high round V. To get at deletability differences among the various high Vs, he proposes a further subdivision of MAX(V[+hi]) into MAX(i), MAX(u), ...

[4] David Odden has suggested that perhaps the relevant parameter here is not vowel height and/or sonority, but rather intrinsic duration. I am in the process of evaluating how these two proposals would differ importantly, if at all, in effect. In the meantime, I will make use of the vowel height distinction for purposes of exposition.

[5] The 10th/11th centuries saw a widespread apocope process in OSp., affecting only forms ending in /e/ preceded by a single coronal C, as in the following examples:

fiele	>	fiel
dare	>	dar
orígene	>	origen
céspede	>	césped

Penny (1991:49-50) notes, and J.I. Hualde (p.c.) also points out, that a more extreme form of apocope in OSp., giving rise to final noncoronal Cs as well as some final C clusters, developed later under French influence and is attested in some medieval texts (e.g., *nove* > *nuef, nocte* > *noch, monte* > *mont*). Hualde reports that 'extreme apocope' was abandoned definitively with Alfonso X's standardization of Castilian in the 13th cent., so that *nueve, noche,* and *monte* became the ultimate forms for these examples. For further particulars, see Penny (1991). However, the OSp. data of concern to us in the present paper predate slightly the stage of both of these apocopes.

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