Stem Faithfulness in the Derivational Morphology of Italian

Submitted by

Henry Beecher

For
Sharon Rose
(LIGN 215)

Abstract

In this paper I argue *per* Peperkamp (1995a) that morphological derivation in Italian is *stem*-based as opposed to *word*-based. Although Peperkamp's proposal, which crucially relies on prosodic structure in combination with well-formedness constraints, provides an account for some aspects of the data such as the 'blocking' of intervocalic *s*-voicing, it fails to explain other aspects like regressive assimilation. I contend, however, that the generalization holding throughout the derivational processes in Italian is preservation of the stem. Furthermore, the loss of affix-final vowels in di-syllabic prefixes and intermediate suffixes in Italian is indication of a more striking asymmetry between stems and affixes than the perceived asymmetry between prefixes and suffixes. Peperkamp's efforts to find within prosodic constituency an explanation for why suffixes cohere with their bases yet prefixes seemingly do not, entirely disregards any stem-affix asymmetry. Indeed, Peperkamp discounts the not uncommon loss of prefix-final vowels as a "fast speech phenomenon"; and conflates the issue of final-vowel loss in intermediate suffixes by analyzing occurrences of multiple suffixation (*i.e.* compound suffixes) as single, composite affixes. In contrast, stem-affix asymmetry is a direct consequence of my central claim that stem preservation shapes phonological processes associated with Italian derivation. In adopting such morpheme-sensitive constraints as MAXMI which requires every morpheme-initial segment in the input to have a correspondent in the output, I rely on the further elaboration *per* Correspondence Theory in OT (McCarthy & Prince 1995) that segments have corresponding phonetic features. Incorporating MAXMI and associated MAXWI with the parallel constraints IDENT-MI(*f*) and IDENTV-WI (*f*) accounts for all the issues raised in Peperkamp's analysis without any need for the alignment constraints on which she relies. However, by including a variation on a stem faithfulness constraint proposed by Benua (1997), I am also crucially able to account for those situations in Italian involving the loss of prefix-final vowels as well as vowel loss when suffixes are combined. Thus I propose a theoretically more comprehensive analysis of the facts pertaining to derivation in Italian than previously offered.

Stem Faithfulness in the Derivational Morphology of Italian

0. *Introduction.*

Word formation in Italian is characterized by the cross-linguistically common processes of prefixation and suffixation. Conspicuously, though, several phonological features of Italian including syllabic onsets, intervocalic *s*-voicing and homorganic clustering while otherwise characteristic and pervasive in the language are pre-empted by these morphological processes. For example, joining the prefix *co-* to the noun *occurreDhza* produces *cooccurreDhza* ('co-occurrence') with an onsetless syllable, as does joining the suffix *-astro* to the adjective *bl D* to produce *blu Dstro* ('bluish'). Also, in northern varieties of standard Italian the /*s*/ of the prefix *dis-* is voiced when joined to a vowel-initial word such as *oneDsto* producing *di[z]oneDsto* ('dishonest'). Yet, the initial /*s*/ of *sociDle* is not voiced when prefixed by *a-* to produce *asociDle* ('antisocial'). Without exception processes such as nasal assimilation occur regressively as opposed to progressively when the final consonant of a prefix like *in-* creates a homorganic cluster with the initial consonant of a word like *mor Dle* to form *immor Dle* ('immoral'). More generally, with the exclusion of some non-native vocabulary, nouns and adjectives in Italian end in a vowel which does not surface in affixed forms such as *famoDso* ('famous') derived from *faDma* ('fame') or *brevit D* ('shortness') derived from *br Dve* ('short').

Both Scalise (1983, 1984) and Kenstowicz (1996) have formulated word-based hypotheses to account for these facts. In this paper I argue *per* Peperkamp (1995a) that morphological derivation in Italian is *stem*-based as opposed to *word*-based. The hypothesis put forth by Peperkamp, however, crucially relies on a notion of prosodic word as a domain of phonological processes. Under this approach, prosodic structure in combination with well-formedness constraints is able to provide an account for some aspects of the data such as the 'blocking' of intervocalic *s*-voicing, but fails to explain other aspects like regressive assimilation. I contend that the generalization holding throughout the derivational processes found in Italian is preservation of the stem. This observation was perhaps adumbrated by Peperkamp herself in noting that ". . . neither with prefixation nor with suffixation does the left-hand vowel of the sequence surface at the cost of the right-hand vowel. Apparently, there is a *general constraint* that favors the parsing of morpheme-initial segments over that of morpheme-final ones.[2]"

While not refuting prosodic structure as a valid theoretical construct, my analysis shows that an account for morphophonological processes found in Italian derivation is obtainable without recourse to

[1] Primary word stress is indicated by use of the acute accent and does *not* necessarily correspond to any diacritic used in written Italian.

