Constraints and Preferences

Edited by
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Contents

Rules vs. constraints in modeling phonological change: the case of Raddoppiamento Fonosintattico*

Michele Loporcaro

0. Introduction

For those trained as linguists during the second half of the twentieth century, the notion of rule has come to be considered as a matter of course, as something intrinsic to our understanding of linguistic structure. Things have been changing recently, though. While the term "rule" continues to be used, there is now an increasing shift towards non-dynamic (i.e. static, or "declarative") models of linguistic description. In these models, whose most successful representative is nowadays Optimality Theory (henceforth **OT**), the grammar of any specific language is described as the product of a ranking of universal violable constraints selecting among candidate outputs. Thus, the rule component is dispensed with.

In this paper, I will tackle the question from the vantage point of phonological change. Many instances of change which were previously described as changes in the rule component have been recently reanalyzed within OT as the product of constraint re-ranking. Consider for instance Löhken's (1997) treatment of vowel lengthening in Middle High German. No lengthening rule is assumed (see e.g., the rule in Vennemann 1972: 191). At stage (1a) a constraint FILL-μ, preventing lengthening, outranks STRESS-μμ, imposing that all stressed syllables be bimoraic; the reverse is true in (1b), and this reversal represents the change.

(1) Löhken (1997): vowel lengthening in Middle High German (e.g., [tu.gent] > [tū.gent])

a.

	input: /tugent/	undominated constraints	FILL -μ	STRESS -μμ	non-selective constraints	FOOT-MAX(μ)
☞	1. [tu.gent]			*		*
	2. [tuu.gent]		*!			**

b.

	input: /tugent/	undominated constraints	STRESS -μμ	FILL-μ	non-selective constraints	FOOT-MAX(μ)
	1. [tu.gent]		*!			*
☞	2. [tuu.gent]			*		**

One argument often mentioned when comparing the relative merits of static vs. dynamic descriptive models, is that the former directly allow for the expression of what is universal in language, whereas rule-based descriptions, it is claimed, are confined to the language-specific dimension. From the point of view of the historical linguist, I must say that I cannot see anything inconvenient about being language-specific. It is, of course, part of the task of historical linguistics to try to detect constant factors, found to be at work cross-linguistically in different instances of change. But there is also a highly language-specific aspect about doing historical linguistics, one which is rooted in the object itself: history is by definition "specific", not general or universal.

In what follows, I will present some considerations as to how we should best describe phonological change, whether with rules or with constraints. To do this, I will take into consideration an example drawn from the diachronic phonology of Romance languages, viz. the historical development of Italian Raddoppiamento Fonosintattico (henceforth **RF**).

The paper is organized as follows. In §1 I first sketch briefly the synchronic working of RF in modern standard Italian, and state the diachronic problem which we will have to deal with. §2 reviews the alternative diachronic explanations which have been put forward for the rise of RF. Since it turns out that reanalysis was crucially involved in this historical development, §3 briefly discusses the notion, arguing that constraint-based models bring us back to lack of distinction between reanalysis and analogy. Finally, §4 discusses a re-

cent OT account of RF and addresses some general problems concerning the modeling of postlexical sandhi processes within OT, compared with more traditional, rule-based models.

1. Raddoppiamento Fonosintattico: the synchronic facts and the diachronic questions to be asked

RF consists of lengthening of a word-initial consonant, triggered by a preceding word with stress on the final vowel, be it a polysyllable or a stressed monosyllable (2a-b).

(2) a. *farò* [b:]*ene* 'I'll do well' (oxytones)
b. *sto* [b:]*ene* 'I'm fine' (stressed monosyllables)

The examples in (2a-b) instance phonologically regular RF: all words ending in a stressed vowel regularly trigger it (including loans or nonce forms). This is informally stated in rule (3):

(3) C → C:/ V́ # __ [where # = $][1]

In work grounded in Generative Phonology over the past three decades (cf. Saltarelli 1970, 1983; Vogel 1978, 1982: 66 ff.; Chierchia 1986; Kaye et al. 1990: 206; Sluyters 1990: 92; Bullock 1991: 115; Nikiema 1992: 11), it has been proposed that there is no separate rule of RF, but rather, that RF reduces to an epiphenomenon of a general constraint on syllabic quantity, a constraint which is seen at work in (4):

(4) a. *cane* 'dog' CV́:CV (V: = ~200 ms)
canne 'reeds' CV́C:V (V́ = ~100 ms)
b. *farà* 'will do' ... CV # (V́ = ~100 ms)
c. *farà bene* (*-V́ C-) → *farà* [b:]*ene* 'it'll do well'

In Italian, stressed vowels are short in closed syllables and long in open syllables ((4a)), except word-finally ((4b)), where they are also

short. Thus it has been proposed that RF is simply a repair strategy to prevent the creation of illegal patterns such as the one which would arise in (4c) (with a stressed short vowel followed by a short initial consonant), if RF did not apply.

Of course, this explanation cannot be directly equated with analyses making use of violable constraints *à la* OT. The basic idea underlying the approach in (4c) is of the type which has now found its fullest expression within OT: the attempt to reduce the weight of the rule component in linguistic description, and to shift the 'work' performed by a grammar from rules to representations (and constraints on output representations).[2]

I have already shown elsewhere why an account of RF as a well-formedness constraint has to be rejected (cf. Loporcaro 1988: 349–352; 1997a: 11; I will review the topic briefly in §4.1 below). In what follows, I will simply talk about "stress conditioned RF", assuming rule (3).

