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On the analysis of geminates
in Standard Italian and Italian dialects.[*]

1. *Introduction*

The debate on the phonological representation of Italian geminate consonants is virtually as old as phonology as a discipline itself. As is well known, two opposite views have been alternatively maintained by scholars. The 'traditional' one considers geminates as composed of two identical segments belonging to different syllables. The alternative analysis, on the other hand, regards geminates as single segments at the phonological level, distinctively long (or tense) and entirely syllabified in the onset of the following syllable. The two competing analyses are schematically represented in (1) (and will be referred to as (1a) and (1b), respectively, in what follows):

(1)   a. $'VC_1{}^\$C_1V$ b. $'V^\$C{:}V$

            /·fatto/   ->   [·fat:o]   /·fat:o/   ->   [·fat:o]   'fact'

Among the proponents of (1a), one might mention e.g. Swadesh (1937: 6f), Trubeckoj (1939: 246), Porru (1939), Hall (1948), Muljac&ic! (1972: 62-70), Mioni (1973: 66f), Bertinetto (1981: 115-46, 1985: 601-11), and Vogel (1982: 32f). (This list is of course far from exhaustive.)[1] Analysis (1b) has been put forward e.g. by De Gregorio (1935), Romeo (1967), Valesio (1967: 268-70), Saltarelli (1970), Martinet (1975), and, more recently, Hurch -- Tonelli (1982) and Luschützky (1984).[2]

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1   To my knowledge, nobody has ever proposed that geminates are bisegmental and tautosyllabic ($*'VC_1C_1{}^\$V$ or $*'V^\$C_1C_1V$), an analysis which would create a blatant violation of Italian phonotactic constraints - no such clusters are allowed word-finally or word-initially. Thus, it is possible to single out analyses of the type (1b) by labelling them 'tautosyllabic' ('monosegmental' is necessarily implied). Another theoretically possible option consists in regarding geminates as monosegmental and heterosyllabic. (Within traditional phonemics this would have been tantamount to defining them as 'ambisyllabic' segments.) Within recent non-linear frameworks, on the other hand, geminates are defined as segments consisting of a single melodic unit (i.e. phonetically specified segment), doubly linked to some kind of higher nodes. Although subtheories differ as to exactly how the double linking is represented (e.g. the melodic unit may be linked to two C slots at the CV tier, as in CV-phonology; or to a mora and a syllable node, as in Hayes' 1989 version of moraic phonology), they all agree on the fact that geminates belong to both the coda of the preceding syllable and the onset of the following one. The phonological rules of Italian and Italian dialects that will be discussed in what follows and used as diagnostics for syllable structure, do not usually offer any means to empirically discriminate between a non-linear representation of this kind and the linear one exemplified in (1a). Given this empirical indeterminacy (see however §2.1.2.1. for some potentially discriminating data) and the limited scope of this contribution (in which there is no room for a systematic comparison of claims laid within different theoretical frameworks), I will include under the label (1a) the recent analyses of Italian geminates developed in this vein (see e.g. Saltarelli 1983 on Italian, Steriade 1988 on Romance, as well as Hayes 1986 and Schein -- Steriade 1986 for the framework of reference).

2   The relevant feature distinguishing ['fat:o] 'fact' from ['fa:to] 'fate' is consonantal tenseness (/'fa$to/ vs. /'fa$To/), according to Romeo (1967), and stressed vowel (phonemic) length (/fāto/ vs. /făto/) according to Saltarelli (1970). Saltarelli, writing in the SPE framework, does not touch upon the issue of syllabification. Bullock (1991: 112) has proposed that the length of the stressed vowel in ['fa:to] is represented underlyingly: in her own words «all stressed vowels in open syllables are <u>underlyingly</u> bimoraic» [emphasis added]. She thus returns to Saltarelli's (1970) view in this respect, although in an implicit way and without providing a refutation of the objections to Saltarelli raised by many authors (see fn.3). Since however Bullock (1991: 111) agrees that

The aim of this paper is to provide evidence in favour of the 'traditional' analysis. The starting point for my discussion are the last two contributions mentioned, both because of their intrinsic interest and because previous works espousing analysis (1b) have long been confuted.[3] In §2 I will briefly discuss the arguments produced by Hurch -- Tonelli (1982) and Luschützky (1984) and develop some counterarguments. In §3 it will be argued that analysis (1b) is incompatible with all the evidence obtainable from the synchronic and historical phonology of Italo-Romance dialects.

In making systematic use of evidence from Italian dialects, I will follow a line differing from that of most contributions specifically devoted to the analysis of Italian geminates, which usually take only Standard Italian into account. I believe that the attempt to deal with this enlarged body of evidence can lead to fruitful results, for at least two reasons. The first is one of method. Standard Italian (henceforth **SI**)[4] is not an isolated system, either synchronically or diachronically. It has inherited geminate consonants from (late) Latin/early Romance, just like all cognate Italo-Romance varieties. Therefore, if it can be shown that either of the two hypotheses under discussion is the only one which allows us to account for both diachronic and synchronic variation within Italo-Romance, this will strongly suggest that we should prefer this hypothesis over the alternative one. The second reason is an empirical one. Italian dialects provide a fairly rich set of phonological processes sensitive to syllable structure, which enable us to test more extensively the implications entailed by the different hypotheses on the phonological analysis of geminates.[5]

2. *The recent debate on Italian geminates: refuting the arguments for a monosegmental/tautosyllabic analysis*

The arguments that have been produced in support of a tautosyllabic analysis of geminates, in its recent revival within the framework of Natural Phonology, are based on both external (§2.1.) and internal (§2.2.) evidence.

2.1. *External evidence*

2.1.1. *Evidence from word games*

Luschützky (1984) has presented the results of a word game performed by one speaker. The subject was requested to insert a CV syllable (either [ra] or [ta]) after each syllable of polysyllabic words. When these contained geminates, the parasitic syllable was inserted to split the geminate in 21 cases out of 29, whereas in the remaining 8 cases the insertion resulted in $CVraC_1C_1V/CVtaC_1C_1V$, with the geminates preserved. Luschützky interprets the results as follows: whenever geminates are split under insertion, this is due to the influence of standard orthography (prescribing the syllable division *fat-to*), whereas the very existence of some deviation (albeit in a minority of cases) must reflect a discrepancy between orthography and phonological representation (hence $/CV\$C\!:\!V/$ is correct). This interpretation has already

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«Italian no longer exhibits the contrastive vowel length of Latin; the length contrast which is phonologically relevant is manifested by the consonants» there seems to be some inconsistency in her treatment. Moreover, Bullock's proposal is cast in the framework of moraic phonology, but I fail to see how it can be reconciled with Hayes (1989: 258), since Hayes is in substantial agreement with traditional phonemics in stating that «contrastive mora count, not length per se, is represented underlyingly.».

3 Conclusive objections to Romeo, Valesio and Saltarelli have already been raised by a number of authors (Hall 1971, 1972, Mulja&cic 1972, Bertinetto 1981, Vogel 1982 among these), so that it is unnecessary to repeat their arguments here. (On De Gregorio 1935 see fn.11 below.) Martinet (1975) only provides a (weak) distributional argument in favour of (1b), based on the observation that intervocalic /ɲ/ and /ç/ can only be long and lack non-geminate counterparts. Objections to Hurch -- Tonelli (1982) are presented in Bertinetto (1985: 601-8).

4 The following abbreviations will be used: **AMR** = allomorphic morphological rule, **MPR** = morphonological rule, **PR** = phonological rule, **SI** = Standard Italian.

5 For the present discussion, I will assume - rather unproblematically - the notion 'syllable' as an internally structured unit. (See Dressler 1985: 35f for the insertion of the current views on the syllable into the framework of Natural Phonology.) I think this notion is needed in order to characterize linguistic phenomena in general and, in particular, to account for the processes observed in the Italian dialects I shall discuss. This is true, as far as I can see, whatever conception of the syllable is assumed; i.e., both under the view that phonemic strings are syllabified underlyingly and under the view - upheld by Donegan -- Stampe (1978), among others - that syllabification is entirely predictable on segmental grounds and is performed in the course of the derivation.

been criticized by Bertinetto (1987: 893f, 915), who has also analyzed a more extensive corpus of data from word-games (his results support analysis (1a)). I will add only one more remark here, concerning the intrinsic limits of an experimental procedure such as Luschützky's as a source of information on this topic. Insertion of a CV syllable into a CVC꞉V word, in fact, in many cases results in a sequence disallowed by Italian phonotactics, unless the geminate is kept undivided. For instance, Luschützky reports a syllabification *pel.lic.cia*, inferred from his test, and to get such a result, his subject must have violated Italian phonotactic constraints, producing something like [pelta·lic&tac&a] or [pelra·lic&tac&a] (with either of the disallowed sequences *[c&t], *[c&r]). Since the rules of the game do not coincide with those of Italian phonotactics, the results should not be expected to unveil phonotactic regularities in a direct way.