[2] *Yearbook of Morphology 1994*, p.235 – emphasis added.

prosodic word constituency. The rest of this paper is organized as follows. An overview of Italian derivational affixation is given in section 1 with particular attention given to defining and differentiating such key components as *root, stem, base* and *affix*. Section 2 provides a constraint-based analysis of Italian derivational prefixation within an Optimality Theoretic framework. The central claim that stem preservation shapes phonological processes associated with Italian derivation is supported by appeal to positional faithfulness constraints proposed by Casali (1996,1997) and Beckman (1998). The claim is further corroborated in section 3 by extending the analysis to Italian derivational suffixation using the same constraint ranking. The analysis is shown to account for compound suffixes as well by incorporating a novel adaptation of stem faithfulness as proposed by Benua (1997) and interpreted by Bakovi D′ (forthcoming). The main conclusions are then summarized in section 4.

1. *Overview of Derivation in Italian*

Word derivation in Italian is accomplished by adjoining morphemes in grammatically prescribed patterns.[3] Nouns, verbs and adjectives may each serve as a *base* morpheme to which may be adjoined a variety of *affix* morphemes. Prefixes in Italian are generally category preserving in that the category of the base does not change as a result of prefixation.

(1)	*Prefix*	*Base*		
a.	stra-	ordin D′rio	straordin D′rio	‘extraordinary’
b.	pre-	avv D′so	preavv D′so	‘pre-announcement’
c.	sopra-	saturaD′re	soprasaturaD′re	‘to supersaturate’
d.	de-	ambul D′re	deambul D′re	‘to walk around’
e.	iper-	sensiD′bile	ipersensiD′bile	‘hypersensitive’
f.	super-	affoll D′to	superaffoll D′to	‘over-crowded’
g.	bis-	D′volo	bisaD′volo	‘great-grandfather’
h.	bi-	sessuaD′le	bisessuaD′le	‘bisexual’

In contrast suffixes may be either category preserving or category changing.

(2)	*Base*	*Suffix*		
a.	seminaD′rio	-ista	seminariD′sta	‘seminarist’
b.	liD′bro	-aio	libraD′D′io	‘book seller’
c.	maD′schio	-ile	maschiD′le	‘masculine’
d.	ideD′a	-etta	ideeD′tta	‘small idea’
e.	liD′nea	-are	lineaD′re	‘linear’
f.	volontaD′	-ario	volontaD′rio	‘volunteer’
g.	oD′cchio	-ello	occhieD′llo	‘button hole’
h.	liD′ngua	-ona	linguoD′na	‘big tongue’

[3] I adopt this notion strictly for descriptive expediency, without any particular assignment of theoretical significance.

An obvious asymmetry is that a prefix may join to a base without segment loss in either the affix morpheme or the base morpheme; yet adjoining a suffix invariably results in the loss of the final vowel in the base. While this pattern is most prevalent in Italian, it is not without exception. Adjoining the following prefixes results in the loss of the affix-final vowel.

(3)	*Prefix*	*Base*		
a.	semi-	interraD͡to	seminterraD͡to	‘basement’
b.	sovra-	umaD͡no	sovrumaD͡no	‘superhuman’
c.	sopra-	abbondaD͡nte	soprabbondaD͡nte	‘superabundant’
d.	extra-	uteriD͡no	extruteriD͡no	‘ectopic’

There are also cases in which suffixation to a base does not result in the loss of the base-final vowel.

(4)	*Base*	*Suffix*		
a.	caffeD͡	-accio	caffeaD͡ccio	‘bad cup of coffee’
b.	reD͡	-uccio	reuD͡ccio	‘small king’
c.	rebus	-ino	rebusiD͡no	‘little puzzle’

The situation with each of the examples given in (4) is attributable to a distinctive aspect of the base and is not contingent upon the selection of the suffix. Apart from the fact that *reD͡* in (4)b is a monosyllabic base of which there are few in Italian, a word-final stressed vowel is generally not lost as the result of suffixation[4]. Consonant-final nouns or adjectives like *rebus* in (4)c are always loan words in Italian.