Before we consider the diachrony of RF, a further piece of information needs to be introduced along with the regular RF of (2), there is also a phonologically non-regular RF, triggered by the items listed in (5). This verson of RF applies after some non-stressed monosyllables (5a) and after a handful of polysyllabic words which are not stressed on the final vowel (5b):

(5) a. *e* [t:]*u* 'and you' (*a* 'to', *da* 'from', *e* 'and', *o* 'or', *ma* 'but', *né* 'nor', *tra, fra* 'between')

b. *cóme* [t:]*e* 'like you' (*cóme* 'like', *dóve* 'where', *quálche* 'some')

RF in (5a-b), unlike in (2a-b), is not amenable to a phonologically transparent condition: there is no final stress preceding the target consonant here, yet this does undergo gemination. The morphemes belonging to the lists in (5a-b) must simply be marked in the lexicon by means of a rule feature [+RF], as shown in (6):[3]

(6) $C \rightarrow C\text{:} / [\_\_]_{Wd}\ \#\ \_\_$ [where # = $]
$|$
[+RF]

This synchronic irregularity, though, has a straightforward historical explanation. The Latin antecedents of the words in (5) all ended in a consonant, which were assimilated to the following word-initial consonant in sentence phonetics, thereby yielding gemination. This is shown in (7):

(7) ET VIDES > *e* [v:]*edi* 'and (you) see'
*QUOMODO+ET ME > *come* [m:]*e* 'like me'

Then the final consonants were lost from phonemic representation; and the process became lexicalized, as expressed by the rule feature in (6).

Now, the question the historical linguist has to ask is what exactly is the historical relationship between irregular RF (in (5)) and regular RF (in (2)), triggered by final stress. In fact, as shown in (8) and (9), not all words with stress on the final vowel have lost a final consonant: RF is found after final stress, both in (8a) *che* [v:]*edi*, where a final consonant was in the etymon, and in (8b) *tu* [v:]*edi*, where no consonant was ever present to assimilate historically.

(8) a. QUID VIDES > *che* [v:]*edi* 'what do you see'
b. TU VIDES > *tu* [v:]*edi* 'you see'

(9)

assimilation	stress
+	–
+	+
–	+

examples:
(7) ET VIDES
(8a) QUID VIDES
(8b) TŪ VIDES

The diachronic issue can in turn be analyzed into two subproblems. Once we take for granted that RF in (5) was triggered by assimilation, as shown in (7), a) what exactly happened in (8a)? Was assimilation responsible for the genesis of RF in this case as well?

And b) what happened in (8b), where no final consonant was ever there? How exacly did final stress begin to act as a trigger of RF?

2. The rise of Raddoppiamento Fonosintattico: two alternative hypotheses

As I mentioned at the outset (§1), it is the contention of recent work in generative phonology that regular RF is the product of a general output constraint on syllabic quantity (as seen in (4a-b)). This explanation has been extendend from synchrony to diachrony, to account for the rise of regular RF in the history of Italian.

The authors mentioned in (10) have proposed that regular RF (2) arose in Proto-Romance, as a by-product of the collapse of Latin contrastive vowel quantities.

(10) Korzen (1980), Vincent (1988), Repetti (1991)

a.	QUID VIDES	> **ké vedi*	> *ke* [v:]*edi*
b.	TŪ VIDES	> **tú vedi*	> *tu* [v:]*edi*
		final C loss V̄-shortening	RF

As shown in (10), a conspiracy is assumed: on the one hand, final consonants were dropped (10a), and on the other hand final long vowels were shortened (10b). The two processes converged to create an illegal pattern in which a stressed short vowel was followed by a short consonant. Hence RF was born, as a sandhi application of the same constraint seen in (2a-b), which bars such strings within words. This view is summarized in (11):

(11) Regular RF as the product of a constraint on syllable quantities
   a. regular (stress conditioned) RF is Proto-Romance;
   b. it arose as a by-product of the collapse of Latin contrastive vowel length.

In Loporcaro (1997a) I have argued for an alternative view, which is summarized in (12):

(12) Regular RF as a sandhi rule, born through reanalysis
  a. regular (stress conditioned) RF is not Proto-Romance;
  b. it arose later, only in some Romance varieties including Tuscan (on which standard Italian is based), from the reanalysis of assimilatory gemination at word boundary, of the kind illustrated in (7).

This alternative view is presented more analytically in (13)-(14):

(13)

		a. /et vides/	b. /dat pane(m)/	c. /tu vides/
1st stage	sandhi assimilation (spoken Latin)	[v:]	[p:]	[v]
2nd stage	irregular RF (whole Romance)	[v:]	[p:]	[v]
3rd stage	regular RF (Tuscan & Gallo-Romance)	[v:]	[p:]	[v:]
	final stress:	–	+	+
	final consonant:	+	+	–
gray	= gemination			
white	= no gemination			

(14) a. stage 1 > 2: Loss of final consonants from the underlying representation. Its input being lost, gemination is reanalyzed as triggered by an idiosyncratic feature of the lexical items involved (= irregular RF, cf. (5))
  b. stage 2 > 3: Gemination in (13b) is reanalyzed as triggered by a preceding final stress (= regular RF, now extended to (13c)).

