

A note on
*Syllable Structure vs. Segmental Phonotactics:
Geminates and Clusters in Italian Revisited*
by K. McCrary*

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19th April 2008

In 2002 Kristie McCrary published an interesting paper with the title *Syllable structure vs. segmental phonotactics: geminates and clusters in Italian revisited* (McCrary 2002). Its abstract follows.

This paper reports on research that seeks to determine whether individual native Italian speakers consistently treat consonant clusters as heterosyllabic vs. tautosyllabic in experiments involving two phonological phenomena which have received syllable based-analyses: *Raddoppiamento-Sintattico* (RS) and definite article allomorphy. The convergence of both RS and article allomorphy on the same syllable structure has been claimed to provide empirical verification for the success of the syllable-based analyses. However, experimental results show that while speakers vary in the choice of article allomorph before various consonant clusters (e.g. CN, CS), interpreted as variability in syllabification, comparable variability does not occur in the application of RS. An analysis of RS is proposed that draws on syllable-independent phonotactic constraints governing the context where geminates are permissible.

A more thorough account can be found in her PhD dissertation (McCrary 2004): things that might look like inaccuracies in the paper often find some sort of justification in her thesis. Also, the paper completely skates over the diachronic dimension, which is instead taken in due consideration in her thesis.

McCrary makes a number of interesting points, some of which would definitely deserve further investigation since they *could* have implications for the understanding of RS and syllabification in Italian *as well as phonetic transcription*.

The aim of this brief note is to examine a few statements from McCrary's publications and see whether they are indeed acceptable.

*Originally published as a series of posts on Luciano Canepari's *canIPA* forum.

I Article allomorphy

Skipping straight to the end, McCrary's (2004) conclusion is that

the conditioning factors for these central processes in Italian phonology [*i.e.*, RS and article allomorphy] are segmental, contrast-based conditions. Syllable structure is not implicated in these phenomena.

This may well be. Yet, not all her arguments are convincing, and there definitely are some clear-cut inconsistencies in some of the reasonings.

A very preliminary objection could be that it doesn't make much sense to compare the two phenomena at hand: ['phonological'] RS [affecting *all* polysyllabic oxytones and *all* stressed monosyllables, as opposed to '(morpho)lexical' RS, involving *some* unstressed monosyllables and *some* paroxytones¹] is a regular and *productive* phonological phenomenon in Centro-Southern Italian, whereas article allomorphy is by its very definition a *morphological* phenomenon, albeit phonologically motivated.

This fact, for which the author cannot be blamed, is nevertheless no minor point. Indeed, if we do want to find the common "conditioning factors" of these two phenomena —and even if we don't and just want to motivate the latter—, we need to consider the phonological context *at the time of the systematization of article allomorphy*.

This is precisely why her 'lexical phonotactic constraints' hypothesis is not acceptable. Apart from the fact that I'm always a bit sceptical when phonologists present us with a long list of rules —which certainly *describe* the phenomenon, but... do they really *explain* it?—, McCrary's "LEX-*/ldz/ constraint" cannot be the reason behind **il z-*, not because of the existence of the comparatively rare words *elzeviro* (first recorded in 1887 and whose second meaning is not *so* rare!) or *Belzebú* (*a.* 1313!) [although no Tuscan who knows the words would ever pronounce them with /-lts-/], but for the *many popular words with /ts-/*. And, if it is true that initial /ts/ is no longer 'productive' in Italian (all new or [recently] borrowed words automatically having /dz-/) and is declining also in native words because of the increasing prestige associated with the Northern Italian pronunciation (but /ts-/ resists in natural Tuscan speech at least in words like *zio* and *zucchero*), there is no doubt whatsoever that *at the time of the systematization of the [current] distribution of il/lo, words with /ts-/ did certainly exist* (...and Tuscans were not ashamed to pronounce them, as some of them are today in some social contexts).

As for the other lexical constraints, it seems to me that *all* Marotta's (1993) original objections to Stammerjohann (1973) still hold. In particular, if it is true that

[s]equences of /l/ followed by /j/ systematically became /ʎ/ in the change from Vulgar Latin to Italian: e.g. FILIUM → *figlio* /fiʎo/ (Rohlf's, 1966). Modern examples of /lj/ sequences occur mostly in place names due to the influence of Latin: e.g. *Emilia, Italia, Sicilia*[,]

the statement that

¹I'm not going to argue with this classification here, but *cf.* Loporcaro (1997: 1).