Resyllabification across morpheme boundaries occurs as a result of both prefixation and suffixation, in order to provide syllables with onsets where possible. Consequently, the example in (1)f is syllabified as *.su.pe.raf.fol.l D͡to.* in which the final /r/ of the prefix becomes an onset for the vowel-initial base. Similarly the example in (4)c is syllabified as *.re.bu.si.no.* in which the final /s/ of the base becomes an onset for the vowel-initial suffix. Other phonological processes are also triggered by derivational affixation. Notably, intervocalic *s*-voicing which always applies within a base (*e.g. a[z]ola* ‘button hole’) also applies between a base and a suffix as in *ca[z]ina* ‘small house’. However, while voicing applies to a prefix-final /s/ when adjoined to a vowel-initial base as in example (1)g *bi[z]aD͡volo*, it fails to apply to a base-initial /s/ preceded by a prefix-final vowel as in example (1)h *bi[s]essuaD͡le.* In addition a coronal nasal /n/ totally assimilates to a following sonorant consonant in Standard Italian. Thus adjoining a prefix like *con-* to a base like *lateraD͡le* produces *collateraD͡le* ‘collateral’. Finally, adjoining a suffix having an initial stressed */iD͡/* to a base ending in a glide-vowel combination results in the loss of the glide as shown in (2)a in which the suffix *-iD͡sta* is added to *seminaD͡r[y]o* to produce *seminar[iD͡]sta.*

Some suffixation processes applicable to verbal bases remain to be described. However, a concise description of verbal suffixation would benefit from addressing first the question of just what

[4] Exceptions like *volontaD͡rio* shown in (2)f are discussed below.

constitutes a derivational base in Italian. As previously noted, an entire surface word could plausibly be posited as the base morpheme for prefixation. Positing the same for suffixation though requires some further explanation as to why the final vowel of the base does not generally surface. Scalise (1983, 1984) attempts to conform the Word Based Hypothesis of Aronoff (1976) to Italian morphology by proposing that Aronoff's definition of 'word' be equated to a more generalized notion of 'abstract word'. In keeping with Aronoff's concept of 'word' as an uninflected lexeme, Scalise argues that the final vowel of nouns and adjectives in Italian is a 'theme' vowel grouping together all masculine forms having a plural in *–i* and conversely all feminine forms having a plural in *–e*. This structure would then be parallel to verbs which in their traditional infinitival citation form, such as *parlare* 'to speak', consist of a *root* followed by a theme vowel (*a, i* or *e*) plus the inflectional morpheme *–re*. For Scalise then the root plus the theme vowel forms a *stem* which as an 'abstract word' is the derivational base. While the theme vowel of verbal stems typically does surface in derived forms, the final-vowel counterpart of nominal and adjectival 'stems' does not. Thus a phonological rule of vowel deletion is required to account for the final vowel not surfacing in denominal and deadjectival forms.

Peperkamp offers a counter-proposal to Scalise in which she argues that the final vowel of nouns and adjectives represents an inflectional morpheme akin to the final *–re* of verbs. In this view the base for all derivation in Italian is the stem of the noun, adjective or verb as identified by removing the final inflectional morpheme. Consequently, verbal stems consist of a root and a theme vowel while nominal and adjectival stems consist of just the bare root. Peperkamp depicts this arrangement schematically as follows:

(5)

	Stem		
	Root	Theme V	Inflection
Verb	*parl*	*a*	*re*
Noun/Adjective	*libr*	-	*o*

While I concur with Peperkamp's opinion that the stem as represented in (5) is the base for derivation in Italian, two unresolved issues related to identification of the stem still remain.

Recall in (4) that the final stressed vowel of some nouns and adjectives (*e.g. caffeD'* or *bluD'*) do in fact surface in derived forms. These examples, however, contrast with another group of nouns and adjectives like *volontaD'* in which the final stressed vowel does not surface in derived forms. The contrast is evident in the following forms.

