

Output-to Output Faithfulness in Phonology: The Italian Connection*

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Abstract

Italian alternations like *vád-o/ and-iámo* (**vad-iámo*) ‘I go/ we go’, *vínc-ere/ vín-to/ vènc-it-óre* ‘to win/ won/ winner’ instantiate consistency of metrical properties over surface forms. This article argues that derivational means such as ‘cyclicity’ are highly ineffective in accounting for these phenomena, which rather support a fully parallel model of grammar, based exclusively on surface forms with no Underlying Representation.

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* This work was first presented at the ‘Conference on Italian Linguistics’, SUNY, Stony Brook, September 7, 2001. The material presented and the analysis overlap substantially with the contents of Burzio (1998) to which the reader is referred for various further details. The present article addresses the comparison with cyclic phonology more specifically and directly. I am grateful to two reviewers for *Lingue e Linguaggio* for insightful comments leading to significant improvements. All errors are mine.

1. Introduction

The goal of this article is to point to the relevance of certain morpho-phonological alternations of Italian for the theoretical conception known as ‘Output-to-Output faithfulness’, and for its comparison with an alternative conception that incorporates traditional derivations within Optimality Theory.

In my 1994 *Principles of English Stress* (PES), I argued that the ‘stress transfer’ phenomena illustrated in (1) have a simple account in terms of direct surface-to-surface relations among words, and for a general approach to phonology based on violable constraints, similar to Prince and Smolensky’s (1993) ‘Optimality Theory’ (OT).

- (1) a. phe(nómeno)nø Y phe(nòme)(nó-logy) b. ar(tícu)(làte) Y ar(tícula)(tòry)
 c. propa(gánda)Y propa(gándis)tø d. a(mérica)nø Y a(mérica)(n-ìstø)

The account of (1) was shown to consist of the simple hierarchical relation in (2), where ‘Metrical Consistency’ (MC) is a constraint holding between surface forms, a type of Output-to-Output faithfulness.

- (2) a. **Metrical Consistency’s rank:** \
 b. **Grammar of stress:** C₁ ... C_i C_j ... C_n
(Metrical Well-formedness) (Metrical Alignment)

The arrow in (2) schematically represents the fact that MC interacts with the rest of the stress grammar by simple ranking: given an independent grammar of stress consisting of a constraint hierarchy C₁ ... C_n, Metrical Consistency will interject into that hierarchy at a specific point, thereby predicting that stress transfers will obtain in violation of the dominated portion of the hierarchy, here called ‘Metrical Alignment’, but never in violation of the still dominant portion, here called ‘Metrical Well formedness’. This was shown to account for the lack of stress transfers in (3), in contrast to the transfers of (1).

- (3) ca(tástrophe)Y *ca(tàs)(tróph-icø) (cómpen)(sàte) Y *(cómpensa)(tòry)

In the PES analysis, the derivatives in (3) are ungrammatical because they have ill-formed feet: a unary foot and a ternary foot with a heavy median syllable, respectively, and as such they violate Metrical Well-formedness. The correct forms are rather *càtastróphic* and *compénsatòry*, respectively, violating MC as predicted. In contrast, the derivatives in (1) are optimal because they have well formed feet, and only violate the ancillary conditions that regulate the relationship between foot boundaries and word edges: Metrical Alignment.

The success of this account endorses the natural intuition that whatever exactly causes affixed stems to be largely consistent with their bases segmentally must do so metrically or prosodically just as well, and argues against the traditional generative model, that makes this intuition inexpressible by imposing the independent derivations in (4).

(4) **Traditional Derivations**

	<i>Underlying Repr.</i>	<i>Derivation</i>	<i>Surface Repr.</i>
a.	/phenomenon/	calculate stress-1	phenómenon
b.	/phenomeno(n)-logy/	calculate stress-2	*? phènomenó-logy cf. àbracadábra, etc.

In (4), derivation of *phenomenology* from an independent Underlying Representation (UR) rather than from the surface form of *phenómenon* incorrectly predicts a secondary stress on the initial rather than the second syllable, on a par with *àbracadábra*, *Tàtamagóuchi* and many other cases. Similarly, (1b) above would be expected to be **àrticulatòry*, with two stress iterations over the first four syllables, like *àpalàchicóla*, etc., while (1d) should be **àmericanist*, with the same regular main stress as underived *antágonist*. The traditional response to this kind of challenge has been to invoke the principle of the phonological ‘cycle’, according to which the derivation of (4a) is effectively nested within that of (4b) (although the history of ‘stress-neutral’ affixes like *-ist* in (1c, d) is more complex. See PES). From this point of view, segmental and accentual similarities between the derived and the base noun in (4) have different sources: the former is from sharing material in UR, while the latter is due to the phonology applying ‘cyclically’. Like PES and later elaborations (Burzio 1996, 2000a, b, 2001, 2002a, b, c) this article aims to back-track roughly the past 35 years of generative work, and argue that the correct move in the light of stress transfers and other so called ‘cyclic’ effects is *not* to augment the notion of UR -which proves insufficient- with the notion of ‘cyclicity’, but rather to move in a different direction altogether, rejecting UR in favor of surface-to-surface/ ‘Output-to-Output’ relations. This alternative direction was once precluded by the notion that regularity results from re-write rules, as the latter presuppose multiple derivational levels. But it becomes immediately available once we shift from rules to surface constraints. In retrospect, the cycle can thus be seen as in indirect admission that surface-to-surface relations are necessary as the surface form of *phenómenon* must be derived first, before that of *phenòmenólogy* can. From this it should follow by conceptual parsimony that surface-to-surface relations should also be sufficient, leading to the rejection of both UR and rules.

Turning to more specific empirical reasons to reject the cycle, there are rather direct ones applicable to a rule-based version, given in PES. Essentially, a rule-based cycle runs into a ‘duplication problem’ –a textbook argument against rules (Kenstowicz and Kisseberth 1977, Kager 1999). The reason is that cyclic preservation of stress obtains only when well-formed feet result, as in (1) versus (3). Hence, with rules, the notion of well-formed foot would have to be expressed twice independently: once in the formulation of the iterative rules that construct feet, and once in the conditions that are part of the cycle and that prescribe when to preserve and when to erase earlier stresses.

However, the cycle has been proposed not only in the context of rule-based phonology, but also in the context of Optimality Theory. See, especially, Kiparsky (1998, 2000), Rubach (2000), and for similar views Clements (2000). This general approach, which combines constraint-based optimization with sequential derivations, is referred to as ‘Lexical Phonology and Morphology OT’ (Kiparsky), or ‘Derivatioanl OT’ (Rubach). This approach is immune to the

just noted duplication problem, and would in fact work very much in accordance with my (2) above for the cases in (1): taking the output of one cycle to be the input to the next in OT, the Metrical Consistency of (2a) would simply be an Input-to-Output, rather than an Output-to-Output faithfulness constraint, leaving the above interaction by ranking unchanged. We will see in the discussion of Italian below, however, that this version of the cycle is unworkable as well for several reasons that include the following two: (i) There are simultaneous transfer effects from multiple bases, consistently only with a fully parallel system. (ii) Transfer effects obtain not only with stems, but with affixes as well. The latter are not expressible by the cycle because, unlike stems, affixes are not persistently present through a derivation. For instance, *-ic* has the same metrical properties in both *napoleón-ic* and *barbár-ic* (stressing the syllable that precedes it), and yet these two items are not part of the same derivation.

The ensuing discussion utilizes the specific conception of Output-to-Output relations developed in Burzio (1996, 2000a, b, 2002a, b, c) with roots in PES. The latter is based on the hypothesis that mental representations constitute sets of violable entailments, such that each element of a representation violably entails the presence of the other elements: the ‘Representational Entailments Hypothesis’ (REH). Such hypothesis enables representations to influence each other directly, as similar but not identical representations violate some of each other’s entailments. This approach, which has transparent links with both connectionism and Bybee’s (1988, 1995, 2001) ‘Network’ model, is shown in Burzio (2002a, b, c) to derive the two major effects in (5).