[i]n Tuscan Italian [...] *Italia* is commonly realized as /itaʎa/. The spellings *Itaglia* and *Itagliano* also occur as alternative spellings of *Italia* and *Italiano*

is unacceptable. It is true that in *marked* Tuscan accent /lj llj nj nnj/ can be realized respectively as [ʎ llj nj nnj] (cf. *M^aPI*, §12.1.2), but this is by no means ‘standard’ in any sense. The erroneous spellings *Itaglia* and *Itagliano* do occur, but usually only in Northern Italian, where, e.g., *l’Italia* /li’talja/ [li’ta:ʎja] (‘(the) Italy’) and *li taglia* /li’taʎʎa/² [li’ta:ʎ:ʎa] (‘[he] cuts them’) are neutralized in [li’ta:ʎa]. This is so true that by a Tuscan speaker [li’ta:ʎa] is perceived as /li’taʎʎa/, not as /li’talja/!

The other statement that

[w]hether a /lj/ sequence occurs at all in Tuscan (or Modern Standard Italian) is a question that should to be empirically examined

is simply baffling... unless, of course, the author has in mind a different definition for what is normally denoted by /lj/.

2 Syllable structure and RS

But let’s come to what is probably the most interesting part (because more strictly phonological) of McCrary’s investigation, which concerns syllable structure and RS.

2.1 Tautosyllabicity and heterosyllabicity: consequences for article allomorphy and RS

The starting point on Italian syllable structure is the following:

- a) Claimed tautosyllabic clusters: CL, CN

e.g. *pa.dre*, *li.tro*, *i.pno.si*

- b) Claimed heterosyllabic clusters: LC, NC, SC, CS, CT³

e.g. *al.to*, *par.to*, *tan.to*, *pas.ta*, *lap.sus*, *naf.ta*, *ic.tus*

³All analyses must make special provisions, such consonant adjunction, in order to account for utterance initial SC, CS and CT.

(in the author’s notation, “C = obstruent, S = sibilant fricative, T = non-nasal stop, L = liquid, N = nasal, V = vowel” [McCrary 2002]).

This classification essentially follows from Davis’s (1990) analysis. As you can see, CN is considered tautosyllabic, whereas many authors (amongst whom Luciano Canepari: cf., e.g., *DⁱPI*, *passim*) regard it—in my opinion, *with reason*— as heterosyllabic. I said “with reason”

²Like many other authors, for phonetic perspicuity, I denote standard Italian ‘self-geminate’ phonemes /ʎ ɲ ʃ ts dʒ/ by a reduplicated symbol when intervocalic.

because ‘historically’ CN belongs with the other Grecisms CS and CT, which appear in *learned words only*. This is no small detail: masculine nouns starting by CN, CS and CT represent, according to the *GRADIT* figures, only 0.11% of all the masculine nouns in the ‘vocabolario di base’ (‘basic vocabulary’: all words with ‘usage stamp’ *fondamentale* [‘fundamental’, FO], *ad alto uso* [‘high usage’, AU] or *ad alta disponibilità* [‘high availability’, AD]). Basically, it consists of the three nouns *psichiatra* (AU), *psicologo* (AD) and *pneumatico* (AD). On the other hand, masculine nouns starting by SC represent 5.51% of all masculine nouns (153 words): most of them are popular words and several are marked FO.

This is ultimately recognized by the author herself (McCrary 2004), who is actually forced to regroup the RS experiment outcomes for CN with the other heterosyllabic clusters. The diachronic perspective and consequent relative lexical rareness also account for the inconsistencies in the choice of article allomorph before CN (...the much less significant inconsistencies before CS can perhaps be explained by the [diastatically marked] Tuscan epenthesis CiSS [for CS], hence, e.g., *lo psicologo*, but ??*il pissicologo*).

2.2 Stressed vowel length and RS: consequences for phonetic transcription?

But perhaps the most interesting point about syllable structure with consequences for phonetic transcription are McCrary’s claims on stressed vowel length. In a nutshell, according to her analysis it wouldn’t make sense to write [ˈpaːdri] (*padri* /ˈpadri/) or [ˈpaːdi] (*pardi* /ˈpardi/)³ because the length of the [a] is not significantly different in the two contexts at hand.