(6)	*Base*	*Suffix*		
a.	caffeD'	-iD'sta	caffeiD'sta	'coffee connoisseur'
	bluD'	-iD'ssimo	bluiD'ssimo	'very blue'

b. facoltaD′ -ativo facoltaDtivo ‘wealthy’
pietaD′ -oso pietoDso ‘pitiful’

Unlike most nouns and adjectives in Italian, examples like those in (6) with a final stressed vowel (as well as loan words ending in a consonant) do not bear an inflectional morpheme. Peperkamp observes that these words neither have a distinct plural form nor is their final vowel (plausibly) thematic. Thus she suggests that the stems for all nouns and adjectives with a final stressed vowel are constituted by the entire word. However, conflating all words with a final stressed vowel as being non-derived leaves no alternative but to posit as lexical exceptions those like (6)b in which the final stressed vowel does not surface.

Although I agree with Peperkamp that words with a final stressed vowel do not bear an inflectional morpheme, it is my contention that the final *-aD′* of examples like (6)b is in itself a derivational morpheme albeit not a productive suffix in modern Italian. Under this approach such words containing the suffix *-aD′* are in fact derived but they do not have a lexical item as their base[5]. This possibility is neither unattested nor unproductive in Italian. Following are just a few of the many examples available.

(7) *derived pair* *non-lexical base*
a. simpatiDa ~ simpaDtico ‘sympathy ~ sympathetic’ simpat-

b. utopiDa ~ utopiDsta ‘utopia ~ utopian’ utop-
c. fanatiDsmo ~ fanaDtico ‘fanaticism ~ fanatic’ fanat-
d. comuniDsmo ~ comuniDsta ‘communism ~ communist’ comun-

The difference between these examples and those in (6)b is that all the suffixes involved in (7) are productive in modern Italian. Nonetheless the bases common to the these pairs, which I propose are equivalent to stems, are to no extent more recognizably lexical items than are the stems *volont-, facolt-* or *piet-*.

Thus I argue that the derivational base in Italian is the *stem* which is equivalent to a word minus any inflectional or derivational affix (including the unproductive suffix *-aD*). For most nouns, adjectives and verbs this is consistent with Peperkamp’s proposal of the stem comprising the root morpheme and (in verbs) a thematic vowel. Some remaining details regarding deverbal suffixation may now be elucidated. In contrast to denominal and deadjectival suffixes which with few exceptions[6] all begin with a vowel,

[5] This is not to claim that final *-aD* in *all* words is an unproductive suffix. For instance *cittaD* ‘city’ patterns like the examples in (6)a except that a /*d*/ surfaces before vowel initial suffixes as in *cittadiDno* ‘citizen’ *cf.* §2.
[6] The suffixes *–cino* and *–cello* are allomorphs of *–ino* and *–ello*, respectively, which select stems ending in the sequence /*-on*/ as in the derived pair *leoDne ~ leonciDno* ‘lion ~ small lion’.

deverbal suffixes may begin with either a consonant or a vowel. Some consonant-initial deverbal suffixes are illustrated below.

(8)	*Base Verb*	*V-stem*	*Suffix*		
a.	medicaD're	medica-	-D'D'bile	medicaD'D'bile	'curable'
b.	riferiD're	riferi-	-mento	riferimeD'nto	'reference'

As shown in (8) consonant-initial deverbal suffixes attach directly to the verbal stem consisting of the root plus a theme vowel. A different pattern emerges, however, when vowel-initial deverbal suffixes are combined with the verbal stem.

(9)	*Base Verb*	*V-stem*	*Suffix*		
a.	ammiraD're	ammira-	-eD'vole	ammireD'vole	'admirable'
b.	canterellaD're	canterella	-iD'o	canterelliD'o	'singing'

Most notably the thematic vowel of the verbal stem fails to surface when a vowel-initial suffix is adjoined. In effect vowel-initial deverbal suffixes are sessile attaching directly to the bare verbal root, a pattern analogous to that found in nouns and adjectives. Following Dressler & Thorton (1991), Peperkamp proposes that the verbal root can serve as an alternate base for suffixation, a claim with which I concur. A final set of vowel-initial suffixes are depicted below.