2.1.2. *Evidence from slips of the tongue*

Hurch -- Tonelli (1982: §9) regard as relevant evidence the fact that geminates do not usually break in slips of the tongue. In fact, Hurch -- Tonelli claim that geminates never break, basing their analysis on the corpus of slips of the tongue gathered in Padova at the Centro di Studi per le Ricerche di Fonetica del CNR. However, it can be observed that the similar corpus gathered in Pisa (at the Scuola Normale Superiore) does contain some instances of geminate alteration: e.g. *sarèbbe tròppo -> sarèbbe tròmp…* 'it would be too much' (Miranda 1988: 319), with a nasal inserted instead of the first half of the input geminate. This phenomenon is observed also in the diachronic development of many Italian dialects, and is considered by Trumper -- Romito -- Maddalon (1991: 334) as an argument for a bisegmental analysis of geminates in the varieties where it occurs (see also Tuttle 1991: fn.27). Cf. also *prendi quella carta da imballaggio -> prendi quella calt…* 'take that wrapping paper' (Miranda 1989: 116), *confessare ciò che provi -> confesvare ciò che prosi* 'to confess what you feel', *massa ineguale -> malsa ineguase* 'uneven mass' (Miranda 1989: 121).[6]

Note, besides, that geminates normally substitute for and are substituted by both single consonants and consonant clusters, so that their behaviour cannot be straightforwardly equated with that of either category. The (tendency towards the) inalterability of geminates may simply be due to closer coarticulation since, obviously, in no other consonant cluster are the segments involved so articulatorily near. I do not think, however, that a phonological analysis of type (1b) can be justified on these grounds only.[7]

2.1.2.1. *A note on inalterability*

The inalterability of geminates, with respect to sound change (and synchronic PRs), is a widespread cross-linguistic phenomenon and has been used as an argument for monosegmental analyses - as seen in the preceding section. While the inalterability of geminates is the rule in Italian and Italian dialects (as it is also across languages), there are however some interesting exceptions. Zamboni (1976: 330), who produces arguments in favour of (1a), mentions some cases in which the first half of a geminate /ll/ has undergone vocalization (/l/ > /u/ /_$) whereas the second has been preserved. For instance, Zamboni follows A. Prati and G.B. Pellegrini in reconstructing the following diachronic development for the form ['pjOla] 'plane', today found in the dialects of Veneto, Emilia and Lombardia: *PLANULA (derived from PLANA) > *['planla] > ['pjalla] (cf. SI *pialla*) > [·pjaula] (this intermediate stage is still attested in some dialects of the Marche) > ['pjOla]. Other cases of similar developments are attested in place names like *Zola* Predosa (prov. Bologna) < *Ceula* (attested in mediaeval Latin texts) < CĔLLA, or *Roncoleulo*, *Sarmeola* (near Padova), *Vanzoleulo* (near Monselice), all originally containing the suffix -ĔLLU/-A.[8]

Comparable cases of non-inalterability are found in synchronic rules also. In some varieties of Italian spoken in Veneto (cf. Canepari 1979: 83, 209; 1984: 97f), an /l/ in syllable coda is pronounced as a voiced monolateral fricative (/l/ -> [Ó]]_$), no matter whether it is

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6   See Bertinetto (1985: 607f) for further criticism to the inferences concerning the analysis of geminates drawn by Hurch -- Tonelli from slips of the tongue. Bertinetto points out that only the occurrence of slips like *tippo mato <- tipo matto* 'crazy guy' could be made a case for a monosegmental/tautosyllabic analysis. Slips of the tongue of this sort, however, do not seem to have ever been reported.

7   There is no evidence available on linguistic games or slips of the tongue in any Italo-Romance variety other than SI.

8   See also Pellegrini (1990:19f) for further examples.

followed by another /l/ or any other consonant: ['kwaÓke] 'some', ['moÓto] 'much', ['kweÓlo] 'that'. A similar rule, differing only as to the phonetic output ([lʲ] rather than [Ó]), is reported by Canepari (1979: 206) for the Piedmontese variety of Italian: /l/ -> [lʲ]/ _$ as in [ˈpalʲla] 'ball', [ˈfe6lʲtro] 'felt (n.)', [ˈfalʲso] 'false'.

These data are difficult to handle under the assumption that geminates are monosegmental (let alone tautosyllabic, as in (1b)). This provides an argument to discriminate between analysis (1a) and non-linear analyses, since the rules discussed could hardly be expressed in a non-linear framework, under standard assumptions (see fn.2). Schein -- Steriade (1986: 693), for instance, distinguish between two complementary classes of rules: a) structure dependent rules (which are skeleton- or syllable-structure sensitive) and b) segmental rules (which are sensitive to segmental information only, not to syllable structure). Now, a rule mentioning «/l/ in coda position» by definition belongs to the former type and will be allowed to apply to structures such as (2a):

(2) a. X X   b. X X   c. X   X
        | | \ / | |
        l C   l   l   l
      /lC/ cluster   true geminate   fake geminate

Under the standard non-linear representation of geminates (as shown in (2b)), it is predicted that the first half of a geminate [l:] is not affected by such a rule, because of Hayes' (1986: 331) Linking Constraint («Association lines in structural descriptions are interpreted as exhaustive.»): /l/ in /'palla/ 'ball', if represented as in (2b), is associated to both a coda and an onset position at the same time, hence it does not satisfy the structural description of the rule. On the other hand, under a bisegmental, linear representation of geminates (see (1a)), we have no difficulty in deriving the correct result (/'palla/ -> [·paÓla] since the first half of the geminate is in coda position like any other preconsonantal /l/. Note further that geminate /ll/ in the varieties of Italian spoken in Veneto and Piemonte has to be considered as a 'true' geminate (just like any geminate in Italian and Italian dialects: see e.g. Trumper -- Romito -- Maddalon 1991: 331ff), according to the standard criteria of non-linear frameworks. Naturally, if it were represented as a 'fake' geminate (as in (2c)), the problem posed by the statement of the rules under discussion would disappear. That kind of representation, however, is only available «where a geminate arises through morpheme concatenation» (Hayes 1986: 326), whereas a lexical representation containing a fake geminate is inconceivable, since it would violate the Obligatory Contour Principle (Leben 1973, McCarthy 1986 etc.). On the other hand, Schein -- Steriade (1986: 736) «expect that all morpheme-internal geminates will obey the principles developed here.» [*scil*. principles based on the assumption of representation (2b)]. /ll/ in the cases here taken into consideration occurs morpheme-internally (/kwell+o/, /pall+a/), hence cannot be represented as in (2c), and in spite of this does not obey such principles.

The existence of exceptions of this kind shows that cross-linguistic properties of geminates, such as inalterability, cannot be regarded as following from the format of a (multi-linear) phonological representation - more specifically, from double linking. The reason for the (prototypical; no less no more) inalterability of geminates must be sought in phonetic rather than formal constraints.

2.1.3. *The diachronic development of geminates*
Hurch -- Tonelli (1982: §3) have drawn attention to the fact that Italian geminates have arisen, in some cases, from strengthening processes conditioned by primary (or, sometimes, secondary) stress position, rather than from insertion of a new segment. This should warn us - in their view - against analyzing the geminates in e.g. ['fem:ina] ·female' (< FEMINA), [ˌsep:e·l:i:re] 'to bury' (< SEPELIRE) as bisegmental. However, it must be considered that

geminate consonants previously existed in the Latin phonological system (e.g. ĔSSE(*-RE) > [ˈEs:ere] 'to be', TĔRRAM > [ˈtEr:a] ·earth'),[9] and that they were demonstrably heterosyllabic in that, as is well-known, the syllable preceding them counted as heavy (for metrics, stress assignment and other syllable related prosodic rules) even if containing a short vowel. The

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9   See Giannini -- Marotta (1989) for a comprehensive study of Latin geminates, as well as for references.

same goes for those Latin consonant clusters which resulted in Italian geminates through assimilation (e.g. NŎCTEM > [ˈnOt:e] 'night', SĒPTEM > [ˈsEt:e] 'seven').

As for the other main source of Italian geminates, i.e. lengthening of C_1 in C_1C_2 clusters with C_2 = non-nasal sonorant, there are good reasons to assume that the clusters were heterosyllabic before gemination (see Vennemann 1988: 46). If gemination in, say, [ˈsap:jaa] 'know (subj., 3rd sg.)' (from classical Latin SAPĬAT) is explained as a syllable contact readjustment (through onset strengthening: */·sap.jat/ > /·sap.pja/ the output of this change must be assumed to be the phonological representation of today's SI *sappia*, unless evidence to the contrary is provided.

Geminates in *fémmina, àttimo, legìttimo* and the like, while admittedly resulting from strengthening rather than epenthesis, have probably been analyzed in the same way as previously existing ones. I would like to stress, in this connection, that since the bisegmental and heterosyllabic status of Latin geminates is certain, the burden of proof lies entirely on proponents of analysis (1b) when they claim that things have changed in the course of the diachronic development from Latin to Italian.[10] Yet, no account of such implicitly assumed reanalysis (e.g. /'Es.se.re/ > /'E.s:e.re/ or /'sap.pja/ > /'sa.p:ja/) was ever provided by those scholars, who based their claims on synchronic evidence only.[11]

2.1.4. *Euphemistic substitutions*

A further argument by Hurch -- Tonelli (1982: §7) is drawn from euphemistic substitutions, applying to curses or other taboo phrases. The authors assume that, when curses are modified in this way, the first syllable of the taboo word is always left unchanged. Given this premise, they argue that the pattern of replacement in cases like (3a-b) supports their claim, in that geminates occurring in the input of substitutions are never split (see (3b)), and in that C꞉V sequences in euphemisms can replace CV sequences as in (3a):

(3) a. ma·dOn:a -> ma·t:i:na e. ·mɪNgja ->   ·mɪt:sɪga   (Sicilian)
     b. ·kat:so -> ·ka:volo f. ·sOǎa   ->   ·sOrbole   (Bolognese)
     c. ·kristo -> ·krib:jo g. ·mE:rda ->   ·fE:rda   (Bolognese)
     d. ma·dOn:a -> ma·dOska h. ·kat:s   ->   ·at:s/·it:s/·ut:s   (Apulian)

As already pointed out by Bertinetto (1985: 605-7), however, there are also substitutions in SI which do not fit Hurch -- Tonelli's (1982) generalization, like those in (3c-d) (cf. also ['kaspita] used instead of the taboo form (3b)) where geminates alternate with consonant clusters. One might object that the syllabification of /sC/ clusters is a matter of debate, and that, if they are analyzed as complex onsets (although I think the evidence against this analysis is overwhelming: see §§2.2.3., 2.2.4. and 3. below for some of this evidence), examples like (3c-d) do not counterindicate Hurch -- Tonelli's (1982) argument. However this may be, Italian dialects present euphemistic substitutions in which geminates alternate with unquestionably heterosyllabic clusters: in (3e) the nasal in the coda of the initial syllable is not preserved, and the first half of a geminate [t:s] substitutes for it; the first syllable of the substitute in (3f) contains a coda trill, unlike the taboo [ˈsOǎa] 'suck'. Thus, an account of the phonology of geminates which aims at a comprehensive characterization of Italo-Romance cannot maintain Hurch -- Tonelli's (1982) generalization. The requirements to be fulfilled by euphemistic substitutions seem to be somewhat looser: substitutes must preserve some of the segments of the taboo words - preferably the initial segments, to help identification, but not

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10 Comparison of other Romance varieties shows that geminates still closed the preceding syllable in early Romance. To quote just one example, Old French diphthongization of stressed vowels in open syllables did not apply to vowels followed by either consonant clusters (other than muta cum liquida) or geminates:

(i)   (Latin   >   Old French)   (Latin   >   Old French)
     CAPĬLLU > chevel 'hair'   ≠ PĬLU   >   peil (> poil) 'hair'
     FĔRRU > fer   'iron'   ≠ FĔRU   >   fier   'fierce'

11 De Gregorio (1935: 69) has speculated about such a reanalysis (e.g. /pt/ > /tt/ > /t:/ in SEPTEM > sette) without providing any evidence in support. His whole argument, anyway, is hardly worth considering because of his unduly mixing phonetic and phonemic criteria.

necessarily so, as shown by (3g-h) where namely the initial segment is deleted or replaced (the example (3g) stems from Menarini 1942:73).[12]

2.2. *Internal evidence*

2.2.1. *Input-output correspondence*

A further argument adduced by proponents of (1b) concerns the relationship between phonological and phonetic representation. Hurch -- Tonelli (1982) point out that a bisegmental analysis, unlike a monosegmental one, assumes a difference between the representations at the two levels, which requires an explicit motivation. This is correct, and the evidence to be presented in §2.2.3. and §3 is meant to reply to this challenge. Note, however, that what is needed to derive the phone $[C_1ː]$ from a phonological representation $/C_1C_1/$ is simply the application of a fusion rule (a very natural one, as Luschützky observes) of the form $/C_1C_1/ \rightarrow [C_1:]$, which is required independently to derive the sandhi geminates in *con noi* 'with us' [ko·nːoːi], or *per ridere* '(in order) to laugh' [peːrːiːdere], since these obviously cannot be regarded as single segments at the phonological level.[13]

2.2.2. *Syllable structure typology*

A direct implication of (1b) is that the syllable preceding a geminate consonant must be an open syllable at the phonological level (or - depending on theoretical options - at that intermediate level of derivation at which segment strings are parsed into syllables). In Hurch -- Tonelli's (1982: 398) view, this is a welcome consequence of the analysis they advocate, in that it is consistent with the strong tendency towards CV syllable structure otherwise displayed by Italian: if geminates are not heterosyllabic, then only sonorants and /s/ (or even only sonorants, in case internal /sC/ clusters are analyzed as complex onsets) can occur in syllable codas.

Now, this approach has the following implication (schematically represented in (4b)): we should expect to observe phonological rules which apply to vowels before geminates and before single consonants, but not to vowels preceding heterosyllabic consonant clusters.

(4)　　　single C　|　geminate CC　　|　CC cluster
a.　　　　　　　　'CV$_i$C$_1$$C$_1$V　　=　'CVC$_1$$C$_2$V　⊃　'V$_i$ is in closed syllable
b.　'CV$CV　=　'CV$_i$$C:V　　　　　　　　　⊃　'V$_i$ is in open syllable

Conversely, the opposite prediction (i.e. (4a)) is made by the heterosyllabic analysis, under which it is expected that geminates will pattern together with consonant clusters rather than with single consonants, in the environments of phonological rules.[14] We will check these

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12 This is not surprising, given the fact that euphemistic substitutions are a rather marginal domain within the phonology of a language. The operations from which substitute words arise belong to 'metamorphology', in Dressler -- Merlini Barbaresi's (to appear, §I.9.1.) terms. Examples of similar 'loose' phonological regularities are sometimes found even within 'morphological grammar' proper. Compare for instance Turkish superlative formation, where the rule cannot be stated more precisely than this: duplicate the first syllable of the base form (if it is light) or its head only (if it is heavy), and add (unpredictably) /m/, /s/, /p/, or /r/: büsbütün <- bütün 'all', b o m b o ʃ <- b o ʃ 'empty', k ɨ p k ɨ r m ɨ z ɨ <- k ɨ r m ɨ z ɨ 'red', y a p y a l n ɨ z <- y a l n ɨ z 'alone' (Rossi 1963: 35).

13 Luschützky (1984: 107) compares this rule with that which operates in sandhi in languages lacking lexical geminates, such as German, English or French: e.g. Germ. /...d+t.../ -> ['ʔeːåt^h:ail] Erdteil 'continent', Engl. /...t+t.../ -> ['sOft^h:Op] soft top, Fr. /la#d´dA$/ -> [lad:A$] 'in there'. Whether the sandhi geminates of such languages can be equated with Italian (sandhi or lexical) geminates is a matter of debate: Luschützky is in line with many scholars (e.g. Swadesh 1937: 4, 7 comparing [n:] in saneness ['sein:´s] with Italian geminates, or Ladefoged 1975: 223f), but see e.g. Trumper -- Romito -- Maddalon (1991: 331f) for a different view.

14 As regards the fact that, under analysis (1a), obstruents in coda position occur in Italian (apart from loanwords) exclusively as first members of geminates, I do not consider this as a difficulty, in that it is not an isolated case. Japanese, for instance, allows only either a nasal or the first half of a geminate to occur in syllable codas word internally (cf. Vennemann 1978:180). No alternative analysis is available for Japanese geminates: the first half of a geminate counts as one mora for (pitch-)accent assignment and for metrics in poetic compositions, which would not be the case if geminates were tautosyllabic (cf. McCawley 1968: 84, 131, Shibatani 1990: 158ff). Yoshida (1990) has recently departed from the communis opinio on Japanese syllable structure with arguments which are purely internal to the framework of Government Phonology. In his

predictions in the following sections by means of data from several varieties of Italo-Romance.

2.2.2.1. *A note on the diachronic development of Italian syllable structure*

In a diachronic perspective, it may be interesting to observe that the process leading to the loss of syllable final stops interwove with that which created Romance geminates from Latin clusters (see §2.1.3. above, and Hall 1964, Loporcaro 1988b). At a given stage, coda stops assimilated to the following consonants, both word-internally and in sandhi. Subsequently, the clusters in the former context underwent restructuring (e.g. /pt/ -> [t:] <- /tt/ in *septem > sette*). At word boundary, on the other hand, a final consonant which was assimilated to a following initial consonant ceased to constitute a recoverable phonemic input after it was eventually lost also in prepausal and prevocalic positions. As an effect of this restructuring, sandhi geminates, formerly resulting from final consonant assimilation (e.g. /ad#me/ -> [a ·m:e] 'to me'), were reanalyzed as resulting from a strengthening effect of the preceding word (*raddoppiamento fonosintattico*; see Hurch 1986). Although many details are omitted here, the point is that the diachronic process responsible for the non-occurrence of word final stops in modern Italian cannot be simply construed - at its outset, at least - as a conspiracy to create a CV syllable structure. Rather, it was part of a larger pattern of assimilation and, in particular, concurred, rather than conflicted, with the assimilatory process which created many new word-internal geminates (and hence resulted in the occurrence of the first halves of these geminates in syllable codas).

2.2.3. *Stress placement*

No proponent of (1b) has ever drawn attention to Italian stress while discussing the phonological representation of geminates. This is easily understood if one considers that the claim that geminates belong entirely to the following syllable would prevent us from recognizing the (almost) only clear phonological regularity constraining Italian stress assignment, viz. the one which imposes that a heavy penult bears stress, as is illustrated by the examples in (5):[15]

(5)   a. CV'CVCV   *senìle*   'senile'   and   'CVCVCV   *àbile* 'skilful'
      b. CV'CVC$_1$C$_2$V   *dipìnto*   'painting'   but   *'CVCVC$_1$C$_2$V
      c. CV'CVC$_1$C$_1$V   *compàtto*   'compact'   but   *'CVCVC$_1$C$_1$V

(5) simplifies actual data for expository simplicity. Italian, in fact, also has ultimate-stressed polysyllables, whose stress is (morpho-)lexically specified and does not obey to any phonological condition. Furthermore, while the constraint (5b-c) holds for the whole of the vocabulary of Latin origin, there are - as is well known - a few isolated exceptions to it in loanwords which have preserved their original non-Latin stress pattern, such as *Tàranto, Lèpanto, Òtranto, Àgordo* (place names), *Òfanto* (a river's name), *màndorla* 'almond', *pòlizza* 'policy'.[16]

Under the analysis of geminates in (1b), we should expect (5c) to pattern with (5a) rather than (5b), as far as stress assignment is concerned; we should expect, in other words, the stress in *pòlizza* to be the rule rather than an exception, which is obviously not true. Thus, we have a neat confirmation of prediction (4a) (and of analysis (1a), from which it follows).

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treatment, mora nasals are not analyzed as coda consonants, but rather as syllabic onsets followed by empty nuclei: e.g. ko$^\$$N$^\$$ya 'tonight'. Under this analysis, the only possible coda consonants that are left are the first elements of geminates: e.g. ko$^\$$ot$^\$$ta 'was frozen' (traditionally syllabified koot$^\$$ta). Another case in which geminates deviate from constraints on syllabification otherwise holding in the language, is discussed by Bertinetto (1985: 605 fn.4), showing that in Finnish no syllable coda may consist of two consonants unless the second consonant of the coda cluster is the first element of a geminate.

15 All clusters but obstruent+r(/l) behave as described in (5b). The fact that Italian has words like tedésco 'German', fantásma 'phantom' but no word with a *'CVCVsCV stress pattern is evidence for the heterosyllabicity of /sC/ clusters.

16 Some exceptions are also observed among place names that can be traced back to Latin, such as Lèvanto, whose stress pattern is learned (while Lèvanto is the SI form, the local dialect has [le'vantu]; cf. Petracco Sicardi 1990: 352). Also Àgosta, near Rome (< Augusta), shows an irregular stress shift (Marcato 1990: 11; compare the regularly stressed Agósta (Uzzano, PT) mentioned in Pellegrini 1990: 326).