There is a wealth of evidence in favour of the account in (12-14) that can be gleaned from inspection of ancient texts as well as from comparison of modern Romance languages and dialects. This evi-

dence is discussed in detali in Loporcaro (1997: 41–117). A very brief summary of the crucial facts allowing us to posit the three subsequent stages (13a-c) would include the following. In the first stage in (14) – say, in spoken (late) Latin – final consonants were assimilated to following initial consonants, yielding a geminate in both (13a) and (13b): that is, regardless of stress. Evidence for this fact, which largely goes unnoticed in Latin handbooks, is found in Latin inscriptions. A few examples of recorded assimilations are given in (15a), whereas (15b), a distich from a Pompei inscription, would be metrically corrupted unless we assume that the string *ama valia peria qui* ... was actually pronounced *ama* [b:]*alia* [p:]*eria* [k:]*ui* ... (cf. Fanciullo 1997):

(15) a. *sud die* (= *sub die*) CIL V 8280, *at tuos* (= *ad tuos*) CIL VI 31066, *emmimoriam* (= *in memoriam*) CIL III 14014;
b. *quisquis ama valia, peria qui nosci amare*
bis [t]anti peria, quisquis amare vota (CIL IV 1173)

No gemination is found in (13c) TU VIDES, at this stage, as in *tu* [v]*ides* there is no final consonant, and hence no possible input to gemination.

The development from stage 1 to stage 2 is due to an independent change (cf. (14a)): final consonants are lost prepausally and before vowels and, consequently, they disappear from underlying representation, a very well known change from Latin to Romance. But for our sandhi clusters in (13a-b) this loss had no effect at the surface. The sandhi geminate in e.g., [e ˈv:e:di] (13a) is preserved. Evidence for this preservation comes from the fact that this geminate has been carried over all the way to modern standard Italian, as seen in (5). However, this geminate underwent reanalysis: at stage 2, it was no longer the product of a sandhi assimilation, since final consonants had disappeared from the input, but it was reanalysed as depending on a lexical idiosyncrasy of words like those in (13a-b), that is, of all the words which had lost a final consonant.

Conclusive evidence for this stage 2 comes from comparative data. Sardinian, as well as all the dialects spoken in southern Italy

never developed a regular, stress-conditioned RF. In other words, all of these varieties still are at stage 2, today. In (16) this situation is exemplified with data from Neapolitan:

(16) a. [ˈkə ˈdːiːʃə] 'what are you saying' < QUID DICIS (= (13b))
b. [ˈki ˈriːʃə] 'whom are you saying' < QUI DICIS (= (13c))

RF occurs in (16a) after [ˈkə], a stressed monosyllable which has lost a final consonant, whereas it does not take place in (16b) after [ˈki], which never ended in a consonant, in spite of the fact that it carries stress on the final vowel.

Now we finally come to stage 3 in (13), which was reached by Tuscan only. A second reanalysis took place, as argued in (14b). Wherever the sandhi geminate was directly preceded by stress (as in 10b), stress was a natural candidate for a phonologically transparent trigger of the gemination. Then, the geminate in (13b) was reanalysed as the effect of a rule such as (3).

This is the point in time when regular stress-conditioned RF was born, which consequently has nothing to do with the collapse of Latin contrastive vowel quantities. This final reanalysis, of course, did not concern (13a): unstressed monosyllables went on triggering RF due to the preservation of an idiosyncratic lexical feature. But the important consequence of this second reanalysis – at the surface – was the extension of RF to (13c): it is at this moment (presumably, not later than the 10th century A.D., whereas the loss of distinctive vowel quantity was completed by the 5th century; cf. Loporcaro 1997a: 55–70, 133–141) that we can locate the origin of the pronunciation [ˈtu ˈvːeːdi], which was our explanandum. This is in my view the most reasonable explanation of how RF came to be applied after words like *tu* (< TU), which are stressed on the final vowel, but did not contain a final consonant in Latin.

3. Rules, constraints and the distinction between reanalysis and analogy

What can we conclude from this discussion relevant to our topic, "rules vs. constraints"? Obviously, my account of the rise of RF would have to be radically reformulated in models which do not admit phonological rules. Some aspects of this reformulation will be touched upon in §4. In the present section I will develop some brief remarks concerning one specific point, viz. the distinction between reanalysis and analogy and the way this distinction can be represented in rule-based vs. constraint-based models.

A significant advance in our understanding of the topic was the identification of the rise of stress-conditioned RF as an instance of reanalysis. Schuchardt (1874), the first to sketch an explanation along the lines we have followed here, used a misnomer for the change implying the extension of RF from (13b) [ˈke ˈvːeːdi] to (13c) [ˈtu ˈvːeːdi]: he called it *analogical extension.*

The ideological background behind this move of Schuchardt's is clear. He thought he had succeeded in showing that a change which is entirely *lautgesetzlich* in its consequences (as we have seen in (2)) was not the product of a sound law but had arisen instead through analogy: that is, through what counted as the chief disturbing factor interfering with *Lautgesetzlichkeit* in the Neogrammarian world.