(5) Effects of the Representational Entailments Hypothesis (REH)

- a. **SELECT:** Affixes select their environment of occurrence.
E.g. *al* Y/N ___ (*al* entails a noun to its left)
- b. **GRADIENT ATTRACTION (GA):** Given a representation R, another representation R’ is attracted to R in a way that is inversely related to their geometrical distance. This is because each component over which R’ differs from R is subject to pressure to become identical to that of R, whose magnitude, measurable in number of entailments, is determined by the number of components over which R’ is identical to R, as shown in the example.

	R	R’	Pressure on R’: 2entailments
Example:	A B C	A B -C	A Y C; B Y C

The GA effect in (5b) predicts that a word could be influenced in principle by any other to which it bears some similarity, but that the strongest influence should be from words to which it is most similar (like the members of the same general ‘paradigm’). The SELECT effect in (5a) predicts further that derived words should be particularly influenced by the ones that would be their ‘morphosyntactic bases’ in traditional terms, as in fact in the stress transfers of (1) above. Hence, the stress discrepancy of *párent* Y *parént-al* is a partial violation of SELECT(5a) since the latter requires *-al* to follow a structure that is a noun in the lexicon. The stem *parént-* is different from

such a noun, however, having a different stress. The latter discrepancy is also a violation of GA (5b) since *párent* noun and *parént-* stem are highly similar and yet not identical, thus standing in a maximal attraction relation. The effects in (5a) and (5b) combine to yield the more descriptive notion of Metrical Consistency of (2), and the still descriptive but more general OT notion of ‘Output-to-Output faithfulness’ (OO-F). Violations of OO-F / Metrical Consistency embodying either (5a) or (5b) or both, as in *parént-al*, occur as compelled by higher ranked constraints, like the Metrical Well Formedness of (2) above (hypothetical **párental* having an ill-formed metrical foot). On this characterization, OO-F will not only capture phenomena in the domain of phonology proper, such as those of (1), but will also express the type of word-to-word relations that were once province of a separate Morphology module. It does so by virtue of incorporating the ‘SELECT’ entailments of (5a), which are effectively violable subcategorization frames for affixes (Burzio 2002a, b, c).

Previewing the rest of the discussion, the next section presents two kinds of Italian alternations that challenge derivational accounts but support the present approach, one involving a special type of suppletion, the other the morphology of past participles and their derivatives. Section 3 completes the analysis of Italian participial alternations, while sections 4 and 5 map out the specific consequences for a derivational approach, arguing that one set of phenomena would require postulating disjunctive input sets, while the other would require that cyclic derivations be allowed to skip cycles, noting the stipulatory character of each provision. Section 6 summarizes the conclusions, and the Appendix briefly reviews earlier analyses of the same or related Italian material.

2. Consistency Effects beyond the Cycle

Italian exhibits at least two effects which are beyond the reach of any ‘cyclic’ account. One is illustrated in (6).

(6) Beyond the Cycle, I:

**Metrically conditioned allomorphy/
suppletion (DiFabio 1990)**

	‘go’ PRES. IND.	‘finish’ PRES. IND.
1	vád-o	fin-ísc-o
2	vá-i	fin-ísc-i
3	vá.	fin-ísc-e.
4	and-iámo	fin- -iámo
5	and-áte	fin- -íte
6	ván-no	fin-ísc-ono

As argued in DiFabio (1990), these alternations can be attributed to ‘Metrical Consistency’: by varying the segmental structures, *and-/vad-*, *-isc-/∅*, each individual segmental sequence, including that of the inflectional affixes, is able to maintain fixed metrical properties, thus

satisfying Metrical Consistency, or ‘OO-F (metrical).¹ The latter is here a reflex of REH (5), more specifically GA (5b): the form *vád-* generates an entailment ‘[vad]] stress’, which would be violated by an unstressed form *vad-*. Differently put, *vád-* and hypothetical *vad-* would be in a maximal attraction relation because highly similar (same segments), but not identical (different stresses), and for this reason they cannot coexist, but rather neutralize to just one form *vád*, and similarly with *and-* and *-ísc-*.

However, the alternation *and-/vad-*, like most allomorphy, also violates GA (5b), as the entailment that the meaning ‘go’ be associated with [vad-] is violated by [and-], and vice-versa. Attraction is not maximal, though, since the two forms differ both segmentally and metrically. Nonetheless, the latter alternation also violates ‘Paradigm Uniformity’ (PU), a consequence of SELECT (5a). As argued in Burzio (2002c), regular paradigms, like first conjugation *am-o/...am-iamo/...*, where the stem is segmentally consistent, generate entailments that the two forms preceding *-o*, *-iamo* be segmentally identical. Such entailments are violated by *vad-o/ ...and-iamo/...* The *-isc-/∅* alternation similarly also violates PU segmentally. Since GA (5b), SELECT (5a), and PU are all instances of what I am collectively referring to as ‘OO-F’, the alternations in (6) are amenable to the wholesale analysis in (7).

(7) OO-F (metrical) >> OO-F (segments)

Under the ranking in (7), the need to maintain stable metrical properties for each segmental sequence will force segmental alternations. The exact segmental content of the alternants, however, will need to be determined by some specific ‘input’ information. In the present framework, in which there is no UR, the input is associated directly with surface forms. The effectiveness of such input information in producing alternations will be determined by ranking. As argued in Burzio (2000a, 2002a, c), when OO-F dominates Input-to-Output Faithfulness (IO-F), regular morphology results, as in (8a) below, while the opposite ranking yields *irregular* morphology, as in (8b). The case of metrically conditioned suppletion of (6) is now analyzable by way of the ranking in (8c), which incorporates (7).

¹ That stress plays a crucial role in the alternations in (6) has been widely recognized (see Zamboni 1983, Maiden 1992, Aski 1995). DiFabio’s work was the first, however, along with Burzio and DiFabio (1994) to argue that the effects in (6) and those once attributed to the cycle were one and the same.

(8) **Types of morphology in the Surface-to-Surface approach**

	<i>Morphology</i>	<i>Examples</i>	<i>Constraint Ranking</i>
a.	Regular	compel/ compell-ed (*compUIS-ed)	OO-F >> IO-F
b.	Irregular/ suppletive	compel/ compUIS-ive (*compell-ive)	IO-F >> OO-F
c.	Metrically conditioned suppletion	VÁD-o / AND-iamo	OO-F >> OO-F >> IO-F (metrical) (segments) (segments)

All capitalized segments in the examples represent input information. In general, segments in the input will only have an effect when IO-F(seg.) is dominant, as in (8b). In contrast, in (8a), high-ranked OO-F will ensure, for instance, that the stem in *compell-ed* be identical to the bare verb *compel*, thus suppressing the effects of any specific input to the word *compelled*. In (8c), however, IO-F(seg.) will be expected to have an effect despite its low rank because its competitor OO-F(seg.) is effectively knocked out of the action by top ranked OO-F(metr.). Hence, when the stress changes, the segments are required to change by OO-F(metr.) (avoid different stresses on same segments). Then, when the segments change, they will do so in compliance with IO-F(seg.) to the extent that OO-F(seg.) is independently violated and hence made inactive. While thus allowing input information to play a role, the grammar in (8c) will also correctly prevent it from introducing arbitrary segmental alternations, e.g., AND-íamo/ *ERT-áte, etc. This is because such alternations would be violations of OO-F(seg.) not compelled by OO-F(metr.), excluded by the ranking in (8c). Purely idiosyncratic alternations such as these are only allowed under the ranking in (8b), in which IO-F is dominant.