The starting point is the following (Loporcaro 1996):

Derived vowel length in Italian is usually accounted for by the allophonic rule in (6) (where \$ is a syllable boundary, not coinciding with a word boundary):

$$(6) \quad V \rightarrow \frac{[+long]}{[+stress]} \$$$

A vowel is lengthened in an open stressed non-final syllable (/ˈkasa/ → [ˈkasa] ‘house’, /ˈladro/ → [ˈladro] ‘thief’), and remains short elsewhere. As regards stressed vowels, the excluded environments are two: a) word-final position (/manˈʒɔ/ → [manˈʒɔ] ‘(he) ate’), and b) closed syllable (e.g. /ˈmanʒa/ → [ˈmanʒa] ‘(he) eats’).

In a very famous study,

Bertinetto’s [(1981: 136)] shows that while (6) holds true when words are pronounced in isolation, stressed vowels do not display any significant increase in duration depending on syllabic structure when words are uttered in (non-sentence-final position in) connected speech. He proposes, therefore, “tendentially long” as a more appropriate label for what is usually called “long” vowels

(Loporcaro 1996).

McCrary’s takes these conclusions further by claiming that (McCrary 2004: 230)

³For the specificity of /rC/ (and /Cr/) see also note 4 on the next page.

[n]o categorical difference was found between main stressed vowel duration in open vs. closed penultimate syllables in Italian. The durations of stressed vowels in open syllables were very similar to the duration of stressed vowels in closed syllables.

In particular,

[t]here was no significant difference between the duration of stressed vowels before consonant clusters that differ minimally with respect to syllable structure and linear order, while maintaining identical segmental content. On average, stressed vowels before CR clusters were not significantly longer than stressed vowels before RC clusters; stressed vowels before CL were not significantly longer than stressed vowels before LC.

A preliminary objection to McCrary’s conclusions could be that they are drawn from *acoustic* experiments lacking any sort of *perceptual* confirmation, which is always important when trying to assess phonological phenomena. But the real problem with her experiments is the sample, *i.e.* speakers of *Pisan Italian* (cheekily referred to as “Pisan Standard Italian”, whereas one could at most speak of ‘Standard Pisan Italian’ as opposed to, say, any diastatically or diatopically marked version of Pisan Italian itself).

Now, it is well-known that in Pisan Italian [also closed syllable] vowels are diphthongized (*M^aPI*, §12.1.1) or, to ‘say it acoustically’, melodically modulated *and longer* (Calamai *et al.* 2003): explicitly, we have [aʌ] in both [ˈpaʌdri] (*padri* /ˈpadri/) and [ˈpaʌrːdi] (*pardi* /ˈpardi/, and similarly for stressed /i e ε ɔ o u/). So, although it is very true that previous experiments made use of too small samples and (sometimes of) ‘geographically dubious’ speakers, McCrary’s results cannot be relied upon as far as vowel length goes: Pisan Italian is indeed [quasi-] standard *phonologically*, not so *phonetically*.

Only if McCrary’s results could be reproduced by using a suitable sample of, say, Florentine [and Roman] speakers, would we be in a position to draw her same conclusions (what *can* be said is that Pisan Italian speakers seem to still follow standard Italian *phonology* despite this [relatively recent] *phonetic* trend).

Until then, I think we can agree with Loporcaro’s (1996) remarks on Luschützky’s (1984) review (two papers [surprisingly] McCrary does not seem to be aware of):

Fava – Magno Caldognetto’s (1976) results are summarized in (7): (The first row represents segmental patterns: C = consonant, V = vowel, P = plosive, S = sibilant, N = nasal, R = trill, L = lateral — and the second row contains the average values — in milliseconds — for stressed vowel durations in each environment.)

(7)	'CVCV	>	'CVPRV	>	'CVRPV ⁴	>	'CVLPV	>	'CVSPV
	208.4		184.1		177.6		121.7		112.7
							'CVNPV		'CVC:V
							> 98.6		> 85.3

As can be observed, duration values decrease gradually from 'CVCV to 'CVC:V forming a continuum. From this fact Luschützky (1984: 115) concludes that an allophonic rule

⁴Bertinetto (1981: 131*n*) quotes Lehiste’s (1974) explanation for the greater duration of the stressed vowel

such as (6) «does not seem to be a valid generalization» and that vowel length depends «on the nature of the following consonant(s) rather than on syllable structure». Note that Luschützky's observation is at odds with the conclusion Fava – Magno Caldognetto (1976: 62) themselves drew from their own experimental results. In fact they regarded the data as confirming, rather than contradicting, the existence of rule (6).