Now – after one more century of research in historical linguistics – we can tell the difference between analogy and reanalysis. The latter, unlike the former, is firmly grounded within the realm of regular sound change.[4] This distinction has become part of the linguists' common sense, and is totally independent of specific formalisms. Consider for instance the following quotation:

> Reanalysis modifies underlying representations ... and brings about rule change. Analogy, strictly speaking, modifies surface manifestations and in itself does not effect rule change, although it does effect rule spread either within the linguistic system itself or within the community (Hopper and Traugott 1993: 32).

The concept of rule has a central role to play, in the establishment of the distinction. We can observe in passing that Hopper and Traugott (1993) are surely not writing in the *Sound-Pattern-of-English* generative orthodoxy of the seventies, although if one goes through recent literature in the rules-vs.-constraints debate (e.g., the papers collected in Roca 1997), one might easily get the impression that rules were used exclusively by generative phonologists. (The recent paper by Hurch 1999 is illuminating on this point.)

To illustrate why the change at stage 3 (in (13)) cannot be legitimately termed "analogical",[5] let us contrast it with a genuine case of analogical extension of RF, found in central and northern Calabrian dialects (cf. Loporcaro 1997a: 116 fn. 24, 1997b: 49). In these varieties, third person verb forms cause RF since they once ended in a dental stop, which assimilated ((17a), (17c)).[6] In the imperfect, the [+RF] feature has been extended to first singular forms by analogy (17b), since the 3rd and 1st persons coincide phonetically. Note that this analogical extension is not observed in the present tense (17d), where the phonetic coincidence which provided ground for analogy in the imperfect is lacking:[7]

(17) a. [kanˈtaːβa ˈsːɛmpre] < CANTABAT SEMPER
'(s/he) always sang'

b. [kanˈtaːβa ˈsːɛmpre] < CANTABAM SEMPER
'(I) always sang'

c. [ˈkanta ˈsːɛmpre] < CANTAT SEMPER
'(s/he) always sing'

d. [ˈkantu ˈsɛmpre/*ˈsːɛmpre] < CANTO SEMPER
'(I) always sing'

In the first person, the rise of RF rests on no historical ground, as final -M deleted early in spoken Latin and consequently never acts as a trigger for sandhi assimilation. Obviously, no new rule has arisen here, unlike what happened in the third stage of our reconstruction in (13). Simply, one lexically specified feature characteristic for the phonological behaviour of one form has been extended to another form. This is analogy in its clearest manifestation: an isolated

change, independent from the rest of the system, which does not at all affect the rule component.

Now, how can we handle these facts if we no longer have a rule component? How can we cope with the difference between (17) and (13), between analogy and reanalysis (or rule-based changes in general).

One of the basic features of constraint-based, output oriented models like OT is precisely the fact that they tend to obscure this difference. Consider for instance Kenstowicz's (1996: §3.1) recent analysis of Standard Italian intervocalic /s/ voicing. The empirical fact to be explained is that voicing applies, in prefixed words, when the prefix boundary follows /s/ (as in *di*[z]*onesto* 'dishonest') but not when the boundary precedes /s/ (as in *a*[s]*ociale* 'antisocial').

This is a very simple description of the facts: /s/ voices in a context which is phonologically defined (intervocalic position), but the rule is blocked by a morphological condition (cf. e.g., Bertinetto 1999; Loporcaro 2000 with specific reference to intervocalic /s/ voicing, and Pensado 1999, on *f* > *h* in Spanish). Instead of this, Kenstowicz proposes an account based on Correspondence Theory, in the form of the tableau reproduced in (18). (√ = constraint satisfaction, * = constraint violation, *! = fatal violation.)

(18)

		Base-Identity	*VsV
☞	di[z]-onesto	√	√
	di[s]-onesto	√	*!
☞	a-[s]ociale	√	*
	a-[z]ociale	*!	√

& sociale

The lower-ranked constraint in (18) substitutes for the /s/-voicing rule, while the higher-ranked correspondence constraint (Base-Identity) is responsible for the blocking of voicing whenever the form to which voicing should apply happens to occur elsewhere in the language, as an independent word, with voiceless [s]. This is the case for *asociale* (cf. *sociale*) not for *disonesto* (cf. **dis*). We can

here disregard the fact that the proposal suffers from empirical inadequacy, as for instance the prefixes *bis-* 'twice', *tris-* 'three times' do undergo voicing (e.g., *bi*[z]-*àvolo* 'grand-grandfather', *tri*[z]-*àvolo* 'grand-grand-grandfather') in spite of the fact that the same morphemes also occur as independent words, with voiceless [s]: *il bi*[s] 'the encore', *un tri*[s] 'a group of three' (e.g., *tris d'assi* 'three aces').[8]

Apart from this, the crucial point for our present concern is that the difference between analogy (here expressed by Base-Identity) and regular sound change (here /s/ voicing) evaporates in this model. The two are not formally distinct. Rather, they both receive the same expression, under the form of constraints within one and the same hierarchy.[9]

4. Conclusion

It is not my contention that the account of the rise of RF advocated here cannot be rephrased within output oriented models such as OT. In fact, accounts in that vein have been produced recently. For completeness, I will devote the next two subsections to a brief discussion of actual (§4.1) or potential (§4.2) no-rule approaches to RF.