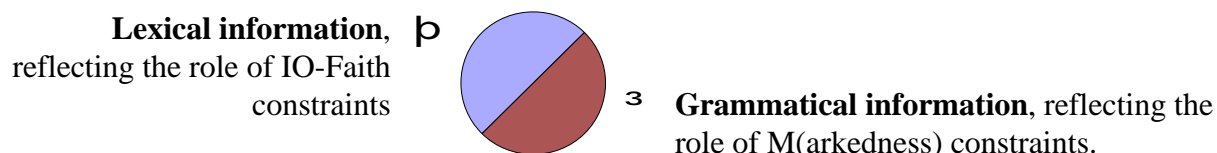
Note that in this system, in which the input is ubiquitous, potentially present in both underived forms (*compel*) and derived ones (*compuls-ive*), the question arises as to where exactly lexical representations are. While the question may seem initially puzzling, exactly the same question arises in the original version of Optimality Theory.

Consider here Prince and Smolensky's (1993, 192) discussion of 'Lexicon Optimization'. They note that, given any specific output, OT does not uniquely determine the nature of the input. For instance, given some plausible OT grammar of English, the output [MmérMkM] (my example, LB) could come from an input with reduced vowels, one with full vowels, with stress, without stress, with the incorrect stress, with some impossible consonant clusters, without such clusters, etc. Some hypothesis additional to the logic of OT is thus necessary to define what the actual input is for each actual output. Prince and Smolensky propose that the actual input is just the 'optimal' one, namely the one that yields the given output with the minimal amount of constraint violation. It is then easy to see that the latter input is just the output or surface form itself, in this case [MmérMkM]. While not necessary (OT would still work with other inputs as well), this hypothesis seems natural, and, as argued in Burzio (1996), it is then equivalent to the claim that there is no UR, the grammar effectively functioning as a checking device directly over surface forms.

While, in some sense, the 'lexical' form for [MmérMkM] would thus be just the surface

form, the above question was really about ‘lexical’ information as opposed to grammatically induced information. Under ‘Lexicon Optimization’ surface forms effectively conflate the two types of information, so that it is necessary to think of them as having internal bi-partitions of the kind suggested by (9).

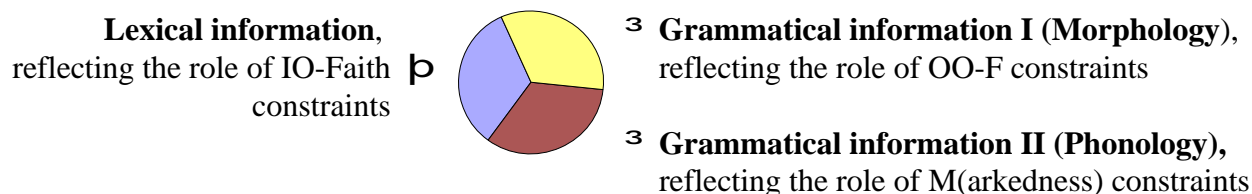
(9) **Surface forms under ‘Lexicon Optimization’**



The internal partition in (9) will reflect the structure of the constraint hierarchy: for any aspect a of the representation, a represents lexical information if IO-F(a) dominates M(a). It represents grammatical information if the opposite ranking holds. In the first case, a depends on nature of the Input. In the second case, a depends on the nature of the Markedness constraints. There is no longer any level of representation, however, that collects all and only the a 's that depend on the Input, like the old ‘underspecified’ UR's.

While Prince and Smolensky (1993) revert to the traditional conception in the case of morphologically complex words, with a UR (Input) distinct from the surface representation, the present framework simply upholds the parallel conception in full, by adding a further set of constraints when morphologically complex words are involved: OO-F, thus turning the internal bi-partition of surface forms of (9), into the tri-partition of (10).

(10) **Surface forms in the Surface-to-Surface approach**



The question of the exact representation of lexical information remains unaffected by this move. For any surface form, the ‘lexical’ information continues to be the collection of all a 's such that IO-F (a) is dominant over the other constraints of the system, now M(a) and OO-F(a). More accurately, though, both in (9) and in (10) the ‘lexical’ information is the collection of all a 's such that IO-F (a) is dominant over the other *active* constraints of the system. We have seen that in (8c) IO-F (segments) is effective in specifying the form of the suppletives, and yet it is dominated by OO-F (segments). This is because the latter is not ‘active’, as higher-ranked OO-F (metrical) compels its violation.

Returning to the main point, while accounted for by the parallel grammar in (8c), the metrically conditioned suppletion of (6) is intractable by cyclicity because here consistency of metrical properties is achieved not by transferring the stresses from some other calculation, as would be in the nature of the cycle, but rather by failing to transfer the segments.

The second effect that fundamentally challenges the cyclic approach is illustrated in (11).

(11) Beyond the Cycle, II:	<i>to win</i>	<i>won</i> (PART.)	<i>winner</i>
Multiple correspondence (Burzio 1998)	vínC-ere	vín-t-o	vìnC- it -óre

In (11), I will take the agentive noun to hold a primary OO-F relation with the participle, as determined by SELECT (5a). That is, I assume that the suffix *-óre* entails an element to its left which is a participle in the lexicon aside from the inflectional ending (*-o* in (11)), essentially as in the analysis of Scalise (1983). This is indeed the regular pattern: *lavor-át-o/ lavor-at-óre* ‘worked/ worker’, *rap-ít-o/ rap-it-óre* ‘kidnaped/ kidnapper’, etc. The reason that such entailment is violated segmentally in (11), yielding *vìnC-it-óre* rather than compliant **vin-t-óre*, is again (7). As argued in Burzio (1998, 2002b), peripheral suffixes like the *-óre* of (11) that bear specifications for lexical category benefit from a higher ranked type of OO-F, which prevents them from altering their own accentual properties. Given the stress of *-óre*, segmental faithfulness to the participle *vínt-* would force the stem to de-stress under clash, violating OO-F(metr.). To maintain the stem stress, a buffer syllable is thus needed, whence the fact that the participial affix *-t* ‘*unsyncoptes*’ to *-it-* --an alternative participial affix found elsewhere in the lexicon as discussed below. The more immediate result **vi.n-i.t-ó.re* is still excluded, however, because it would syllabify the *n* as an onset, differently than in the rest of the paradigm: *vin.ce.re*, *vin.to*, thus violating a form of prosodic faithfulness similar to the metrical faithfulness. The consonant [..] is then borrowed from the infinitival stem with which the agentive noun is expected to hold a secondary OO-F relation due to their similarity/ proximity in space: GRADIENT ATTRACTION (5b). The relevant ranking schema based on (7) is here as in (12).

(12) **Unsyncopted participial derivatives: *vìnc-it-óre*, etc. under OO-F**

OO-F(metr./prosodic) >> OO-F(seg.)-participle >> OO-F(seg.)-infinitive, OO-F(seg.)-*it*

Under the ranking in (12), OO-F(metr./prosodic) imposes metrical and prosodic identity with the participle, hence *.vín*. The same type of OO-F(metr./prosodic) to the infinitive *vínc-ere*, not given in (12), is concurrently also satisfied. This, however, forces the derivative to break away from the participle segmentally, violating OO-F(seg.)-participle relative to the affix *-t*, given the potential stress clash. The derivative’s relation with the infinitive, sponsored by lower-ranked OO-F(seg.)-infinitive, which is normally dormant and occulted by the higher-ranked OO-F(seg.)-participle, is thus revealed, as is its relation with other items in the lexicon featuring participial affix *-it* (see below), sponsored by equally lower-ranked OO-F(seg.)-*it*. Combined, these two relations: with the infinitive, and with *-it*, provide the needed segmentism *C-it* of *vìnC-it-óre*.