I would rather adhere to this latter view: although Luschützky's argument is subtle and constitutes an important *caveat* against any simplistic statements on this matter, I think that there is no real contradiction between the phonetic gradience documented by (7) and the phonological rule (6). *There can be little doubt that every aspect of linguistic sounds is ultimately amenable to phonetic continua, and that one major aim of phonology — understood both as component of language and as an analytical discipline — is to individuate discrete categories on such phonetic continua.*

(emphasis mine).

2.3 Word-final stressed vowel duration

To finish off, another baffling statement by McCrary (2002):

The results of the RS experiment also cast doubt upon the empirical validity of the interaction of syllabification and metrical structure as the rationale for RS. According to the standard analysis, RS occurs instead of vowel lengthening in order to satisfy FtBin [“Foot Binarity”, essentially (6) above], thus preventing a violation of *FinalLongV. Duration data from the RS experiment, presented in (28.) show that word final stressed vowels are longer than word final unstressed vowels ($p < .05$). Word final stressed vowels **do** lengthen in Italian, both before consonants that undergo RS and consonants that fail to do so. In light of this new vowel length data, the interaction FtBin and *FinalLongV does not seem plausible as the structural rationale for RS.

Word Final Vowel Duration: stressed vs. unstressed					
		V / __ CV, CL (RS applies)		V / __ SC, CS, CN (No RS)	
(28.)	-Stress V	35 ms.	<i>divènto presidente</i>	44 ms.	<i>divènto stimàto</i>
	+Stress V	66 ms.	<i>diventò presidente</i>	74 ms.	<i>diventò stimàto</i>
	Mean dif.	31 ms.		30 ms.	

Now, usual caveats on Pisan Italian aside (*cf.* §2.2), it seems to me that all this proves is that, *ceteris paribus*, vowels lengthen under stress, which is a well-known fact for most languages (Ladefoged 2001: 113), and certainly for Italian (*cf.*, *e.g.*, Bertinetto 1981: 86).

What a sentence like “diventò presidente” should be compared with is something like “di vent’opre splendente” (or something slightly less artificial), and, although we have no example of /CVCRV/ in the exact same context, there is no doubt (even from McCrary's own

preceding /rC/ compared to the one preceding the other consonant clusters, whereby “the sonant would still retain, in many languages, a certain degree of syllabicity, despite having lost most of the times the power of constituting an independent syllable nucleus (as it used to in Indo-European)”. This is also in line with the fact that in Italian words ending in /VC/ all have a short V and a long C except for /Vr/, where the liquid is short and the the vowel is long (*M^aPI*: 165).

experiments: 'CVCRV 169 ms. [McCrary 2004: 214]; *cf.* also Esposito & Di Benedetto 1999) that, in Italian, the first vowel in 'CVTTRV is always shorter than the corresponding vowel in 'CVTRV. So the *ò* [ɔ] of “diventò” is [relatively] *short* (...and a perceptual study would be particular useful here).

Of course, this would not and does not prove that *FinalLongV is the structural rationale for RS:

[r]ecent experimental studies (Esposito and Di Benedetto, 1999, Pickett et al., 1999) have found that preceding vowel duration (or the C/V ratio) is one of the primary cues for geminate consonants in Italian. Short vowel duration before geminates may simply be interpreted as an enhancement of the singleton vs. geminate contrast

(McCrary 2004), but it certainly doesn't disprove it either!

Moreover, although a recent study seems to cast some doubts on this (Hajek *et al.* 2007), there seems to be general agreement that stressed word-final and —which is more important here— *phrase*-final vowels are [relatively] short in Italian (Vayra 1995, D'Imperio & van Santen 1999; *cf.* also Vayra 1994), so *RS does keep stressed final vowels short*.