The generalization would be missed, under (1b), not only with respect to SI, but also for many of the dialects of Italy. As the phonological constraint on stress under discussion is a remnant of the Latin stress rule,[17] it is shared by all Italo-Romance varieties due to their common origin. In the dialects of Apulia, for instance, the constraint illustrated in (5b-c) is even stronger than in SI,[18] in that it does not admit of any exceptions at all (not even in loanwords): for instance, Greek ἀμύγδαλα has been adapted - through late Latin *amyndala*) as /a·mEn´l´/ (contrast the SI counterpart *màndorla*, with irregular stress). The name of the Apulian town *Tàranto* (SI form), is /"tartu/ in the local dialect (< */·tarantu/ < Greek Τάραντα, accus. case of Τάρας), /"tard´/ (from an earlier */·tar´nd´/) in the Apulian dialects spoken further north (e.g. in Bari), and /ta·rantu/ (< */"tarantu/) in the dialects of Salento, spoken south-east of Taranto. In the last variety stress has simply shifted rightwards to eliminate the exceptional accent pattern, whereas in the former two the same effect has been obtained through syncope. Similarly, the river *Òfanto* (SI form) is called /"Oft´/ in Bari, and the name of the town *Òtranto* (SI form) sounds [u·T«antu] in the local Salentino dialect (see Rohlfs 1966: 173, 445).[19]

2.2.4. *Stressed vowel length*

The claim about syllable structure entailed in monosegmental analyses (i.e. (4b), §2.2.2.) is clearly at odds with a traditional argument in favour of (1a), viz. that concerning the distribution of allophonic vowel length in stressed syllables. 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)   V   ->   [+long]/ $
                               [+stress]

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17 This constraint is the only part of the phonological stress rule of Latin which was left over (although transformed into a prelexical constraint on stress placement) after the vowel length contrast was lost. This is a matter of fact, in spite of the proposals which periodically insist on suggesting that the Latin stress rule has survived unchanged into Italian.

18 The stress pattern of the Apulian dialect of Altamura (prov. Bari; Loporcaro 1988a), which is given in (i) as an example, coincides with (5). (Minor differences between SI and Altamurano - and, more generally, southern Italian dialects - concern the interaction of stress placement and clitic affixation, but they are immaterial to our present discussion.)

(i)   a.   CV'CVCV   /man'nu̯l´/   'towel'   and   'CVCVCV   /·fac̆l´/ 'easy'
       b.   CV'CVC$_1$C$_2$V   /p´t'tsend´/   'beggar' but   *'CVCVC$_1$C$_2$V
       c.   CV'CVC$_1$C$_1$V   /ab'bac̆c̆´/   'down'   but   *'CVCVC$_1$C$_1$V

19 Historically, alternations like <u>Òtranto</u>/*Otrànto and the like must be traced back to the long period of Graeco-Latin/Romance bilingualism experienced by the southernmost regions of Italy. There is a fairly large bibliography on this issue (see e.g. Pulgram 1975:169f, etc.) which need not be discussed here. The point is simply that also in these dialects, inasmuch as the Latin-Romance stress pattern has prevailed, geminates behave like clusters in attracting stress. The Latin stress pattern has prevailed, as pointed out, with virtually no exceptions in the dialects spoken in the Centre-South (e.g., in northern Apulia, Abruzzi, Campania, etc.). On the other hand, the dialects on which the influence of Greek was stronger, like Salentino or southern Calabrian, display a slightly more complex situation. Examples like [ta'rantu] and [u'T«antu], quoted above, show that in some cases words of Greek origin have been adapted to the Latin/Romance stress rule, but in these varieties there are also many words which preserve a Greek stress pattern: see ['jeme∂:u] 'twin', ['kanc̆e∂:u] 'gate', ['kuku∂:u] 'hail', found in southern Calabrian (cf. Rohlfs 1966: 444), or ['kopi∂:a] 'dry twigs' in Salentino (Otranto; cf. Rohlfs 1956-61: 160). The quoted southern Calabrian forms derive from Latin words first borrowed into Greek - with stress shift - and then back into Romance: e.g. Lat. <u>gemellus</u> > Gk. gevmello" > south. Cal. ['jeme∂:u] (contrast SI [ğe'mEl:o]).

Sardinian, although diverging from Italian dialects in many respects, groups with them (as opposed to the remaining Romance varieties) in having preserved geminate consonants. The constraint illustrated by (5b-c) is observed in Sardinian too, at least in the vocabulary stemming from Latin. Significantly, some exceptions (i.e. forms of structure 'CVCCVCCV) are observed among the many place names of pre-Latin origin: <u>Bóttid̲d̲a</u>, <u>Trékkid̲d̲o</u>.

A vowel is lengthened in an open stressed non-final syllable (/ˈkasa/ -> [ˈkaːsa] 'house', /ˈladro/ -> [ˈlaːdro] thief'), and remains short elsewhere.[20] As regards stressed vowels, the excluded environments are two: a) word-final position (/manˑʤO/ -> [manˑʤO] '(he) ate'), and b) closed syllable (e.g. /ˈmanʤa/ -> [ˈmanʤa] '(he) eats'). The shortness of stressed vowels before geminates (e.g. /ˑfatto/ -> [ˑfatːo] 'done') is straightforwardly accounted for under a heterosyllabic analysis (as there is a segment in coda position), whereas it constitutes a problem under the alternative view.

In order to overcome this difficulty, both Hurch -- Tonelli (1982: §2) and Luschützky (1984: §§10-11) have maintained that (6) is not descriptively correct. Luschützky, in particular, carries out a challenging discussion of stressed vowel duration measurements by Fava -- Magno Caldognetto (1976), which deserves considerable attention. 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.)[21]

(7)	'CVCV	'CVPRV	'CVRPV	'CVLPV	'CVSPV	'CVNPV	'CVC:V
	208,4 >	184,1 >	177,6 >	121,7 >	112,7 >	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 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).[22]

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

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20 Italian is traditionally ranged among languages in which «the domain of the placement of quantity patterns ... appears to be a syllable» (Lehiste 1970: 42, citing Icelandic, Norwegian and Swedish as instances of this kind). The phonetic motivation of rule (6) is easily identified: it serves temporal compensation (see Donegan 1978: 54). There is a phonetic tendency for a segment to be lengthened at syllable boundary, also manifested in Italian by the fact that single consonants are longer in this context than when occurring in syllable-initial intervocalic position (cf. Farnetani -- Kori 1986: 23). See Bertinetto (1981: 115-46) for an extensive discussion of the phonetic correlates of rule (6) in Italian. Particularly interesting are the results of measurements of stressed vowel length concerning words within sentences (vs. in isolation). Bertinetto shows that while (6) basically 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. This argument, among others, is brought to bear by Bertinetto against Saltarelli's (1970) claim that vowel length is distinctive in Italian (see fn.2 above).

21 I have slightly simplified the data and have not reported, in particular, the two following items: 'CVNSV = 235,3, 'CVRLV = 187,9. These results, especially the former, do not fit in well with the hierarchy in (7), in that they display a greater vowel duration than, respectively, 'CVNPV and 'CVRPV. However, these results are rather marginal within the general framework of Fava -- Magno's experiment, as the values were measured in the former case on one single occurrence of the words [ˈpEnsa] '(he) thinks' and [ˈsEnso] 'sense', and in the latter on one occurrence of the word [ˈparla] '(he) talks'.

22 The authors conclude that the analysis of their data confirms the distinction between «due tipi di vocale tonica all'interno di parola: una vocale tonica lunga in sillaba aperta e una vocale tonica breve in sillaba chiusa. La vocale tonica in sillaba aperta presenta valori quasi doppi rispetto alla vocale tonica in sillaba chiusa.» [two kinds of stressed vowels word-internally: long stressed vowels in open syllables and short stressed vowels in checked syllables. Stressed vowels in open syllables rate nearly twice as long as stressed vowels in checked syllables] (Fava -- Magno Caldognetto 1976: 62). The last statement refers to the <u>average</u> values measured by Fava -- Magno Caldognetto (1976: table XVI A) for stressed vowels in all bisyllables with comparable syllable structure (irrespective of the phonetic nature of coda consonants): 'CVCV (200 ms), 'CVC$_1$C$_2$V (100 ms), 'CVC$_1$C$_1$V (100 ms for all geminates but [ˆ: ʃ: ʎ:]; 90 ms for [ˆ: ʃ: ʎ:]). These results are in keeping with those of all experimental works both preceding Fava -- Magno Caldognetto's study (see references cited there) and following it (see below). However, curiously enough, they are not taken into account by Luschützky.

ultimately amenable to phonetic continua, and that one major aim of phonology - understood both as a component of language and as an analytical discipline - is namely to individuate discrete categories on such phonetic continua. Consider for instance the English PR aspirating voiceless stops in non-complex onsets of stressed syllables. This is no doubt a valid generalization, and we are justified in giving it a synthetic expression ($C \rightarrow C^h/\$\_[+stress]$, where C = [-son, -cont, -voice]) in spite of the fact that aspiration has a different phonetic implementation depending on environments: the place at which it is articulated moves gradually along the vocal tract as a function of the place of articulation of the stressed vowel, as aspiration is phonetically an unvoiced version of the latter. Its duration also varies systematically, depending on the place of articulation of the voiceless stop ($[k^h] > [t^h] > [p^h]$; see Lehiste 1970: 22).

Italian stressed vowel length, as shown by the data in (7), is determined by the interaction of phonetic and phonological factors, which have to be carefully distinguished. To begin with, Italian has no phonemic vowel length (see fns.2-3): in other words, vowels lack any length specification underlyingly, so that their duration, relative and absolute, is determined in the course of phonological derivation and phonetic implementation. As for low-level phonetic facts affecting vowel duration, it is beyond doubt that coarticulation with the following consonant plays a rôle. Farnetani -- Kori's (1986: 25) experimental study of stressed vowel duration in Italian shows that there is a gradual decrease in stressed vowel length in environments like those in (8a) and (8b):

(8)   a.   'lara (209 ms)   >   'lala (190 ms)   >   'lana (185 ms)   'CV$\$$CV
       b.   'larto (156 ms) >   'lalta (140 ms) >   'lanta (136 ms)   'CVC$\$$CV

(The values in ms reproduced in (8) refer to Farnetani -- Kori's subject 2; the remaining two subjects also show a comparable pattern.)[23] However, as is apparent even from the few data quoted in (8), the average duration of stressed vowels in open syllables is remarkably higher. The detailed analysis performed by the authors on their corpus leads them to the conclusion that stressed vowel length, while being «very little affected by the complexity of the syllable onset» (§3.1.2.), displays a clear correlation with the presence vs. absence of a syllable coda, as «there is a highly significant reduction of vowel duration in closed syllables» (§ 3.2.1.). Geminates «have the same shortening effect on stressed vowels as the presence of a syllable offset» [*scil.* the first member of a C_1C_2 cluster] (§3.2.2.). (These results are summarized in the tables on p.24.)

Thus Farnetani -- Kori's measurements, like Fava -- Magno Caldognetto's and, in general, experimental work carried out so far in Italian phonetics, confirm that *both* syllable structure *and* the phonetic specification of the following segments affect stressed vowel length. In other words, we do need, in the phonology of Italian, a rule specifying that vowels in stressed open syllables (i.e. in the first two environments from the left in (7)) are long. The output of this rule is then modified by coarticulation effects (or *microprosodic timing rules*, cf. Salza -- Sandri 1986) which translate the allophonic specification [±long] into actual durational values.