In this case, the ineffectiveness of cyclicity is in its inherent serialism, which prevents it from dealing with multiple inputs or bases (participle and infinitive) simultaneously in the same calculation. A more structured critique will be made possible by considering the full range of syncopted and non-syncopted participial allomorphs, as I do in the next section.

3. Distribution of Participial Allomorphs

The general schema in (7) above accounts not only for the segmental discrepancy between participle and derivative in (11), but also for the participial syncope itself. Specifically, non syncopated **vinc-út-o* would feature loss of the stem stress under clash, since *-út* is resilient to a stress change, like *-óre*, for the same reasons, namely because it determines lexical category. The ranking in (7) will thus compel a breach of segmental faithfulness instead, by way of the syncopated allomorph *-t*, segmentally different from the primary allomorph *-út-*. Other participles feature *-s* as a syncopated allomorph, however, as in *córr-ere/ cór-s-o* ‘take/ taken’.² This array of facts can be accounted for under the ranking schema in (13), still a descendant of (7).

(13) Syncopated participles: *vín-t-o*, *cór-s-o*, etc. under OO-F

OO-F(metr.) >> OO-F(seg.)-*ut* >> OO-F(seg.) *-t/ -s* >> IO-F(seg.)

Here, top-ranked OO-F(metr.) imposing the same stem stress in the participle as in the infinitive, induces a violation of OO-F(seg.) relative to participial morphology. In (13) there are three types of OO-F(seg.) pertaining to participial morphology. Faithfulness to *-ut* is top-ranked among them, because this is the canonical or statistically preponderant allomorph compared with the other two, as I discuss further below. Next comes faithfulness to each of the syncopated allomorphs *-t*, *-s*, whose relative rank is taken to be indeterminate, as indicated by the slash. Because of this, the competition between the latter two allomorphs will be resolved by bottom ranked IO-F (seg.). That is, in the surface representations *vín-t-o*, *cór-s-o*, input information associates each stem with either allomorph, *-t* or *-s*, thus accounting for the idiosyncratic character of the latter choice (see below and Burzio 1998 on the unpredictability of the *-t/ -s* variation).

The ranking schema in (13) is effectively a subcase of the one in (8c), with IO-F(seg.) becoming active only under the appropriate metrical conditions, thus making the *-ut/ -t, -s* alternation also a case of metrically conditioned suppletion. This case differs, however, in having two suppletive forms: *-t, -s* in contrast to just one: *vád-* in (6a). This difference seems attributable to the fact that in (13) different verb stems can associate with different suppletives, while in (8c) we are dealing with a single verb ‘go’. One may still consider that (13) provides no formal account for the suppletive forms in this case being exactly two, an issue that I put aside, as just an accident of history.

² Note that the terms ‘syncope’, ‘syncopates’, ‘unsyncopates’, etc. are used here in a purely descriptive sense. The relationship between *-út* or *-ít* and *-t* or *-s* is not taken to be a strictly phonological one. Rather, these are treated as ‘listed’ allomorphs, their relationship being essentially one of suppletion, as noted in the text below. Hence, *-t* and *-s* do not violate OO-F (metrical) relative to *-út* or *-ít* any more than *and-* does relative to *vád-*. These are independent segmental structures, or they are at least sufficiently different that the effect of GA (5b) is minimized.

The examples in (19) and others (see Burzio 1998) constitute minimal pairs, indicating that predictability in these domains is not achievable. Hence, these facts will not challenge the analysis. Also, they will not take away its explanatory force, which is in reducing all segmental alternations in (20) to MC.

(20) **Effects of MC/ OO-F (metrical). See (15 a), (16a), (18a):**

- a. Standard infinitive/ syncopated participle: *decíd-ere/ decí-s-o* ‘decide/ decided’
- b. Syncopated participle/ standard derivative: *vín-t-o/ vînc-it-óre* ‘won/ winner’
- c. Standard participle/ syncopated derivative: *àggred-ít-o/ àggres-s-óre* ‘attack/ aggressor’

Since MC –a form of OO-F, is both a natural consequence of the general architecture in (5) and independently motivated by standard ‘cyclic’ effects as well as by the other cases of suppletion in (6), the analysis is maximally principled. It is superior to other analyses that see such alternations as totally idiosyncratic or just ‘Latin borrowings’ (see Appendix) by finding a simple grammar for them, thus reducing the role of the input to the mere specification of the form of two suppletives: (13) above. In addition, by attributing segmental alternations to MC, the present analysis correctly predicts that participial syncopes will be limited to the conjugation that has stressless *-ere* in the infinitive, while derivatives could be syncopated in any conjugation, as illustrated in (21).

(21) **Correct predictions**

- a. *cònfess-áre/ cònfess-át-o* (**confés-s-o*)/ *confes-s-óre* ‘confess/ confessed/ confessor’
- b. *pòssed-ére/ pòssed-út-o* (**possés-s-o*)/ *posses-s-óre* ‘possess/ possessed/ possessor’
- c. *àggred-íre/ àggred-ít-o* (**aggrés-s-o*)/ *aggres-s-óre* ‘attack/ attacked/ aggressor’

The reason for the lack of participial syncopes in the other conjugations is that they would only violate rather than satisfy MC, by creating a stem stress which the infinitive did not have, as in the starred examples. In contrast, syncope in the derivatives continues to be motivated by the need to avoid unstressed *-at-/ -ut-/ it/*, i.e. the usual MC.³

³ A handful of *-íre* verbs feature participial syncopes for reasons partially independent of MC, and related to the complex onset of the infinitive, as in *apr-íre/ apér-t-o* ‘open/ opened’, *offr-íre/ offér-t-o* ‘offer/ offered’ *scopr-íre/ scopér-t-o* ‘discover/ discovered’. An epenthetic vowel [e] breaks up a potentially complex onset in the participle and receives the main stress. We may assume that such stress is still due to MC, as the alternative **àper-ít-o* would stress material that is not stressed in the infinitive. Once the [e] is stressed, however, *-ít* is excluded by clash avoidance, while unstressed *-it* is excluded by MC, whence the syncope. Even in these cases, the derivatives exhibit the expected behavior: sometimes they keep the syncope: *òffer-t-ório*

In contrast to the above account based on surface relations, we now consider the prospects for the traditional calculation of allomorphy from a UR supplemented with the derivational notion of the cycle (Kiparsky 1998, 2000; Rubach 2000).

4. Disjunctive Inputs

Considering first the Metrical Consistency effects in (6a), I already noted that the ‘cycle’ would be of no assistance. It would also not be sufficient to postulate underlyingly stressed *vád-*, *-ísc-* and a high-ranked IO-F (metrical) (mirroring its OO counterpart in (7)) to trigger the necessary repairs. The reason is that, while one can imagine a repair that would turn *-ísc-* to zero rather than de-stress it, one that would turn *vàd-* to *and-* seems patently ad-hoc, since *and* is not a natural modification of *vad*. Rather, the only recourse for a derivational analysis would be to assume that both */and/* and */vád/* are in the input, disjunctively, both generating competing candidates which are then selected by the various constraints, notably IO-F (metrical), as in (22).

(22) a.	and/ vád-o	IO-F (metrical)	b.	and/ vád-iámo	IO-F (metrical)
	ánd-o	*		┌ and-iámo	
	┌ vád-o			vad-iámo	*
	and-ó	*		vád-iamo	*

In (22) every morpheme including the affixes would be assumed to either have or lack stress underlyingly. This would be consistent with the fact that stress in Italian is not fully predictable: *àncora/ ancóra* ‘anchor/ still’, *mángio/ mangió* ‘I eat/ he ate’, etc., requiring input information. At the same time, in a constraint-based framework, underlying or ‘input’ stress is no longer inconsistent with the fact that the same stress may also be partially predictable (e.g. no antepenultimate stress if the penultimate is heavy, etc.: PES, 27ff.). The disjunctive input solution of (22) can then be extended to the case of *-ísc-*, by postulating the comparable disjoint inputs *-ísc-/* \emptyset . While this solution would be adequate, it makes certain concessions to the present claims: the needed ‘inputs’ have all the crucial properties of the ‘outputs’ of the present framework: they are multiply available, and they have metrical structure, suggesting the IO-F of (22) is in fact just a surrogate for OO-F.