4.1. RF in OT

Absalom and Hajek (1997: 170–175) conclude their brilliant paper on RF by sketching an OT analysis of RF in standard Italian. While in-depth discussion of their proposal would exceed by far the scope of the present paper, I will discuss only one specific point which seems of central relevance to the discussion at hand.

In previous work on RF (cf. Papa 1981; Loporcaro 1988: 349–352, 369ff.; Agostiniani 1989: 36ff.) it was pointed out that non-application of RF in the context of word-final glide deletion (e.g., Florentine /faˈrai ˈbɛne/ → [faˈra ˈbɛːne]/*[faˈra ˈbɪɛːne] '(you) will do well') provides a crucial argument against constraint-based ac-

counts of RF. Absalom and Hajek (1997: 171) address the issue and formulate a constraint «*FINALμ (glide): Underparse second mora of a word-final diphthong (optional), i.e. *farai* may surface as *fara'*». In tableau 4 (on p.175) the constraint is seen to be crucially involved in barring both *[fa'rai 'bɛːne] and *[fa'ra 'bːɛːne] at the same time as candidate outputs for the input /fa'rai 'bɛne/, since both incur a fatal mark (*!) by violating it.

However, this solution poses descriptive problems. While the latter candidate is totally ungrammatical, the former is optionally possible at a low speech-rate. Thus, the authors are right in qualifying glide-deletion as optional, but precisely for that reason they cannot be right in claiming that violation of one and the same constraint (viz. *FINALμ (glide)) rules out, by the same token, an ungrammatical string (*[fa'ra 'bːɛːne]) as well as an optionally occurring *Lento-form* ([fa'rai 'bɛːne], to be written without an asterisk).[10] Thus, the account seems in need of further refinement. (And it is indeed presented as a tentative analysis, in appendix to a paper whose main thrust consists in the entirely convincing disproof of claims on RF put forth in recent work on the topic in Generative Phonology: e.g., Bullock 1991; Repetti 1991; Vogel 1994.) Conversely, it is easy to realize that a rule-ordering analysis, by which application of RF precedes (optional) glide-deletion in a counter-feeding order, derives the observed facts without any difficulty (cf. Loporcaro 1997a: 11).[11]

4.2. Further prospects for constraint-based analyses of RF?

There are two facts that must be regarded as crucial for any analysis of RF in both synchrony and diachrony: the first is that it is a sandhi phenomenon, in which phonology and syntax by definition interact (in an interesting way, one might add); the second is that it consists of a regular and of an irregular part (viz. (2) and (5)), and this is what the diachronic account expounded here crucially capitalizes on, by explaining the rise of rule (6) as an instance of reanalysis.

If we now concentrate on the second point, it is easy to see along which lines a full-fledged OT account of the rise of RF could be de-

veloped. Irregular RF could be handled by a theory of lexical exceptions such as that proposed by Kraska-Szlenk (1999), where each irregular morpheme is viewed as a specific constraint. The rise of regular RF out of stage 2 ((13)), on the other hand, could be handled as an instance of lexicon optimization (Prince and Smolensky 1993 and much subsequent work: e.g., Ito, Mester, and Padgett 1995; Yip 1996; Löhken 1997 etc.).

Of course, intellectual exercise is always good *per se*. But the point is whether there is any aspect of our concrete understanding of the history of RF – as I have illustrated it here, by elaborating on the concept of reanalysis within a simple rule-based model – that can be substantially improved by switching to a constraint-based model.

Consider finally the other basic fact about RF mentioned above, viz. the circumstance that it is a sandhi rule. Some problems may arise concerning the input. There are two quite different ideas of input of RF, which circulate in the OT literature. According to one, reflected in the "richness-of-the-base principle",[12] there exists one (infinite) set of inputs which is the same cross-linguistically. As a consequence, literally anything goes as an input for any language, including e.g., [kf:::rz:::] for, say, the competence of English or Italian speakers.[13] It is then constraint ranking which does the job of excluding [kf:::rz:::] from the range of winning candidates that surface as grammatical forms in English or Italian.

There is, however, another view of the input in the same literature. When the label "lexicon optimization" is used to designate the choice of the most harmonic input among possible alternatives (by means of the "tableaux de tableaux" procedure; cf. e.g., Ito, Mester, and Padgett 1995; Yip 1996), then we are to conclude that inputs are *in the lexicon*. (Otherwise, what on earth would "*lexicon* optimization" mean?)[14] And if they are in the lexicon, then, by definition they must be stored, which might pose some problems, with respect to the above mentioned [kf:::rz:::] and surely poses problems for a sandhi process such as RF. This is a postlexical process, whose inputs, to be matched with candidate outputs, consist of phrases rather than lexical units, as exemplified in (19): (Constraints are not specified but indicated generically as *x, y, z*.)[15]

(19)

		x	y	z
☞	*comp*[ˈrɔ kːar]*ciofi*	√	√	√
	comp[ˈrɔ kar]*ciofi*	*!	√	*
	comp[ˈrɔː kar]*ciofi*	√	√	*!
	comp[ˈrɔː kːar]*ciofi*	√	*!	√

'(s/he) bought artichokes'

We can ask where the corresponding inputs (which must be phrases) are concretely retrieved from, in order to be matched with candidate outputs (also phrases, of course). If the answer is "from the lexicon" – since inputs are in the lexicon – then this implies that *syntax* must be in the lexicon. Concretely, in our case *comprò carciofi* '(s/he) bought artichokes' must be stored in the lexicon, as well as *comprò mele/macchine* etc. '(s/he) bought apples/cars' or any other of the infinite set of theorically possible pairings of two Italian words, such that RF applies at the boundary between them.