As regards open syllables, the hierarchy in (7) could be refined by further analyzing the first context from the left: 'CVCV -> 'CVRV > 'CVLV > 'CVNV > 'CVPV, approximately. Moreover, the shorter duration of the stressed vowels of open syllables in the environment 'CV$\$$PRV, with respect to 'CV$\$$CV, has a straightforward phonetic explanation as well: it depends on an effect of temporal compensation. Clear evidence for this effect is provided by Farnetani -- Kori's (1986: 27) results: «a significant shortening of stressed vowels in open syllables occurs with an increase in the size of the following syllable onset.».[24]

Stressed vowels in closed syllables, on the other hand, have a shorter average duration than stressed vowels in open syllables (as rule (6) does not apply to them). As is apparent in (7), they are shortest before geminates; when stressed vowels are followed by heterosyllabic clusters, a systematic variation in length is observed, depending on the kind of coda consonant (cf. also (8b)). Indeed, the sequence in which postvocalic consonants appear in (7)-

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23 Experimental measurements show that absolute values on scales like (7) or (8) vary greatly across speakers. What is important, however, is that the relative ranking of the items on the scales is fairly constant in spite of cross-individual variation.

24 Farnetani -- Kori's subject 3 has the following mean values for stressed vowels: /'lada/ (258 ms) > /'lata/ (223 ms) > /'ladra/ (183 ms) > /'latra/ (182 ms) > /'larta/ (168 ms) > /'lalta/ (137 ms) > /'lanta/ (130 ms).

(8) corresponds to a great extent to their ordering on a sonority/consonantal strength scale.[25] Thus, one may venture the generalization that the more sonorous a postvocalic consonant, the stronger its lengthening effect on the preceding vowel.[26]

From the foregoing discussion we must conclude that the microprosodic timing rules affecting stressed vowel duration as a function of the number and/or type of following segments operate within the limits established by the allophonic rule (6).[27] This rule, consequently - or, more precisely, the fact that it does not apply to stressed vowels before geminates - entirely retains its value as an argument for the heterosyllabicity of geminates.

3. *Sound changes in Italo-Romance and their environments as diagnostics of syllable structure*

Up to this point our discussion has been limited to SI, with only a few minor remarks on Italian dialects. We will now take a closer look at the latter, since the phonologies of Italo-Romance varieties provide us with a rich set of processes sensitive to syllable structure, which constitute a favourable testing ground for the divergent predictions ((4a) vs. (4b)) made by the two competing analyses of geminates. The results of the scrutiny of the evidence available, to which the next sections are devoted, unambiguously support analysis (1a).

As was noted at the outset (§1), evidence from Italian dialects is not usually brought to bear in the theoretical literature concerned with the analysis of Italian geminates (Trumper -- Romito -- Maddalon 1991 is a remarkable exception, however): this is why I think it may be useful to deal with it at some length in this context, even though the fact that geminates close the preceding syllable is in itself quite an obvious notion for anybody who has even an elementary experience of Italian dialects.

3.1. *Central Italian dialects*

3.1.1. *Tuscan diphthongization*
The diphthongization of lower-mid stressed vowels in Tuscan (hence in SI) affected /E/, /O/ only in open syllables. Vowels followed by geminates, as vowels followed by consonant clusters, remained unaffected:[28]

(9)	open syllable			closed syllable			
	'CVCV	'CVPRV		'CVRPV	'CVSPV	'CVNPV	'CVC:V
/E/	·vjE:ne	·djE:tro		·Erba	·vEste	·vEnto	·pEt:o
	'comes'	'behind'		'grass'	'dress'	'wind'	'chest'

In order to schematically display data pertaining sound changes in the Italian varieties under discussion, I adopt the following convention in (9) and all similar following examples. At the far left between slashes, the diachronic source (late Latin/early Romance) of the vowel

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25 See Vennemann (1988: 20) on the relative ordering of liquids (stronger) and trills (weaker) on such a scale. The only disturbing element in the picture given here is the position on the scale of coda sibilants, for which I have no explanation.

26 This is true of all postvocalic consonants, irrespective of the location of the syllable boundary (whether preceding or following the consonant): cf. Salza -- Sandri's (1987: 63) study on unstressed vowel length for further evidence. See also Bertinetto (1981: 131) on the phonetic explanation of the lengthening effect of coda trills.

27 This conclusion is further confirmed by the following observation by Farnetani -- Kori (1986: 26). They found that, while «the extension of the following syllable onset has some shortening effects on the duration of the preceding stressed vowel in open syllables» (as we have seen from the data quoted in fn.24), «the durations of stressed vowels in closed syllables do not change as a function of the following syllable onset.» In pairs like /'kasta/ vs. /'kastra/, stressed /a/'s duration does not show any significant difference: once closed syllable shortening (or, from a phonological - vs. phonetic - point of view, blockage of lengthening) has applied, the short vowel segment cannot be reduced any further.

28 The issue is much more complicated than this, and it is impossible to deal with it in detail here. (See Rohlfs 1966: 102ff for a general description of the data, including the many exceptions observed; the development of /¿/ presents a less clear picture.) What is interesting to us is only the fact that the environment in which we can at present observe the results of diphthongization is open syllable, whatever the origin and early development of the process may have been (i.e. open syllable lengthening since the very outset - as traditionally agreed on by a majority of scholars and most incisively asserted by Castellani, in reply to competing hypotheses - or metaphony, either indigenous - e.g. Schuchardt, Lausberg - or imported into Tuscany from neighbouring dialects - e.g. Schürr, Franceschi; references in Rohlfs 1966: 106).

nucleus in question is presented, and in the following forms across the same row I include one single word, representative of the development of that vowel in the dialects being cited. The top row schematically represents the relevant syllabic/segmental structures, following the conventions illustrated in (7) above. The ordering of the environments is not random. It coincides with the scale of stressed vowel duration values in (7). As will become apparent from a comparison of (9)-(11), (13)-(16) and (22)-(23), this happens to constitute an implicational scale by means of which the different options in syllabification found in various Italian dialects can be represented - a point that exceeds the scope of the present paper and is discussed in Loporcaro (forthcoming). Crucial to our present concern is the comparison, for each row, of the first column from the right, where the reflexes of vowels followed by Latin or Romance geminates are reported, with all the preceding ones, referring to vowels followed by single consonants or consonant clusters. Note that the first row states that the diachronic source had that structure (e.g. 'CVC:V), at the time the sound change focused on took place: as is apparent from the quoted data, such a structure has often been dramatically modified as a consequence of subsequent changes (such as diphthongization, degemination, final vowel deletion, etc.). Given the relevant parameters, the examples I adduce are as exhaustive as possible: in case a given slot is left unfilled, this is because no relevant data is found in the sources (which I cite in brackets on top of each table, preceded by an approximate geographical localization of the variety at issue). Furthermore, as I am interested in syllable sensitive processes, I have included in brackets those items in which changes of a different nature have taken place (i.e. assimilatory changes caused by neighbouring segments; this is typically the case for vowels followed by tautosyllabic nasals: see (10), (11) and fn.29). These items are quoted only for the sake of completeness, but should not be taken into account.

3.1.2. *Raising of lower-mid vowels in the dialects of Garfagnana and Lunigiana*
In some dialects spoken on the north-western border of Tuscany, early Romance /E/ and /O/ were raised in open syllables. As can be seen in (10) and (11), vowels followed by geminates did not undergo raising, like vowels followed by heterosyllabic consonant clusters.[29]

(10)   Castelnuovo Magra (Lunigiana; Bottiglioni 1911, Masetti 1972-73)

	open syllable			closed syllable			
	'CVCV	'CVPRV		'CVRPV	'CVSPV	'CVNPV	'CVC:V
/E/	·meo			·Erba	·rEsto	('dento)	·fEro
	·honey·			'grass'	'string of onions'	'tooth'	'iron'
/O/	·foko			·kOrni	·pOsta	('fronte)	·fjOko
	'fire'			'horns'	'handful of hay'	'forehead'	'bow'

(11)   Sillano   (Garfagnana; Pieri 1893)

	open syllable			closed syllable			
	'CVCV	'CVPRV		'CVRPV	'CVSPV	'CVNPV	'CVC:V
/E/	·fjela	·pjetr		·Erba	·fEšta	('sempr)	·sEt:´
	'gall'	'stone'		'grass'	'feast'	'always'	'seven'
/O/	·kor	·kob:ra		·mOrt´	·nOštra	('mont´)	·Os:´
	'heart'	'(I) cover'		'death'	'our'	'mountain'	'bone'

3.1.3. *Tensing and laxing in the dialect of Borgo San Sepolcro*
In the dialect of Borgo San Sepolcro (near Arezzo, on the eastern border of Tuscany) three successive changes - first analyzed by Merlo (1929) (see also Zanchi Alberti -- Merlo 1937-39, Weinrich 1958: §185, Nocentini 1985, Tuttle 1991: §4.3.1.) and here summarized in (12a-c) - have radically altered the phonological system.

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29 Before the raising exemplified in (10)-(11), lower-mid vowels underwent diphthongization in these varieties like in Tuscan (cf. §§3.1.1., 3.1.3.): */E/ > */jE/ > /je/ > /e/, and /O/ > */wO/ > */wo/ > /o/. The diphthong /je/ is still found in some words in Sillano: ['fjela] 'gall', ['dječ´] 'ten', whereas */wo/ has left no trace. ['kob:ra] (Sillano) derives from a *copro (= SI) through a process of voicing and lengthening of post-stress plosives (cf. RPTA > ['rod:a] 'wheel', RAPA > ['rab:a] 'turnip'), which has modified syllable structure after raising had occurred. The fact that /E O/ are raised before coda nasals as well has nothing to do with syllable structure but depends on an independent assimilatory process. In Castelnuovo Magra, as in northern Italian dialects in general (see §3.3.), geminates were degeminated: this happened after raising had occurred, as can be seen from the contrast ['foko] vs. ['fjOko] (< *['fjOk:o] = SI).