5. Skipped cycles

Consider now the participial synopes in the *-ere* conjugation, as in (11) above or (23).

(23)	Gloss	Infinitive	Participle	Syncope
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‘offertory’, and sometimes they revoke it: *scòpr-it-óre* ‘discoverer’.

a.	<i>win</i>	vínc-ere	vín-t-o	-út- Y -t-
b.	<i>lose</i>	pérd-ere	pér-s-o	-út- Y -s-
c.	<i>sell</i>	vénd-ere	vend-út-o	-út- (no syncope)

As noted, participles in this conjugation unpredictably either syncopate or not, and when they do, they syncopate either in *-t-* or in *-s-*, also unpredictably. In contrast and as also noted, in the conjugation that has stressed *-ére* in the infinitive, there are no participial syncopes, as in (24).

(24)	Gloss	Infinitive	Participle
a.	<i>know</i>	sap-ére	sap-út-o/ *sat-t-o
b.	<i>keep</i>	ten-ére	ten-út-o/ *ten-t-o

In seeking to maintain a traditional perspective, one may attempt to capture these correlations by means of underlying stresses and disjunctive inputs along the same lines as (22) above, as in (25), (26).

(25) a.	vínc-ere/ -ére	IO-F (metrical)	b.	ten-ere/ -ére	IO-F (metrical)
	└ vínc-ere			tén-ere	*
	vinc-ére	*		└ ten-ére	
(26) a.	vínc-út/ -t -o	IO-F (metrical)	b.	ten-út/ -t -o	IO-F (metrical)
	└ vín-t-o			tén-t-o	*
	vinc-út-o	*		└ ten-út-o	

That is, assuming that the stem *vínc-* is underlyingly stressed while *ten-* is not may in this analysis seem sufficient to ensure that the former will simultaneously select both unstressed infinitival and participial endings as in (25a), (26a), while the latter (unstressed) will correspondingly select the stressed ones as in (25b), (26b) so as to remain stressless itself. This analysis will not work, however, because it is not only the stressed *-ére* conjugation that exhibits no participial syncopes as in (24), but also the *-íre* and *-áre* conjugations, as shown in (21) above and again in (27).

(27)	Gloss	Infinitive	Participle
a.	<i>attack</i>	aggred-íre	aggred-ító/ *aggrés-s-o

b.	<i>send</i>	mand-áre	mand-áto/ *má-s-o (cf. prénd-ere/ pré-s-o)
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Hence, while it might have made sense to suppose that the *-ere/ -ére* conjugations are in fact the same one, the difference just reflecting the presence or absence of lexical stress on the stem, the *-íre, -áre* conjugations preclude this analysis. In those conjugations, stems that were underlyingly stressed on their last syllable -if they existed- should correspondingly give unstressed infinitival affixes **-ire, *-are* contrary to fact: (27). Rather than proceeding from the properties of stems, one must rather assign priority to the properties of the infinitival affixes, only *-ere* of (23) being unstressed, while all others are stressed, thus ensuring stressless stems in both (24) and (27). However, underlyingly stressed stems cannot be precluded given Prince and Smolensky's (1993) 'Richness of the Base', and this could give rise to the syncopated participle in (24) and (27) by metrical faithfulness to the UR. What is needed to exclude such participles is thus an obligatory cyclic derivation *via the infinitive*. Since in the infinitive a stressed affix purges the stem of any final stress, it will then correctly follow under cyclic metrical faithfulness/ consistency with the infinitives that the conjugations in (24) and (27) will not have syncopated participles. In the present approach, such correspondence with the infinitive is automatic, since there is no UR and only OO-F, the infinitive being apparently the 'base' for the participle.

Summing up so far: the direct derivations from UR attempted in (26) are excluded. Rather, cyclic derivations of participles from their infinitives is necessary. Regarding participial allomorphs *-út/ -t* (as well as *-s*) as a disjunctive input set would, however, remain appropriate.

The question for the derivational approach at this point is then whether such a cyclic derivation of participles like *vín-t-o* from infinitives like *vínc-ere* of (23), which is necessary, is effectively tenable, or sufficient. There are two main reasons why the answer is negative. The first is that a cyclic derivation would involve the curious truncation of the infinitival affix. Recall that the latter is needed to get the right stem stress. Interestingly, in laying out the derivational framework of 'Lexical Phonology', Kiparsky (1982, 23-25) pointed out that such truncations would be highly unnatural as a type of derivation. He correctly noted that they predict a specific type of 'cyclic' effect: one where a truncated affix would leave traces of its earlier presence on a stem. He went on to argue that such effects are unattested, and therefore that truncation does not exist, consistently with a derivational system. We have just seen, however, that they *are* attested, thus reversing the thrust of Kiparsky's (1982) argument. Note that there is no comparable formal problem of 'truncation' for the present OO-F approach. OO-F relations are seen here as emergent properties of the lexicon, due to the entailments generated by the relevant representations. On this view, the participial stem stands in an OO-F relation with the infinitival stem, first as a form of GRADIENT ATTRACTION (5b): they are similar representations in sound and meaning; and second as a case of PARADIGM UNIFORMITY, a specific reflex of SELECT (5a): a participial affix 'selects' (entails, to its left) a representation X with one particular property: that of occurring to the left of an infinitival affix as well. Hence participle-infinitive pairs must constitute a uniform paradigm. This property is a generalization over the lexicon which results from entailment summation over the representations that instantiate it. It is parallel to the property of English *-al* in (5a), which selects a representation X whose property is that of being a noun in the lexicon (see Burzio 2002b, c, for further discussion).

The second reason for the negative verdict against cyclic derivations relates to the

variability of the participial syncopes as in (23) above and the fact that the same syncope and variability are also found when going from a participle itself to its derivatives, as was shown in (11), (14) and (17) above, and illustrated again in (28).

(28)	Gloss	Infinitive	Participle	Derivatives	Syncope
a.	<i>attack</i>	aggred-íre	aggred-ít-o	aggres-s-óre/ -ióné	introduced
b.	<i>possess</i>	possed-ére	possed-út-o	posses-s-óre/ -ívo	OO-F (metr.) >> OO-F (seg.)
c.	<i>dye</i>	tíng-ere	tín-t-o	tin-t-óre	kept
d.	<i>diffuse</i>	diffónd-ere	diffú-s-o	diffu-s-óre/ -ióné	OO-F (seg.) >> OO-F (metr.)
e.	<i>win</i>	vínc-ere	vín-t-o	vìnc-it-óre	revoked
f.	<i>gather</i>	raccógli-ere	raccól-t-o	raccògl-it-óre/ -ívo	OO-F (metr.) >> OO-F (seg.)

The OO-F account of these facts is repeated in its essence in the rightmost column in (28). When the syncope is introduced in the derivative, as in (28a, b), it is to avoid a metrical inconsistency with the participle by way of unstressed *-it-*, *-ut-*, which would have to de-stress under clash. This results in a segmental inconsistency instead, in the form of the usual syncopated allomorphs *-t* or *-s*. When the syncope of the participle is kept in the derivative, as in (28c, d), it is to the opposite end: maintaining segmental consistency, revealing the usual indeterminacy in the ranking of (7) above. Such segmental consistency results in the loss of stem stress under clash. When the syncope is revoked, as in (28e, f), it is again to avoid a metrical inconsistency, this time by the loss of stem stress. The stress clash is avoided by making the participial affix syllabic again. The cost of this is segmental inconsistency with the participle, by way of an unsyncopated and yet unstressed participial allomorph *-it-*, to which I return below.