Clearly, what we need here to state these facts in a sensible way is not an infinite list of concrete inputs. It is rather a postlexical phonological rule referring to phonological segments, like the one in (3) that we have been elaborating in order to propose our account of the rise of stress-conditioned RF in the history of standard Italian.[16]

Notes

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1. The condition in square brackets in (3) bars the application of RF before initial geminates and heterosyllabic clusters (e.g., *sto* [s]*tudiando* 'I'm studying'). For more details on the synchronic working of RF cf. Loporcaro (1997a: ch. 1) and the further references mentioned there.
2. OT accounts of RF begin to be available: see the valuable paper by Absalom and Hajek (1997: 170–175) (cf. §4.1 below).
3. In spite of recent criticism of rule features (cf. Inkelas et al. 1997), I think no other solution is at hand in the present case. Specifically, the account of RF in (5a-b) proposed in Loporcaro (1988: 364–365), positing an empty consonant in word-final position, rests on no independent surface evidence other than the application of RF itself. It is consequently tantamount to assuming a rule fea-

ture, since the presence of a final empty consonant must be specified for each of the lexical items in (5a-b).

4. I am aware that this is a controversial point. I would not subscribe to the notion of analogy advocated in e.g., Anttila (1977), where the concept is stretched to include many instances of regular sound change. (A consistent development of such a theoretical stance is represented by more recent proposals such as Skousen 1995). With respect to Schuchardt, specifically, there is a challenging attempt (Vennemann 1972) to argue that precisely he, rather than the Neogrammarians, was the real forerunner of the 20th century conception of rule-based phonological change.
5. It is not idle to make this point explicit, since the rise of RF in *tu* [d:]*ici* 'you say' is still sometimes labeled "analogical extension" in the literature in theoretical phonology (cf. e.g., Napoli and Nespor 1979: 877 ff., fn. 12; Absalom and Hajek 1997: 176).
6. This is RF of the irregular kind: the verb forms involved are not oxytones, and the dialects at issue lack stress-conditioned RF altogether, as exemplified in (16) with Neapolitan.
7. Note that phonetic coincidence, while it has favoured the analogical change in (17b), is in itself not a sufficient condition. In the dialect of San Giovanni in Fiore, spoken within the Calabrian area under discussion, third plural present verb forms end in [-u] (< Latin -UNT) and bring about RF: e.g., ['kɨntu 'sːɛmpre] '(they) always sing'. These forms are homophonous with the 1st singular, which however did not acquire the feature [+RF]: ['kɨntu 'zɛmpre] '(I) always sing' (cf. Loporcaro 1995: 546–547).
8. The relation between the two is transparent, both formally and semantically (both are decoded as 'twice'). Cf. Bertinetto (1999: 275 ff.) for more comments on the empirical shortcomings of Kenstowicz's analysis.
9. This seems to be a recurrent pattern which is often encountered during the establishing phase of "revolutionary" models. As Anttila (1977: 76) puts it: "Generative historical linguistics has confused the issue [viz. the distinction of 'sound change' and 'analogy', M.L.] in very much the same way as structuralists did in the beginning."
10. The ungrammaticality only concerns the relation of the quoted output to the input meaning '(you) will do well', since the same phonetic string is the normal output, in both Florentine and standard Italian, of underlying /fa'ra 'bɛne/ '(s/he) will do well', where RF regularly applies.
11. Nespor (1990: 251) raises a data question, meant to deny the empirical foundation of the argument summarized here. She quotes the examples *ventitré* [bː]*arche* 'twenty-three boats' vs. *ventidu(e)* [b]*arche* 'twenty-two boats' (respectively, (16a-b) in Nespor 1990), noting that RF is present in the former, not in the latter, and then goes on to observe:

> The example in (16b) contrasts with (17) [i.e. *ventidue* [b]*arche* → *ventidú* [b:]*arche*, M.L.], a form found in certain dialects of Italian, where the final syllable of *ventidue* (i.e. *e*) is deleted. In this case RS [i.e. RF, M.L.] does apply.

This is unfortunately false. No dialect anywhere in Italy applies RF in such a context; in particular, this is not the case in Florentine, in which **ventidú* [b:]*arche* is ungrammatical. True, the string as such occurs in e.g., Romanesco as well as in all other Central-Southern Italian dialects. But the length of initial [b:] is not due to RF there, since in these varieties [b:] is categorically long in any intervocalic position, both word-internally and at word boundary: e.g *ru*[b:]*à* 'to steal', *le* [b:]*arche* 'the boats' (never **ru*[b]*à*, **le* [b]*arche* vs. standard Italian *rubare, le barche*). This stands out clearly as soon as another consonant is substituted for [b:] in the example mentioned: *ventidú* [l]*inguisti* 'twenty-two linguists' (never **ventidú* [l:]*inguisti*). In sum., the fact that RF is categorically inhibited by the application of glide-deletion suffers no exception, contrary to what is claimed by Nespor (1990).