(12) a.   V   -> [+tense]/__ $\$$
                          [+stress]

      b. C_1C_1 -> C_1/   V __
                          +stress
                          -tense

      c.   V   -> [-tense]/__ C$\$$
                          [+stress]

The statement of this diachronic development is only possible under the assumption that geminates are (and were throughout) heterosyllabic, as is apparent from the exemplification below. First ((12a)), lax vowels, including the diphthongs */jE wO/ (< /E O/), were tensed in open non-final stressed syllables ('CVCV and 'CVPRV): ['œ:po] 'bee' < APEM, ['lo:go] 'place' < *['lwo:go], < ['lwO:go] < LŎCUM, [dje:ʃi] 'ten' < *['djE:ʃi] < DĔCEM, ['pje:tra] 'stone' < *['pj´:tra] < PĔTRAM; original [a], [E] and [O] were preserved in closed syllables (['palmo] 'palm', ['ɲaspo] 'reel', ['anʲʧo] 'breath', ['ɲEnte] 'nothing', ['ɲEspElo] 'medlar', [ka'tOrʧo] 'bolt') as well as before geminates: ['ka:pa] 'cape', ['sE:te] 'seven', ['kO:to] 'cooked'. As these examples show, geminates were subsequently degeminated (by rule (12b)) after lax vowels, with degemination then feeding open syllable lengthening: CAPPA > /'kapa/ -> ['ka:pa] (stressed vowels in non-final open syllables are non-distinctively long, like in SI).[30] After degemination, tense vowels became lax in closed syllables (i.e. when followed by consonant clusters - except /CR/ - or geminates): ['vIsto] 'seen', ['ʧIŋkwe] 'five', ['trIp:a] 'tripe' (vs. ['ni:do] 'nest'), ['busto] 'bust', ['frut:o] 'fruit' (vs. ['lu:na] 'moon'); ['fErmo] 'steady', ['vEnti] 'twenty', ['ʧEp:o] 'stump' (all with original */e/, preserved in ['pe:pe] 'pepper', ['ve:tro] 'glass'); ['mOska] 'fly', ['kOrto] 'short' (with original */o/, preserved in [ni'po:te] 'nephew').

3.2. *The dialects of South-Eastern Italy*
The dialects of Abruzzi, Molise, Apulia, and Lucania display a number of processes sensitive to syllable structure, both in their diachronic development and in their synchronic grammars. Stressed vowels in penultimate and final open syllables have undergone, in these varieties, dramatic changes (mainly through colouring and/or diphthongization) which represent - according to the standard view (see e.g. Weinrich 1958: chs.8-9) - the further, extreme and divergent development of a rule of open syllable lengthening like the one presently observed in SI (cf. (6)) and reconstructible for early Romance.[31] In what follows I will quote only some selected data (but as similar processes are found in all of the dialects spoken in the area, the list of relevant evidence could be virtually endless), in order to illustrate that vowels followed by geminates were/are never affected by these processes. Consequently, prediction (4a) is borne out for these varieties as well.
In the tables (13) to (15), the diachronic sources specified in the first column must be interpreted as follows: a word occurring in the row beginning with the symbol /i/ (or /u/) derives either from a Latin form with /i:/ (or /u:/) or, when no such examples were given in the quoted literature, a form containing a secondary /i/ (/u/) (in turn derived from metaphonic raising of /e/ (/o/) which took place in these dialects prior to open syllable diphthongization/colouring etc.). In the 'CVSPV column words containing /ʃC/ clusters (found in these varieties, unlike in SI: see also (11) above) show up as well. Under 'CVRPV I have included also words containing /LC/ clusters, both because of phonetic/phonological similarity and because the two classes never display any significant difference in the diachronic development of the varieties under discussion.

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30 In spite of what is claimed by Weinrich (1958: §185), vowel length has never become phonologically relevant: long and short vowels have remained in complementary distribution throughout. Needless to say, rule (6) in this variety, as well as in SI, can be easily described only under a heterosyllabic analysis of geminates.

31 Actually, there is here a further complication that I am not introducing at this point so as to simplify the exposition. Rule (6) was modified in these dialects and subsumed under a broader constraint on moraic weight (on which see §3.2.1. below).

In the dialect of Agnone, all stressed vowels in open syllables have undergone (different kinds of) diphthongization. The exemplification in (13) is limited to the reflexes of late Latin /a/ and /i/:

(13)   Agnone (prov. Isernia, Molise; Ziccardi 1910)
open syllable | closed syllable

	'CVCV	|	'CVPRV	'CVRPV	'CVSPV '	CVNPV '	CVC:V
/a/	·sɐan´		'latr´	'mald´	'm:aš̆t´	'kwand´	'kwa¥:´
	'whole'		'thief'	'mortar'	'pack-saddle'	'how much'	'rennet'
/i/	v´č̆oin´		'č̆itr´	s´n'dirl´	·lisk´	·č̆iNg´	'fi¥:´
	'near'		'boy'	'to hear him'	'bait'	'five'	'son'

As is apparent from (13), /a/ -> [ɐa] and /i/ -> [oi] failed to affect stressed vowels unless in the environment 'CVCV. (13) also makes apparent another interesting fact: unlike SI, stressed vowels in 'CVPRV did not take part in open syllable diphthongization, from which we can conclude that obstruent+*r* clusters are (or were, by the time the changes took place) heterosyllabic in this variety. This is a common feature of all the dialects discussed in the present section, spoken all over south-eastern Italy, as shown by (14)-(17) as well. I will not dwell on this point any longer here (see discussion in Loporcaro forthcoming).

In the northern Apulian dialect of Cerignola /a/-fronting, /u/-centralization and the diphthongization processes which modified all the remaining stressed vowels - as shown in (14) - have applied in 'CVCV environments but never to vowels preceding geminates:

(14)   Cerignola (prov. Foggia, Northern Apulia; Zingarelli 1899)
open syllable | closed syllable

	'CVCV	|	'CVPRV	'CVRPV	'CVSPV	'CVNPV	'CVC:V
/i/	'spoik´		p´'d:itr´	'firm´	'vist´	č̆iŋg´	'fig:j´
	'spike'		'colt'	'steady'	'seen'	'five'	'son'
/e/	'sEir´		p´'d:Etr´	'vErd´	'mud:Esk´	'Eŋgj´	'stEd:´
	'evening'		'filly'	'green'	'slack' (f.sg.)	'to fill'	'star'
/E/	'mEil´		'lEb:r´	'vErm´	f´'nEst´	p´t:sEnd	č̆´r'vEd:´
	'honey'		'hare'	'worm'	'window'	'beggar'	'brain'
/a/	'næt´		'kwatr´	'alt´	'raš̆k´	jaŋg´	'ag:j´
	'(I) swim'		'picture'	'high'	(he) scrapes'	'white'	'garlic'
/O/	'vouv´		'Opr´	'fOrt´	'ɲ:Ostr´	'lOŋg´	'fOg:j´
	'ox'		'work'	'strong'	'ink'	'long (f.)'	'vegetables'
/o/	'skrouf´		'Otr´	'fOrk´	'kOst´	'tOmb´	'vOk:´
	'sow'		leather bag'	'fork'	'(it) costs'	'tomb'	'mouth'
/u/	'sÁ:k´			'surg´	'muš̆k´	'numbr´	'nud:´
	'sauce'			'mice'	'humerus'	'number'	'nothing'

Although the processes involved differ considerably in their segmental consequences from dialect to dialect, the guidelines of the diachronic development remain constant all over the area and, as for the aspect which concerns us, trace a unified design. I next give, in (15), an overview of the vowel system of the dialect of Bisceglie (central Apulia). In this dialect as well, various diphthongization processes (/i/ > /Øi/, /e/ > /ai/, /o/ > /au/, /u/ > /iu/) have affected stressed vowels only in the environment 'CVCV, leaving vowels preceding geminates and consonant clusters (including *muta cum liquida*) unchanged: (The same goes for /a/ > /O/; the diachronic developments of /E/ and /O/ are too complex to be dealt with here: cf. Lüdtke 1956: 162, Papa 1981: 97ff, Loporcaro 1988a: 68ff.)

(15)   Bisceglie (prov. Bari, Apulia; De Gregorio 1939, Cocola 1925)

open syllable		closed syllable				
	'CVCV	'CVPRV	'CVRPV	'CVSPV	'CVNPV	'CVC:V
/i/	'føik´	'vitr´	'spird´	'krist´	'spiNgw´	'fig:j´
	'fig'	'glass'	'spirit'	'crest'	'pin'	'son'
/e/	'paip´	a'l:ẹgr´	'vẹrd´	'pẹsk´	'strẹnǧ´	'stẹd:´
	'pepper'	'happy'	'green'	'peach'	'to clasp'	'star'
/E/	'dEǧ´	'pekr´	'erv´	f´'nestr´	'dend´	'set:´
	'ten'	'sheep'	'grass'	'window'	'tooth'	'seven'
/a/	'køp´	'latr´	'varv´	'mbjastr´	('stEŋg´)	'kjat:s´
	'head'	'thief'	'beard'	'poultice' '	bar'	'square'
/O/	'vov´	'ọpr´	'tọrǧ´	'pọst´	'lọŋg´	'nọt:´
	'ox'	'work'	'to twist'	'stake'	'long (f.)'	'night'
/o/	'krauǧ´	'otr´	'vors´	'mosk´	'romb´	'tos:´
	'cross'	'leather bottle'	'bag'	'fly'	'to break'	'cough'
/u/	'miut´	'futr´	'purg´	'ǧ:ust´	'truɾŋg´	'nud:´
	'funnel'	'damps'	'purge'	'right'	tree-trunk'	'nothing'

In (13)-(15) I have exemplified sound changes resulting either in restructuring in the underlying form (as in (15)) or in rule addition.[32] A further example of the second kind, concerning the phonetic realization of phonemic /I/ in the Apulian dialect of Altamura, is shown in (16); like the one in (13), it demonstrates that the generalization concerning the heterosyllabic status of geminates is still valid as a statement about the current grammars of these dialects.

(16)   Altamura (prov. Bari, Apulia; Loporcaro 1988a)

open syllable		closed syllable				
	'CVCV	'CVPRV	'CVRPV	CVSPV	'CVNPV	'CVC:V
	/fɪl´/	/'vɪtr´/	/'spɪrd´/	/'vɪst´/	/'ǧɪng´/	/'skrɪtt´/
->	['fɪi̯l]	['vɪtɾ]	['spɪrd̥]	['vɪst]	['ǧɪNg]	['skrɪt:]
	'thread'	'glass'	'spirit'	'seen'	'five'	'written'

As is apparent from (16), the appropriate environment for the diphthongization PR /I/ -> [Ii̯] can be characterized as 'CV(CV) (open stressed (pen)ultimate syllable).[33] Geminates - as well as other consonant clusters - do not constitute a favourable environment for the rule to apply.