Clearly, a derivation of the agentive nouns in (28e, f) cannot be cyclic from the participles even aside from the need to remove the gender/ number affix *-o*, since the latter nouns contain segmental material that only the infinitive and not the participle has. In the present perspective, this follows from the multiplicity of correspondences expected. When segmental material is needed, the participle is the main supplier, because of the effect of SELECT (5a). That failing, however, other members of the paradigm become available as well, because of GA (5b). As noted above, the [..] of *vìnc-it-óre* (28c) is needed to maintain consistent syllabification: *vin.to/vìn.ci.to.re*. The case in (28f) is similar, orthographic *gl* standing for geminate [ʃ]. In a derivational framework, such participial derivatives would rather have to be derived from a representation like (29a), in contrast to the participles, that would be derived as in (29b).

(29) a.	[[[vínc(-ere)]	-út / -it/ -t /-s (-o)]	-óre]	Y vínc-it-óre
	1	2	3	

it is of the kind that evenly competes with OO-F (seg.), allowing IO-F to choose. Here, *-s* is chosen, while in other items *-it* is chosen instead, as in (29a) above or (33) below.

The artificial character of the above derivations is revealed by several considerations. First, the account of (30) cannot be correct, for reasons already examined: Richness of the Base (ROB) would now predict unattested syncopes like the ones in (27). If a verb stem can have underlying stress by ROB, that stress will disappear under clash in *-íre* infinitives, but if cycle 1 of (30) can be skipped, that stress should then reappear in the derivation of the participle, yielding syncopated forms like **aggrés-s-o*. To exclude such forms, one must stipulate that, while cycle 2 can be skipped as in (29a) and (31), cycle 1 cannot. The reason for such asymmetry is immediately obvious within the present approach. The skipping of cycle 2 is a derivational surrogate for OO-F of the derivative to the infinitive: multiple correspondence. The skipping of cycle 1 does not occur because there is no other surface form that the participle could be faithful to rather than the infinitive. Skipping cycle 1 could thus only mean for the participle to be faithful to some Underlying Representation rather than to the surface form of the infinitive. On the present account, the reason this does not occur is simply because there *is* no UR (the same reason as why *américanist* in (1) is not **américanist*, stressed like *antágonist* in accordance with its underlying segmentism). On the derivational, UR-based, account this too must be stipulated, as was noted.

Secondly, the variable application of cycle 2, skipped in (29a), (30), but activated in (28c,d) is understandable in terms of consistency of surface properties: metrical consistency is achieved when it is skipped, while segmental consistency is achieved when it is not – a ‘conspiracy’ from this point of view, providing a classic argument against derivations (Kager 1999, 55-56). Since consistency of surface properties is sufficient, the cycle is unnecessary. In addition, surface properties seems *necessary* as noted next, making the cycle also insufficient.

Consider here that, if the account of (30) *vend-út-o* cannot feature skipping cycle 1 as argued, it must then appeal to a specific preference for *-út* over the other allomorphs, to correctly yield lack of syncope. That is, regarding *-út* as merely the default case in the presence of no particular preference for any of the allomorphs is no longer sufficient, since *-t*, *-s* have the advantage of maintaining stem stress. The syncopes in (23a, b) will then follow from pitting that preference for *-út* against the loss of stem stress – an even competition as shown by the variability. However, such preference for *-út* is nothing but consistency with the majority of surface forms. Forms in *út* are a majority because they occur not only in the *-ere* conjugation in the absence of syncope, but also systematically in the *-ére* conjugation, where participial syncopes are excluded for the reasons discussed. Hence preference for *-út* needs stipulating in the derivational analysis, but is predictable in the present system in which surface statistics matter, such as the number of representations that generate the entailment: “‘participle’Y *-út*” in the lexicon.

Thirdly, the unstressed allomorph *-it* cropping up in (29a) as well as in (17) above repeated in (32), where the regular allomorph for that conjugation is *-út* is a mystery for the derivational analysis.

(32)	Gloss	Infinitive	Participle	Agentive N
a.	<i>sell</i>	vénd-ere	vend-úto	vènd-it-óre
b.	<i>beat</i>	bátt-ere	batt-úto	bàtt-it-óre

In contrast, consider that unstressed *-it* is just the regular allomorph produced from participles of *-íre* verbs as in some earlier examples or in (33).

(33)	Gloss	Infinitive	Participle	Agentive N	Syncope
a.	<i>supply</i>	forn-íre	forn-ít-o	förn-it-óre	not introduced OO-F (seg.) >> OO-F (metr.)
b.	<i>kidnap</i>	rap-íre	rap-ít-o	ràp-it-óre	

The present analysis of (33), restated summarily in the right-hand column, was given in (18b) above: rather than losing the segmental structure of the participle as in (28a, b), the noun loses the participial stress instead, resulting in unstressed *-it*. The latter is not the bearer of categorial information in the derivatives, and can therefore de-stress under compulsion, unlike *-óre*. Utilization of the same *-it* in (32) --descriptively in the ‘wrong’ conjugation is in the present perspective to avoid the further metrical inconsistency *-út/ -ut*. But there is plainly no cyclic derivation that could relate the derivatives from *-ere* conjugation verbs in (32) to the *-íre* conjugation participles in (33). Only a general principle that establishes faithfulness/ attraction between representations that are independently similar can capture that relation. The syncretic reduction of the participial set {-út, -ít} to just {-it} in unstressed position is in the present view essentially parallel to the reduction of vowel inventories in unstressed position, e.g. Standard Italian {i, e, g, a,], o, u} Y {i, e, a, o, u}. Lack of stress compresses the perceptual space (Steriade 1994), enhancing the proximity among representations, in turn promoting neutralizations under GA. Hence the non existence of unstressed *-ut* can be attributed to attraction by either of its neighbors: *-út* (if same segments, then same stress), or *-it* (if same stress, then same segments).

Fourthly, the disjunctive inputs of (29), (30) turn out to be just another surrogate for the multiplicity of surface to surface relations, exactly as they were in (22) above. This is descriptively relatable to the variable application of the cycle, which allows the derivation to carry over properties from either the infinitive or the participle. Yet there is no formal relation between the two provisions in this approach.

Consider also that, along with *-óre* nouns, other participial derivatives also exhibit syncope or no syncope, variably. Yet derivatives from the same stem consistently make just the same choice, as indicated in (28) above, and further illustrated in (34), where orthographic *z* = affricate [ts] is taken to be an assibilated version of [t] (see Appendix).

(34)	Gloss	Participle	'-er' Noun	'-ion' Noun	'-ive' Adject.	Syncope
a.	<i>sent</i>	sped-it-o	sped-it-ore	sped-iz-ione	sped-it-ivo	none
b.	<i>attacked</i>	aggred-it-o	aggres-s-ore	aggres-s-ione	aggres-s-ivo	in -s
c.	<i>adhered</i>	ader-it-o	ade-s-ore	ade-s-ione	ade-s-ivo	in -s
d.	<i>asserted</i>	asser-it-o	asser-t-ore	asser-z-ione	asser-t-ivo	in -t

While the grammar is generally indeterminate as to which choice from the rightmost column in (34) needs to be made, once one particular choice is made for one member of the derivational paradigm, other members will follow suit. On the present view, this follows from the fact that any GA effect under proximity constitutes an OO-F relation, and the assumption that IO-F is always dominated by OO-F in the phenomena under consideration, as in all of (8c), (15), (16), (18) above. Under that ranking, while IO-F can force different selections of participial allomorph for each row of (34) as discussed above, it cannot force different selections within each row, since this would violate OO-F. In contrast, on a derivational analysis, in which each derivation picks from among the input disjuncts of (31), there is no reason why independent derivations should exhibit exactly the same pick given the general unpredictability from the stem segmentism which (34) illustrates.