12. The principle (cf. Prince and Smolensky 1993: 191; Smolensky 1996: 3) goes as follows: "The source of all systematic cross-linguistic variation is constraint reranking. In particular, the set of *inputs* to the grammars of all languages is the same."
13. Actually, even non-linguistic material should be included in this infinite set. This is a seldom discussed implication which follows straightforwardly, however, from the abolition of distinctiveness as a criterial property for input elements carried out within OT (cf. e.g., Kirchner 1997).
14. Kager (1999: 34) addresses the problem explicitly, and argues that richness of the base and lexical optimization are not in contradiction. Still, I think there is a conceptual problem here, if one does not want to give up the idea that the lexicon is a model of linguistic information stored in the speaker's mind.
15. Tableau (19) applies to RF the OT treatment proposed for another well-known external sandhi phenomenon, viz. French *liaison*, in Perlmutter (1998) and Steriade (1997). In those papers, competing candidates are phrases, just as in (19).
16. Of course, there is still the alternative of expressing candidates in terms of unspecified phonological strings (say, V́#C:, V́:#C etc.) rather than as lexical items, a procedure followed e.g., by Prince and Smolensky (1993) in their discussion of structural constraints defining syllable structure. But in that case, in my view, such a constraint-based representation ultimately boils down to a mere notational variant of a phonological rule.

References

Absalom, Matthew and John Hajek
1997 Raddoppiamento Sintattico: What happens when the theory is on too tight? In: Pier Marco Bertinetto, Livio Gaeta, Georgi Jetchev and David Michaels (eds.), *Certamen phonologicum III, Papers from the Third Cortona Phonology Meeting, April 1996*, 159-179. Turin: Rosenberg & Sellier.

Agostiniani, Luciano
1989 Fenomenologia dell'elisione nel parlato in Toscana. *Rivista italiana di dialettologia* 13: 7–46.

Anttila, Raimo
1977 *Analogy*. The Hague/Paris/New York: Mouton.

Bertinetto, Pier Marco
1999 Boundary strength and linguistic ecology (mostly exemplified on intervocalic /s/-voicing in Italian). *Folia Linguistica* 33: 267–286.

Bullock, Barbara E.
1991 Mora-bearing consonants in coda position and related quantity effect. In: Pier Marco Bertinetto, Michael Kenstowicz and Michele Loporcaro (eds.), *Certamen phonologicum II, Papers from the 1990 Cortona Phonology Meeting*, 105–120. Turin: Rosenberg & Sellier.

Chierchia, Gennaro
1986 Length, syllabification and the phonological cycle in Italian. *Journal of Italian Linguistics* 8: 5–33.

CIL = *Corpus Inscriptionum Latinarum*. Berlin: Preussische Akademie der Wissenschaften, since 1863.

Fanciullo, Franco
1997 Anticipazioni romanze nel latino pompeiano. *Archivio Glottologico Italiano* 82: 186–198.

Hopper, Paul J. and Elizabeth C. Traugott
1993 *Grammaticalization*. Cambridge: Cambridge University Press.

Hurch, Bernhard
1999 Optimalität unf Natürlichkeit. Ms., University of Graz.

Inkelas, Sharon, Ophan Orgun and Cheryl Zoll
1997 The implications of lexical exceptions for the nature of grammar. In: Iggy Roca (ed.), *Derivations and Constraints in Phonology*, 393–418. Oxford: Clarendon Press.

Ito, Jungko, Armin Mester and Jaye Padgett
1995 Licensing and underspecification in Optimality Theory. *Linguistic Inquiry* 26: 571–613.

Kager, René
1999 *Optimality Theory*. Cambridge: Cambridge University Press.

Kaye, Jonathan, Jean Lowenstamm and Jean-Roger Vergnaud
1990 Constituent structure and government in phonology. *Phonology* 7: 193–231.
Kenstowicz, Michael
1996 Base-identity and uniform exponence: Alternatives to cyclicity. In: Jacques Durand and Bernard Laks (eds). *Current Trends in Phonology: Models and Methods*, vol. 1, 363–393. Salford: ESRI.
Kirchner, Robert
1997 Contrastiveness and faithfulness. *Phonology* 14: 83–111.
Korzen, Iørn
1980 Il raddoppiamento sintattico e la geminata nella variante toscana dell'italiano-standard. Risultati di un'indagine sperimentale. *Studi Italiani di Linguistica Teorica e Applicata* 9: 333–366.
Kraska-Szlenk, Iwona
1999 Syllable structure constraints in exceptions. In: J. R. Rennison and K. Kühnhammer (eds.), *Phonologica 1996. Syllables!? Proceedings of the 8th International Phonology Meeting*, Vienna, 1-3 November 1996, 113–131. The Hague: Thesus.
Löhken, Sylvia C.
1997 *Deutsche Wortprosodie. Abschwächungs- und Tilgungsvorgänge.* Tübingen: Stauffenburg Verlag.
Loporcaro, Michele
1988 History and geography of *raddoppiamento fonosintattico*: remarks on the evolution of a phonological rule. In: Pier Marco Bertinetto and Michele Loporcaro (eds.), *Certamen phonologicum, Papers from the 1987 Cortona Phonology Meeting*, 341–387. Turin: Rosenberg & Sellier.
1995 Raddoppiamento fonosintattico dopo III persone plurali del verbo nei dialetti di Conflenti (CZ) e di San Giovanni in Fiore (CS). *Rendiconti dell'Accademia dei Lincei* 392: 543–553.
1997a *L'origine del raddoppiamento fonosintattico. Saggio di fonologia diacronica romanza.* Basel/ Tübingen: Francke.
1997b Lengthening and Raddoppiamento fonosintattico. In: Martin Maiden and Mair Parry (eds.), *The Dialects of Italy*, 41–51. London: Routledge.
2000 Stress stability under cliticization and the prosodic status of Romance clitics. In: Lori Repetti (ed.), *Phonological Theory and the Dialects of Italy*, 137-168. Amsterdam/Philadelphia: John Benjamins.
Marotta, Giovanna
1995 Apocope nel parlato di Toscana. *Studi Italiani di Linguistica Teorica e Applicata* 24: 297–322.