3.2.1. *Syllable structure and moraic weight*

In all the examples provided in (13) to (16) to document syllable structure sensitive changes affecting stressed vowels, only paroxytone bisyllables have been taken into account. However, if the corpus is enlarged to encompass polysyllabic oxytones and proparoxytones as well, one gets the results displayed in (17):

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32 Evidence for this distinction is provided by the divergent properties of the outcomes of diphthongization (or similar foregrounding processes) in, say, Agnone vs. Bisceglie. In the dialect of Agnone, for instance, /i/-diphthongization is still synchronically a PR, as shown by the fact that its application is phonologically conditioned. The rule applies only if the relevant words bear sentence main stress (i.e., occur prepausally): [fi pwo m´'noj:´] 'can you (sg.) come?' vs. [ᵃ pwo m´ᵃni ad:´ mẹan´] 'can you (sg.) come tomorrow?' (Ziccardi 1910: 417). (PRs such as this, found in many southern Italian dialects - cf. Loporcaro 1988a: 179-183 - are historically related to the SI rule (6): in fact, the latter PR as well applies prepausally, as shown by Bertinetto's 1981 experimental results, quoted in fn.20 above.) In the dialect of Bisceglie, on the other hand, /i/-diphthongization resulted in restructuring (> /øi/), as shown by the fact that /øi/ in, say, [a'vøit´] 'you (pl.) have' or ['døiǧ´] 'say' does not alternate with /i/ any longer, irrespective of the prosodic environment: cf. [ᵃ viw´ a ᵃ vøit´ ar:´ vøt´] 'you (pl.) have arrived', [ᵃ kom´ ᵃ døiǧ´ 'tiw´] 'as you (sg.) say' (De Gregorio 1939: 50).

33 Things are a bit more complex actually. This is only a part of a more general rule which turns all non-low vowels into diphthongs in the context specified and applies only to words in prepausal position, since they bear main sentence stress (cf. Loporcaro 1988a: 159ff).

(17) a. 'CVCV = ...CV"CV ≠   b. 'CVCCV = 'CVC(C)VCV

Take for instance /a/-velarization in Bisceglie (see (15)): it has applied in stressed ultimate syllables ([n´kO] 'to drown' < NECA(RE)) but never in antepenultimate stressed polysyllables, independently from the number of consonants following the stressed vowel: e.g. ['rat´k´] 'root', ['sar̆´n´] '(wood)faggot'. This means that 'open syllable' is not in itself a sufficient characterization of the environment in which such changes took place (and, as a matter of fact, both in my previous remarks and in the descriptive literature the relevant environment is further specified as 'open syllable of paroxytones and oxytones'). Savoia (1987: 240) has proposed that the contrast (17a) vs. (17b) can be captured in terms of morae. Slightly modifying Savoia's proposal (see also Savoia 1990), we can represent the environment for all the rules under discussion as follows (the structural change is expressed generically):

(18) A -> B/_μ_0^1#

This restatement does not impinge, however, on the results of our foregoing discussion focussing on geminates. Syllabification is, in fact, a pre-requisite for mora-assignment: given a 'CVPRV string, for instance, we first have to syllabify it (and 'CVP$RV is what we get in these varieties) in order to be able to assign moraic weight to the plosive, which would not be the case if that segment were part of the onset of the following syllable.[34] The relevance of syllabification to the rules at issue is marginal in the case of proparoxytones, since the two syllables following the stressed vowel already provide the two morae necessary to block the rules (as in (17b)). But in the case of paroxytones, as mentioned, the assignment of the second mora (hence the blockage of the rule) crucially depends on how the consonant cluster - if present - is syllabified.

As a consequence, the vocalic processes presented in §3.2., even if described in terms of morae, still retain their validity as diagnostics for syllable structure in all the cases taken into account here. All the evidence discussed, therefore, points to the correctness of a heterosyllabic analysis of geminates for the dialects spoken all over south-eastern Italy.

3.2.2. /w/-insertion in Lucanian

In the Lucanian dialect of Stigliano, there is an AMR of /w/-insertion and/or vowel velarization, which is triggered by the morpheme /l´/ object clitic or definite article m.sg. (as well as by some other determiners).[35] The rule applies to all non-back vowels, both word-internally and in sandhi, but the exemplification in (19) is limited to external sandhi and to the vowel /a/ for the sake of expository simplicity:[36]

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34 This is analytically true under the traditional, theory-neutral definition of the mora as, roughly, something of which a heavy syllable consists of two and a light syllable consists of one. But it is also true, if perhaps less obviously, within the framework of moraic phonology (cf. Hayes 1989: 259, elaborating mainly on Hyman 1985, who inspires Savoia's account). In fact, in this framework only moraic structure, not syllable structure, is represented in the underlying form. Consonants (including clusters) are not assigned a mora underlyingly, unless they are geminates or syllabics. In languages in which checked syllables count as heavy (as is the case for Latin, Romance and probably most others), an adjunction convention assigns a mora to consonants which are not yet linked after the assignment of syllable nodes and after onset creation. In our case, by this point in the derivation we know that the plosive in 'CVPRV is not syllabified in the onset, which implies that it must be in the coda.

35 The reader is referred to Savoia's (1987) in-depth description and analysis for further detail. There are a number of Italian dialects in which w-insertion in this context is observed; similarities and differences between w-insertion rules across dialects are discussed in Tuttle (1985) (see also Loporcaro 1988a: 185-194).

36 The rule was a (M)PR in some former stage of the language (and it still is in some related varieties: cf. Savoia 1987: 255ff), when the triggering morphemes contained a high back round vowel, which was subsequently lost (*/lu/ > /l´/) thereby causing the rule to lose its phonetic motivation and become an opaque AMR. Its application is presently triggered by the features [m.sg.] and [+definite] (cp. the contrasts [±def] in (19a), and [±masc] in (19b-c)). Savoia's analysis differs from mine in that he assumes that the underlying representation of the morphemes triggering the rule has not been restructured (/lu/ -> [l´]): this enables him to formulate the rule in purely phonological terms. This difference, however, is immaterial to our present concern.

(19) Stigliano (Prov. Potenza, Lucania; Savoia 1987)
   a. i) 'CVCV   ['na:s´] 'nose' vs. [l´ 'nO:s´] 'the nose'
       ii) 'CVCV   ['ka:n´] 'dog' vs. [l´ 'kwO:n´] 'the dog'
   b. 'CVC$_1$C$_2$V   [la 'raʃk´] 'I scratch it:fsg' vs. [l´ 'rwaʃk´] 'I scratch it:msg'
   c. 'CVC:V   [la 'fan:´] 'they do it:fsg' vs. [l´ 'fwan:´] 'they do it:msg'

As a consequence of this rule, /a/ turns to /O/ in open stressed penultimate syllables, when preceded by a non-velar consonant (after a velar consonant /a/ -> /wO/). In closed syllables (see (19b)), /a/ -> /wa/ is observed instead of /a/ -> /(w)O/ in the appropriate contexts. Vowels followed by geminates (see (19c)) pattern with vowels followed by consonant clusters, which implies that they close the preceding syllable.

3.3. *Northern Italian dialects*
The vowel systems of the dialects of northern Italy have also been modified by many syllable conditioned processes, in the course of their diachronic development. One major difference between northern and southern Italian dialects is that the former have taken part in consonant degemination, a process which has affected all Romance varieties but Sardinian and central and southern Italian. Quite obviously, the synchronic systems of varieties in which geminates have been lost are not directly relevant to our present concern. Nevertheless, present reflexes of vowels - wherever they have undergone syllable-conditioned changes - allow us to infer which was the syllabic status of geminates before they were lost.

3.3.1. From allophonic to phonemic vowel length
For a past stage of these dialects, as well as of the previously considered ones, scholars agree on positing a rule like (6), which derived allophonically long vowels in stressed open non-ultimate syllables and was at work before degemination took place (see e.g. Weinrich 1958: chs.8-9, esp. §208). After degemination some varieties have transformed the allophonic short/long alternation into a phonemic length contrast. Consider the following data, from Friulian:[37]

(20)   Friuli   (Bender -- Francescato -- Salzmann 1952, Frau 1984)
a.   'CVCV   ≠ b. 'CVC$_1$C$_1$V   = c. 'CVC$_1$C$_2$V
['li:s]   'worn (out)'   ≠ ['lis]   'smooth'   = ['spirt] 'spirit'
['la:t]   'gone'   ≠ ['lat]   'milk'   = ['mars] 'March', ['stramb] 'odd'

Needless to say, a heterosyllabic analysis of geminates is necessarily implied, for all past stages in the development of Friulian dialects preceding the application of degemination. Geminates, as long as they were there, must have closed the syllables preceding them, since they prevented vowel lengthening from applying: this can be inferred from the fact that we have today a (contrastively) short vowel in (20b), like in (20c).
The same goes for the dialects of Canton Ticino, as is apparent from the length contrast exemplified in (21a-b):

(21)   Mendrisiotto (Canton Ticino; Lurà 1987)
a. 'CVCV   ≠   b.   'CVC$_1$C$_1$V (= 'CVC$_1$C$_2$V)
    ['pa:k] 'wages'   ≠   ['pak] 'package'
    ['na:s] 'nose'   ≠   ['nas] 'to be born'
    ['pe:s] 'weight' ≠   ['pes] 'fish'
    ['se:k] 'saws'   ≠   ['sek] 'dry'

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37 See Weinrich (1958: §216), Francescato (1966: 130ff), Vanelli (1979) for more detail on vowel length in the dialects of Friuli. The vowel length contrast - which is today found in high and low, not in mid, vowels: as for /u/, cf. the contrast /'lu:s/ 'light' vs. /'lus/ 'luxury' - arose only in case the consonant (cluster) following the vowel became word-final, after all final vowels other than /a/ were lost.