A similar point can be made on the basis of the participle/ preterit parallelism of (35).

(35)	Gloss	Participle	1SG Preterit	Syncope/ stem stress
a.	<i>won</i>	vín-t-o	vín-s-i	yes
b.	<i>sold</i>	vend-út-o	vend-é(tt)-i	no

As (35) shows, certain forms of the preterit provide a choice between a stressed and a syncopated/ unstressed affix. The choice is again unpredictable from the stem, but mirrors that of the participle, resulting in consistency of stem stress within the participle/ preterit pair. For a derivational theory, the only recourse would be to take the parallelism in (35) to reflect presence versus absence of underlying stem stress, but this is an untenable proposition as we saw above, when we concluded that participles need rather to be derived cyclically from their infinitives. Deriving participles and preterits from their infinitives will not help either, however, since both of the infinitives for (35) have the same stem stress (*vínc-ere*, *vénd-ere*), thus precluding any account of the results.

6. Conclusions

The notion of the phonological cycle, once a staple of phonological theory, encounters insurmountable problems when faced with the Italian alternations reviewed above. Specifically, the phenomenon of metrically conditioned suppletion (*vád-o/ and-iámo*, etc.) is intractable under

the cycle, and would rather require competing and metrically pre-specified inputs. In addition, neither the latter analysis nor the cycle seem applicable to certain infinitive-participle- participial derivative paradigms. In some cases, while containing participial material, the derivatives resemble more the infinitive than the participle, requiring the participial cycle to be turned off. In turn, this move runs into the following difficulties:

- i) The turning on or off of the participial cycle matches satisfaction of surface constraints: a conspiracy from this point of view.
- ii) The infinitival cycle must never be turned off in the derivation of participles, mysteriously from this perspective.
- iii) It is a mystery as well that independent derivations, usually able to make variable choices along the way (syncope/ no syncope; syncope in *-s/* syncope in *-t*) all end up with exactly the same choice when they involve the same stem, as in participle/ preterit and *-ore/ -ione/ -ivo/* paradigms.
- iv) Consistency effects, which can sometimes be captured by the cycle when they concern stems, also obtain for affixal material: the preference for *-út* over the other allomorphs that would be needed to correctly derive *vend-út-o* is transparently the effect of consistency with the dominant pattern, that of items like *sap-út-o*, etc. which are not part of the same derivation; the switch *-út* Υ *-it* of *vend-it-óre* reveals as well that when consistency with one surface pattern needs to be violated, consistency with some other independent pattern is the next best thing, here consistency with items like *rap-it-óre*, again not part of the same derivation.

These conclusions converge with Steriade's (1999) view that allomorphy is constrained by independently existing forms, or 'lexical conservatism'. As Steriade argues, French *beau* [b] 'beautiful-MASC' turns into *bel* [bgl] when a final consonant is needed (liaison) because that allomorph exists independently as the feminine form *belle* [bgl] 'beautiful-FEM'. In the present perspective, such neutralization of gender distinctions under phonological demands is parallel to the neutralization of conjugational distinctions in the '*-út* Υ *-it*' switch. In a fully parallel system it does not matter that the input and the output to a calculation are in different conjugations or have different genders. So long as they are relatable in overall space, they may well influence each other via GRADIENT ATTRACTION, neutralizing in part or in full.

7. Appendix

In this brief appendix I attempt to relate the most salient features of the above analysis to various earlier work on Italian verbal inflection. I proceed by way of two main topics: the notion of 'paradigm' in morphology, and some alternative hypotheses on the morphological structure of *-ore*, *-ione* and other derivatives that have been proposed in the literature.

7.1 The Role of Paradigms

The present line of work is generally consistent with the view held by some morphologists that paradigms constitute proper theoretical objects (see in particular, Carstairs-McCarthy 1994; Stump 2001). Within that view, it becomes possible to express direct relations between or among specific cells in a paradigm. Some of the OO-F relations postulated above are exactly such kind of relations. Maiden (1992) and Aski (1995) make a number of observations on the role of paradigms in the evolution of Romance verb inflection, that include the following:

- i) Verbs that alternate tend to be driven into the same paradigm structure as others, despite the fact that their respective alternations may be of a different nature.

As they argue, in Old Italian, stems of verbs like *venire* ‘come’ initially gave rise to the paradigm structure in (36), in which the subjunctive is totally uniform (gn = [ññ]):

(36)

	1	2	3	4	5	6
Indic.	vegn-o	vien-i	vien-e	ven-imo	ven-ite	vegn-ono
Subj.	vegn-a	vegn-a	vegn-a	vegn-amo	vegn-ate	vegn-ano

Later on, however, these verbs adopted the paradigm structure in (37), which existed independently with verbs like *vincere* ‘win’, as in (38), where $c = [k]$ in the bordered cells, but palatal [..] elsewhere.

(37)

	1	2	3	4	5	6
Indic.	veng-o	vien-i	vien-e	ven-iamo	ven-ite	veng-ono
Subj.	veng-a	veng-a	veng-a	ven-iamo	ven-iate	veng-ano

(38)

	1	2	3	4	5	6
Indic.	vinc-o	vinc-i	vinc-e	vinc-emo	vinc-ete	vinc-ono
Subj.	vinc-a	vinc-a	vinc-a	vinc-iamo	vinc-iate	vinc-ano

- ii) Verbs may acquire alternations of verbs that they resemble.

For instance, the [g] insert appearing in the bordered cells in (37) arose by analogy with verbs like *pung-ere* ‘sting’, in which the *g* was etymological. Specifically, the same palatalization that produced *vin[k]-o/ vin[..]-i*, etc. in (38), also produced *pun[g]-o, pu[ññ]-i*, etc. By paradigm uniformity, *pun[g]-o* then came to acquire the variant *pu[ññ]-o*, uniform with *pu[ññ]-i*. The variation *pun[g]-o/ pu[ññ]-i* was then analogically extended to *ve[ññ]-o* of (36), resulting in *veng-o/ ve[ññ]-o*. Later elimination of such variations in favor of the velar variant resulted in modern *ven-g-o* of (37), where the velar is a pre-suffixal insert, as well as *pung-o*, where the velar is part of the stem. Velar inserts

were then further analogically extended to verbs that did not previously alternate, such as *ten-ere* ‘keep’, whence *ten-g-o*, etc.

iii) First conjugation verbs do not alternate.

The effects in i)-iii) are amenable to formal accounts under the REH (5) above. The effect in i) is a sub-paradigm uniformity effect analogous to paradigm uniformity effects more generally. A sub-paradigm X-1, X-2, where X is a specific form of a stem and 1, 2 are specific affixes will generate entailments to the effect that affix 1 must be preceded by an object such that it also occurs in the context of affix 2 (Burzio 2002b), effectively a stem-identity relation over paradigm cells. This is why the paradigm structure of (38) would have transferred to (37).