Napoli, Donna Jo and Marina Nespor
1979 The syntax of word-initial consonant gemination in Italian. *Language* 55: 812–842.
Nespor, Marina
1990 On the separation of prosodic and rhythmic phonology. In: Sharon Inkelas and Draga Zec (eds.), *The Phonology-Syntax Connection*, 243–258. Chicago/London: University of Chicago Press.
Nikiema, Emmanuel
1992 More than Coda Conditions in Italian phonology. In: Christiane Laeufer and A. Morgan Terrell (eds.), *Theoretical Analyses in Romance Linguistics*, 3–18. Amsterdam: Benjamins.
Papa, Eugene
1981 Is raddoppiamento resyllabification? In: Heles Contreras and Jürgen Klausenburger (eds.), *Proceedings of the Tenth Anniversary Symposium on Romance Linguistics* (Papers in Romance, III, suppl. 2), 249–260.
Pensado, Carmen
1999 Frontera de prefijo, aspiración de "f" y procesos de nasalización en la historia del español. *Romance Philology* 52: 89–112.
Perlmutter, David
1998 Interfaces: explanation of allomorphy and the architecture of grammars. In: Stephen Lapointe, Diane K. Brentari and P.M. Farrell (eds.), 307–338. *Morphology and its Relation to Phonology and Syntax*. Stanford: Center for the Study of Language and Information.
Prince, Alan S. and Paul Smolensky
1993 Optimality Theory: Constraint interaction in generative grammar. Ms., Rutgers University, New Brunswick.
Repetti, Lori
1991 A moraic analysis of *raddoppiamento fonosintattico*. *Rivista di Linguistica* 3: 307–330.
Roca, Iggy (ed.)
1997 *Derivations and Constraints in Phonology*. Oxford: Clarendon Press.
Rohlfs, Gerhard
1982 Ein archaischer phonetischer Latinismus im nördlichen ("lateinischen") Kalabrien. *Zeitschrift für Romanische Philologie* 98: 547–549.
Saltarelli, Mario
1970 *A Phonology of Italian in a Generative Grammar*. L'Aja: Mouton.
1983 The mora unit in Italian phonology. *Folia Linguistica* 17: 7–24.

Schuchardt, Hugo
1874 De quelques modifications de la consonne initiale dans les dialectes de la Sardaigne, du Centre et du Sud de l'Italie. *Romania* 3: 1–30.
Skousen, Royal
1995 Analogy: A non-rule alternative to neutral networks. *Rivista di linguistica* 7: 213–231.
Sluyters, Willebrord
1990 Length and stress revisited: a metrical account of diphthongization, vowel lengthening, consonant gemination and word-final vowel epenthesis in modern Italian. *Probus* 2: 65–102.
Smolensky, Paul
1996 The Initial State and 'Richness of the Base' in Optimality Theory. Johns Hopkins University Technical Report, JHU-CogSci-96-4.
Steriade, Donca
1997 *Similarity and lexical conservatism in surface analogy.* Ms., University of California at Los Angeles.
Vennemann, Theo
1972 Phonetic analogy and conceptual analogy. In: Theo Vennemann and T. H. Wilbur (eds.), *Schuchardt, the Neogrammarians, and the Transformational Theory of Phonological Change: Four Essays*, 181–204. Frankfurt am Main: Athenäum.
Vincent, Nigel
1988 Non-linear phonology in diachronic perspective: stress and word-structure in Latin and Italian. In: Pier Marco Bertinetto and Michele Loporcaro (eds.), *Certamen Phonologicum. Papers from the 1987 Cortona Phonology Meeting*, 421–432. Torino: Rosenberg & Sellier.
Vogel, Irene
1978 Raddoppiamento as a resyllabification rule. *Journal of Italian Linguistics* 7: 15–28.
1982 *La sillaba come unità fonologica.* Bologna: Zanichelli.
1994 Phonological Interfaces in Italian. In: M. L. Mazzola (ed.), *Issues and Theory in Romance Linguistics: Selected Papers from the 23rd Linguistic Symposium on Romance Languages (LSRL XXIII), April 1-4, 1993*, 109–126. Washington, D.C.: Georgetown University Press.
Yip, Moira
1996 Lexicon optimization in languages without alternations. In: Jacques Durand and Bernard Laks (eds.), *Current Trends in Phonology: Models and Methods*, vol. 2, 757–788. Salford: ESRI.