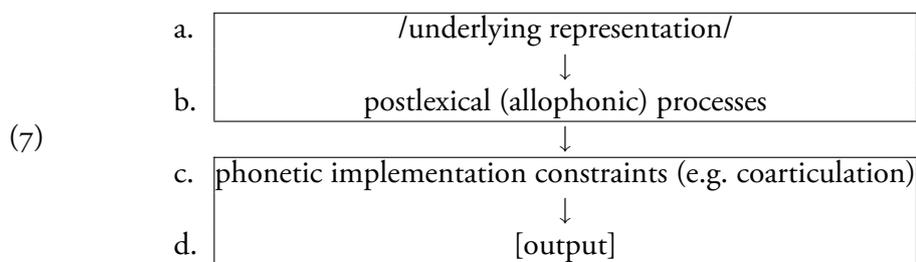
3 Diachronic analysis

A further *methodological* (and diachronic) objection to McCrary's conclusions is contained in Loporcaro's (2007) delightful essay, a well-argued warning to whoever may be tempted to extend [synchronic] phonological methods into diachrony bypassing any of the steps required by historical linguistics.

The fact that stressed vowel duration in Italian, at the phonetic surface, does not display a plain complementary distribution but rather a fine-grained continuum is in itself not surprising and has been known for a long time...

This gradient, however, is not in itself conclusive proof that O[pen] S[yllable] L[engthening] does not exist. McCrary's conclusion crucially depends on the model adopted, which is phonetically-grounded O[ptimality] T[heory], an output-oriented model that conflates phonology and phonetics...

Consider, however, the more conservative view displayed in (7) (e.g. Kiparsky 1985; Keating 1990):



This model differentiates between postlexical allophonic processes (7b), which operate on phonological features, and low-level phonetic constraints (7c) (typically, coarticulation) that are gradual in nature and do not operate in terms of distinctive features.

[...]

Under a model such as (7), the Italian facts in (6) (and McCrary’s findings [...]) can be interpreted as follows. First, allophonic OSL applies, deriving lengthened stressed vowels in open syllables. Then, coarticulation between sounds in the speech chain intervenes, so that the contrast in length becomes blurred at the surface, and the continuum in (6) [*i.e.* §2.2(7)] eventually emerges.

Diachronic evidence in our case supports a model such as (7). To see how, it suffices to consider virtually any one of the syllable-related sound changes reported in handbooks of (Romance) historical linguistics, like /a/-fronting in (Old) French (8) or /ɛ/-diphthongization in (Old) Tuscan (9):

(8) /a/-fronting in (Old) French

/a/	CAPUT	CAPRAM	CHARTAM	CALDAM	CASTAM	CANTAT	CARRUM
	<i>chef</i>	<i>chèvre</i>	<i>charte</i>	<i>chaude</i>	<i>chaste</i>	<i>chante</i>	<i>char</i>

(9) /ɛ/-diphthongization in (Old) Tuscan

/ɛ/	HERI	PETRAM	PERDIT	CELS(AM)	VESTEM	CENTUM	TERRAM
	<i>ieri</i>	<i>pietra</i>	<i>perde</i>	<i>gelso</i>	<i>veste</i>	<i>cento</i>	<i>terra</i>

The standard account of such changes implies that there was an allophone lengthened via OSL in the first place, and that this allophone underwent the change while the non-lengthened one remained unaffected. The examples in (8)–(9) (which contain the Latin etyma as well as the Romance outcomes) are displayed in the same order as the decreasing stressed vowel durations in the continuum (6). Yet, on this continuum, the language itself — through the application vs. non-application of sound change — makes a binary choice. And this binary choice requires that OSL be assumed for those varieties prior to change. In other words, it requires that we have a phonology, interacting with phonetics, rather than just conflating the two.

In fact these elementary generalizations about sound change would be missed under the conflated view of phonology-phonetics. If vowel duration really depended exclusively on segmental coarticulation effects, then the statement of the changes in (8)–(9) could not make reference to either syllable structure or to a lengthened allophone. And no sensible alternative is in sight. Clearly, the nature of the following sound does not play any role here (cf. in (9) the application of diphthongization in *ieri* vs. the non-application in *terra*). Thus, the only possibility left would be to assume that speakers, one day, applied colouring or diphthongization to just those stressed vowels whose actual phonetic duration was, say, ≥ 165.4 milliseconds. This is unconceivable, however, since experimental phonetics shows that there is an overlap in absolute durations across different contexts and, besides, that duration is contingent upon speakers, speech rate and style.

This in no way detracts from McCrary’s account of the PHONETICS of stressed vowel duration in modern standard Italian. Yet, there is no genuine case here against OSL: the phonology of vowel length cannot be reduced to phonetics alone, as the evidence from diachrony eloquently reminds us.

Unfortunately, as we “eloquently” showed above, McCrary’s phonetics is not quite right either because her sample is phonetically non-standard.

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