Analogical extensions such as those in ii) also follow from entailments. For instance, a form like *ven-g-o* will translate into entailments connecting the velar insert to properties of both the affix and the specific stem, whose collective force would schematically be: ‘ven-__-o Y __ = [g]’ (if the stem is *ven-* and the affix is *-o*, then a [g] is inserted). Such entailments will substantially carry over to forms that are similar, such as ‘ten-__-o’

The virtual absence of stem alternations in the *-áre* conjugation of iii) (except for *and-are* discussed above) follows from the overwhelmingly larger size of this class, which results in stronger paradigm uniformity effects under the REH. Consider that for any class of verbs and for any alternation, some percentage p of the total number of verbs t will fail to alternate simply because it lacks the alternating environment (the palatalizing segment of (38), or the stem features that favor the [g] insert). This will generate an identity relation (OO-F) over the otherwise alternating cells, whose magnitude is proportional to p , and hence to the total t , much larger in the *-áre* conjugation as noted. Now the number of potentially alternating verbs will also presumably grow proportionally to the total t . However, in alternations that are not totally productive in the language, the number of alternating items is always idiosyncratically restricted, that is the entailments that support the alternation always come to some extent from the full structure of the alternating item, not only from some specific feature that may be general to other items, despite the analogical extensions reviewed above. This is why, alongside of *val-ere/ val-g-o* ‘be worth’, there is no *vol-ere/ *vol-g-o* ‘want’, and alongside of *venire/ vengo* ‘come’, there is no *finire/ *fin-g-o* ‘finish’. Such alternating effects are therefore at least in part forms of IO-F and as such item specific, not tied to class size for their magnitude. In contrast, the leveling effect is purely tied to class size, and for a large-enough class its magnitude will be correctly expected to swamp any alternating pressure.

The present framework is less sympathetic, however, to the extreme form of paradigmaticity proposed in Pirrelli and Battista (2000), where each paradigm cell is assigned a specific stem form by stipulation, without regard to the structure of the affix. In the present framework, stem variants are bound to the form of each affix by entailments. This explains why like-affixes correlate with like-stems. For instance, when affixes level, so do stems, as in persons 1-3 of the present subjunctive in (37) compared with their indicative counterparts. Pirrelli and Battista claim that all paradigm structures with n stem alternants can be derived from structures with $m > n$ alternants by rules that collapse some of the stem distinctions. While this is -not surprisingly- true, the rules needed turn out to be patently ad-hoc. For instance, while the

indicative paradigm in (37) has three stems: *ven-/ veng-/ vien-*, a rule that simply extended the first stem to the cells once occupied by the second would yield the pathological paradigm structure in (39).

(39)	1	2	3	4	5	6
Indic.	*vén-o	vién-i	vién-e	ven-íamo	ven-íte	*vén-ono

While such a rule is straightforwardly formulable in their system, no Italian verb has such 1-4-5-6/ 2-3 paradigm. From the more ‘syntagmatic’ point of view taken here, the reasons why this does not happen with *venire* are obvious. If the velar insert is removed, cells 1 and 6 will have their stem in the same environment as cells 2 and 3, with the stem vowel in a stressed open syllable, calling for diphthongization (the verb *sedere* ‘sit’ has exactly such 1-2-3-6/ 4-5 paradigm). Cells 1 and 6 could never find the same stress environment as cells 4 and 5, because the latter, unlike the former, have stressed affixes. This kind of considerations extends to all of the several non-existent paradigms that would be derivable in Pirrelli and Battista’s system, as far as I can tell.

7.2 The *-tore* and *-zione* hypotheses

Thornton (1990, 1991) has argued that nouns in *zione*, such as (34a) above *spedizione* are not based on participles like *spedito* via affixation of *-ione* and assibilation of the *t* as assumed above and as in Scalise (1983), but rather on some stem similar to that of the infinitive, perhaps the form of the imperative, and affixation of *-zione*. Bisetto (1996) has proposed a similar analysis for nouns in *-ore*, consisting of the same kind of non-participial base and an affix *-tore*. The main argument for such view is that, although the analysis ‘participle-*ore*/ *-ione*’ correctly yields the type *diffus-ione*/ *tint-ore* of (28c, d) above, it does not appear to work for cases like *aggressore*, *raccoglitore* of (28a, b, e, f) above. Hence both Thornton and Bisetto argue that it is better to maintain a ‘stem-*tore*/ *-zione*’ analysis which proves highly regular and transparent, with not many stem distortions, and set aside the rest of the data as memorized ‘Latin borrowings’.⁴ The argument is less than overwhelming, since -by leaving out the type in (28c, d)- the proposed analysis accounts for fewer data than the one it rejects. Its merits rest on the premise not shared by the present work that any alternation is either totally regular and productive or not part of the (same) mental grammar. More importantly, however, that argument is undercut by the present account of the distortions in participial stems, so that those no longer count as counterevidence that *-ore*, *-ione* attach to participles. Under ‘multiple correspondence’, replacement of one participial allomorph by another, as in *-ut/ -it Y -t* or *-s* or vice-versa, or as in *-ut Y -it*, is a minimal violation of faithfulness. Such violations have been attributed in all cases to Metrical Consistency – a form of OO-Faith which is independently motivated. Note that ‘multiple

⁴ As Thornton notes, there would still be several stem distortions to deal with even from this perspective, however. For instance, the correct imperative form is not **spedi* as would be required for *spedi-zione*, but rather *spedisci*.

correspondence' of participial allomorphs would be needed in any event to account for the fact not addressed in the text above that agentive feminine *-rice* systematically fails to take stems in [s] –plainly just a phonological fact (*[sr]), whence: *aggres-s-ore/aggred-it-rice* ‘aggress-or MASC./FEM.’, etc.

The Thornton-Bisetto analysis is also independently challenged by the fact that it presupposes multiple suffixes all of which have an initial *t* by accident, a consonant identical to that of standard participles by further accident. As noted in Burzio (1998) and partially illustrated in (28) and (34) above, the following five types of derivatives all select the same type of stem with a high degree of consistency: *-óre, -ióne, -ívo, -úra, -ório/ -óio*. To these should also be added the just noted *-rice*, which behaves differently from *-ore* only after *-s*. This means that any argument for the *-zione, -tore* analyses would have automatic extensions yielding *-tivo, -tura, -torio, -trice* as well. As for *zione*, the text claim that *z* (= [ts]) is here just *t* assibilating before the sequence *iV* (as assumed in Scalise (1983)) is vindicated by the following considerations: i) The *ione* derivative has *z* if and only if its co-derivatives have *t*. So *spedizione* finds *speditivo*, but *aggressione* only finds *aggressivo*: (34) above. ii) Other similar environments yield similar alternations: *profet-a/ profet-ia* ‘profet/ profecy’, *pulit-o/ puliz-ia* ‘clean/ cleanliness’, etc. iii) Indeed Italian has no *t* at all before *iV*, except when this is part of verbal inflection: *abbatt-iamo* ‘we fell (trees)’, and except after *s*, where an ‘OCP’ effect blocks assibilation: *Cristo/ crist-iano* ‘Christ/ Christian’, vs. *Egitto/ egiz-iano* ‘Egypt/ Egyptian’. In those cases, the *t* shows up unassibilated before *-ione* just as well: *gest-ire/ gest-ione* ‘manage/ management’ (like *gest-ore* ‘manager’, etc.), as expected.

The problem of the accidental identity of initial *t* in putative *-zione, -tore, -tivo, -torio*, etc. is addressed in Rainer (2001), who proposes that the other derivatives be in fact based on the *-ione* derivative, so that the *t* would then just be copied from *tione*. Note that the latter proposal is parallel to the OO-F relation across derivatives postulated in the text above. The text proposal differs from Rainer’s in two respects, however: i) OO-F relations among derivatives have no particular directionality to them, unlike Rainer’s proposal that singles out the *-ione* derivative as ‘the base’, but gives no particular motivation for this decision. ii) Under multiple correspondence, OO-F relations among derivatives do not supplant the relation of each to the participle, not postulated by Rainer. The correctness of the present view is supported by derivatives like: *difensore/ difensivo* ‘defender/ defensive’ *offensivo* ‘offensive’, *eccessivo* ‘excessive’, *fuggitivo* ‘fugitive’, *combattivo* ‘combative’, *abortivo* ‘abortive’, *governativo* ‘governmental’, *conoscitivo* ‘cognitive’, *scrittore* ‘writer’, *tintore* ‘dyer’, *apritore* ‘opener’, all of which have participles, but no *-ione* counterpart.

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