Vowels formerly preceded by either geminates or consonant clusters ((21b)) are today short.[38]

The dialects of Emilia Romagna also display a vowel length contrast, e.g., /e/ ≠ /e:/, /o/ ≠ /o:/ in Bolognese, as in /'meter/ 'to put' vs. /'me:ter/ 'metre', /'fos/ 'I were' vs. /'fo:s/ 'ditch'.[39] For some vowels, the length contrast has combined with qualitative changes which have applied in open syllables. I will limit my exemplification to the case of stressed /a/ in open syllables which, before degemination, underwent fronting to [æ:] (/æ:/ is found today e.g. in Modena, cf. Bertoni 1905: 17, or in Imola, cf. Bottiglioni 1919: 9) and raising to [E:]. The latter development is exemplified in (22) and (23), with data from one northern and one southern Emilian variety, respectively:[40]

(22) Novellara (prov. Reggio Emilia; Malagoli 1910-13)

	'CVCV	'CVPRV	'CVRPV	'CVSPV	'CVNPV	'CVC:V
/a/	'lE:g	'E:ger	'skE:rpa	'a:zma	'mãNda	'ba:s
	'lake'	'sour'	'shoe'	'asthma'	'(he) sends'	'low'

(23) Grizzana (prov. Bologna; my own field notes)

	'CVCV	'CVPRV	'CVRPV	'CVSPV	'CVNPV	'CVC:V
/a/	'mE:l	'lE:der	'fE:ls	'pa:sta	('mE$:ka/'janda)	'va:ka
	'badly'	'thief'	'false'	'dough'	'left' acorn'	'cow'

Here again we have evidence that geminates, as long as they were preserved, patterned with consonant clusters, and more precisely, with /sC/ and (apart from some differences, which are immaterial here) /nC/ clusters.[41] As is apparent from (22)-(23), in effect /a/-fronting - as well as all phonemic changes which are ultimately amenable to open syllable lengthening - has also applied in the environment 'CVRPV/'CVLPV. As this is true of all the dialects of Emilia Romagna, it has become commonplace in the literature to assume for (some past stage in the development of) these varieties a syllabification 'CV$RPV (and 'CV$LPV) (cf. e.g. Schürr 1919: 15ff, 46-8, Uguzzoni 1975: 55f). While this analysis seems to be needed to account for this and many similar sound changes - whose environment cannot be expressed otherwise than as 'open syllable' - it is hard to reconcile with cross-linguistic properties of syllabification. Nor is it easy to prove it by means of evidence from phonotactics, e.g. by looking - as is common practice - at possible word-initial sequences; these dialects are very liberal in allowing consonant clusters word-initially: [dmãN] 'tomorrow', ['stmE:na] 'week', [vze$N] 'neighbour', [bdo:č] 'louse' (examples from the dialect of Bologna; Coco 1970: 36). Historically, all these word-initial clusters arose from syncope, and were left unmodified except when they would have resulted in sonorant+obstruent(s) sequences, in which case a prosthetic [a] was added: [arpu'zE:r] 'to relax', [ar'spaNder] 'to answer', [al'da:m] 'manure', [aM'vaud] 'nephew'. The fact that precisely these clusters were not tolerated word-initially seems to contrast with the assumption of a syllabification 'CV$RPV word-internally.[42] I

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38 Vowels preceding consonant clusters are phonemically short (e.g. /'rOsk/ 'flock', /'punt/ 'bridge', /'kyrt/ 'short', /'Jvelt/ 'quick'), although sonorants bring about a slight (merely phonetic) lengthening of the preceding vowel: ['pu'nt], ['ky'rt], ['Jve'lt] etc. (see Lurà 1987: 31).

39 The data are from Coco (1970: 88), where they are differently, although in my view unconvincingly, analyzed.

40 Stressed /a/ palatalization in open syllable is so widespread throughout this dialect area that it was chosen as a defining isogloss for this group of dialects. After /a/ > /E/ and after the rise of a vowel length contrast, stressed short non-high vowels (*/E a O/) were lengthened in these dialects (> /E: a: O:/. This change explains why - as can be seen in (22)-(23) - we find today long /a:/'s before the reflexes of original geminates, a fact which has nothing to do with the open syllable lengthening PR (6).

41 Vowels before nasals in the dialects of Emilia have undergone changes independent from the syllable sensitive one we are discussing; these changes need not concern us here. See Hajek (1991) on nasalization in Bolognese and Tuttle (1991) for an extensive survey on nasal weakening and vowel nasalization in all northern Italian dialects.

42 The lack of correspondence between allowed clusters in word-initial and word-internal onsets is by no means rare. See e.g. Rubach -- Booij (1990: 123) on Polish. This asymmetry should not be automatically interpreted as a cue for the 'extrasyllabicity' of word initial consonants in the relevant clusters, unless such an analysis is supported by some independent evidence. For instance, Davis (1990) correctly argues that definite article allomorphy in SI <u>il cane</u> 'the dog' vs. <u>lo sparo</u> 'the shot' can be used as evidence for the heterosyllabification of the /sC/ clusters: [lo s$'pa:$ro]. In Bolognese as well as in the other dialects of Emilia-

cannot pursue this issue any further here:[43] what is important to our present concern is the fact that vowels before geminates developed like vowels preceding undoubtedly heterosyllabic clusters, in this group of dialects as well as in the previously considered ones.

3.3.2. *Syncope of protonic mid vowels in Emilia Romagna*

Now I briefly come to one last example, in which at first glance prediction (4b) (rather than (4a)) may well appear to be borne out. In the preceding section, I have mentioned the syncope which took place in all dialects of Emilia Romagna, and had the effect of deleting protonic unstressed mid vowels occurring in open syllables:

$$(24) \qquad \begin{bmatrix} -high \\ -low \end{bmatrix} \rightarrow \emptyset / C_0^n \underline{\quad}\ ^\$ X \qquad \text{(where X is an arbitrary phonemic string containing a stressed vowel)}$$

Now, if one directly compares the (Latin) etyma with their present reflexes one sees that /e/'s and /o/'s seem to have been deleted when they were followed by either an intervocalic consonant or a geminate, whereas they were preserved before C_1C_2 clusters. The data in (25) are from the dialect of Novellara; I give the Italian counterparts as well, since they largely coincide with the diachronic antecedents to be assumed for the corresponding Emilian words:

(25)   Novellara   (prov. Reggio Emilia; Malagoli 1910-13)
          $CV\acute{C}V$ = $CVC_1\acute{C_1}V$
['zdu:] *seduto* 'sat', ['vde:va] *vedeva* '(he) saw'   =
['stã:Nta] *settanta* 'seventy', ['pkE:r] *beccare* 'to peck'   (< */e/ ... ')
['kvE:rta] *coperta* 'blanket', ['klõNb] *colombo* 'pigeon'   =
['pkõ:N] *boccone* 'mouthful', ['plõ:N] *pollone* 'side-shoot'   (< */o/ ... ')
          $CVC_1\acute{C_2}V$
[ser'pe\$:Nt] *serpente* 'snake', [teN'pesta] *tempesta* 'storm',
[vres'pE:r] *vespaio* 'wasps' nest'   (/e/ ... ')
[for'mi:ga] *formica* 'ant', [roN'ki:na] *roncola* 'pruning-hook',
[mos'ta:s™] *faccia* 'face'   (/o/ ... ')

A moment's reflection, however, is sufficient to understand that things are not as they might seem. The seeming exception disappears if we consider that syncope is a relatively recent process, peculiar to the dialects of Emilia Romagna. These dialects underwent degemination much earlier than syncope, so that the latter did not in fact apply in $CV\acute{C}V$ *and* $CVC_1\acute{C_1}V$ but only in $CV\acute{C}V$ environments, both original and derived from earlier $CVC_1\acute{C_1}V$. I am aware that the case may appear too obvious to deserve mentioning: but it is extremely difficult to find - among the many types of sound changes and phonological rules observed across Italian dialects - any, even only apparent, counterexample to (4a).

4. *Conclusion*

The discussion carried out in this paper was meant to weigh down the burden of proof for future proponents of a tautosyllabic analysis of Italian geminates. As I have shown, the body of relevant phenomena which are easily accounted for under (1a) and very difficult to deal with under (1b) is much wider than often assumed by scholars who have engaged in the debate. This can be easily understood as soon as geographical and diachronic phonological variation within Italo-Romance is taken into consideration.

The limited scope of the present contribution has prevented me from discussing at length some related issues: in particular, the evidence presented to illustrate the syllabification of

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Romagna, on the other hand, no such evidence can be found concerning word-initial clusters. The definite article m.sg., for instance, is /al/ whatever the number of word-initial consonants, whereas under the hypothesis of an extrasyllabic status of word-initial clusters we should expect, say, an epenthetic vowel to be inserted: [al 'kE:ld] 'the warmth', [al 'zda:s™] 'the sifter' (SI <u>setaccio</u>), [al ·fno:č] 'the fennel' (SI <u>finocchio</u>), [al 'bdo:č] 'the louse' (SI <u>pidocchio</u>), [al 'zbdE:l] 'the hospital' (Old Italian <u>spitale</u>).

43 If we accept the analysis traditionally proposed for these dialects, with the syllabification 'CV$^\$$RPV then - as argued in Loporcaro (forthcoming) - the syllable structure change that should be assumed ('CVR$^\$$PV > 'CV$^\$$RPV) can be elucidated in the light of the scale of stressed vowel length in (7).

geminates in Italian dialects invites more detailed discussion on syllable structure and syllable structure changes in Italo-Romance varieties; this will be the subject of a forthcoming paper.

A major concern of my contribution has been a plea of the generalization about the phonology of Italian expressed in (6). This PR has traditionally been considered as providing evidence in support of the analysis (1a), since its environment can be stated as 'open (non-final) syllable' and since it does not apply to vowels before geminates. While the existence of this PR has been denied by proponents of (1b), who have pointed out the alleged inconsistency of the rule with data on vowel length available from work in experimental phonetics, I have shown that a closer inspection of the interplay of phonological and phonetic factors determining stressed vowel length in Italian confirms, rather than disproves, the correctness of (6).[44]

The fact that it has proven possible to reconcile phonetic and phonological evidence, to give a consistent picture of Italian vowel length, should be regarded as a positive result by those who feel that phonology and phonetics are interrelated and interdependent (see e.g. Hurch 1989: 11, Ohala 1990), more than has been implied by many current approaches to phonological theory.

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44 I have also drawn attention to the fact that (6) is not an isolated descriptive statement about SI, but rather one of the very pillars of Italo-Romance (indeed Romance) historical phonology.

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