(10)	*Base Verb*	*V-stem*	*Past.Part.*	*Suffix*		
a.	nevicaD're	nevica-	nevicaD'to	-a	nevicaD'ta	'snowfall'
	bruciaD're	brucia-	bruciaD'to	-uD'ra	bruciatuD'ra	'burn (N)'
b.	promeD'ttere	promette-	promeD'sso	-a	promeD'ssa	'promise (N)'
	leD'ggere	legge-	leD'tto	-uD'ra	lettuD'ra	'reading'

The two verbs in (10)a have regular past participle forms whereas the two verbs in (10)b have irregular past participle forms. By comparing the affixation of *-a* and *-uD'ra* to both regular and irregular verb forms, it is apparent that the base to which these suffixes attach is the past participle and not the verbal stem consisting of the root and theme vowel. On the basis of this data Peperkamp proposes that the past participle also serves as a possible verbal stem in addition to the bare root and the root plus theme vowel. Given, however, that cross-linguistically past participles frequently dual-function as adjectives, I contend that the suffixes *-a* and *-uD'ra* may equally be considered deadjectival suffixes, in which case the final /*-o*/ of the past participle/adjective form represents an inflectional morpheme. Through the regular process of deadjectival suffixation in Italian the affixes *-a* and *-uD'ra* attach directly to the stem consisting of the word (PP/Adj) minus the final vowel. This view is further substantiated by other productive forms of deadjectival suffixation based on the past participle such as *lett-oD're* 'reader' and *lett-orator* 'readership'.

To summarize, in this section I have provided an overview of derivational word formation in Italian which, following Peperkamp, I argue to be stem-based as opposed to word-based. The basic stem is equivalent to a word minus any inflectional or derivational affix (including the unproductive suffix -*aD*).

While this is consistent with Peperkamp's proposal that stems in Italian comprise the root plus (in verbs) a thematic vowel, it does have subtly different implications regarding a notion of the root. For example, *per* Peperkamp the root of a verb like *utilizzaDre 'to utilize'* is *utilizz-* which with the theme vowel *a* forms the stem. In my approach the stem *utilizza-* is equivalent to the surface form minus the inflectional affix *re* without further stipulation as to whether the root itself is *utilizz-* or perhaps just *util-* (by which its relation to other forms such as *utilmeDnte* 'usefully' is more transparent). In contrast to nouns and adjectives, verbs have an alternate stem equivalent to the basic stem without the theme vowel. Also described were various phonological processes related to derivational affixation such as resyllabification, intervocalic *s*-voicing, regressive assimilation, and stem-final glide loss. The remainder of the paper provides an analysis of these facts pertaining to derivation in Italian within an Optimality Theoretic framework. A single unified account is shown to be obtainable without reliance upon prosodic word constituency.

2. *A constraint based analysis of derivational prefixation*

Within Optimality Theory (Prince & Smolensky, 1993) a grammar is represented as a hierarchy of universal well-formedness constraints regulating all aspects of a language including the interaction of phonological and morphological processes. Candidate outputs generated from a given input are evaluated against a language-particular ranking of constraints. The actual surface form selected best satisfies the ranking by violating the fewest low-ranked constraints and is thus the optimal output candidate. A further extension to OT is the Correspondence Theory of faithfulness (McCarthy & Prince, 1993a, 1994ab, 1995) which holds that candidate sets are provided with correspondence relations between elements of related strings.

(11) *Correspondence*

Given two related strings S_1 and S_2, correspondence is a relation $\mathcal{R}$ between elements of S_1 and elements of S_2 such that the segments α (an element of S_1) and β (an element of S_2) are referred to as correspondents of one another if $\alpha \mathcal{R} \beta$.

Identity between elements is not guaranteed by Correspondence; rather it is enforced by ranked and violable constraints. Separate faithfulness constraints regulate individual dimensions of an output form. The constraints in (12) demand complete correspondence between the input and the output. MAX

requires every segment in the input S_1 to have a correspondent in the related output S_2, thereby prohibiting deletion. Conversely, DEP militates against insertion by requiring any segment in the output S_2 to have a correspondent in the input S_1.

(12) *Segment Faithfulness*

MAX: "Every segment S1 has a correspondent in S2".
DEP: "Every segment S2 has a correspondent in S1".

In a similar fashion all phonological features are also individually regulated by IDENT[F] constraints which through ranking force the phonological composition of correspondent segments to be identical.

(13) *Featural Faithfulness*

IDENT[*f*]: "Correspondent segments are identical with respect to feature *f*."

Urbanczyk (1995,1996) makes the further claim that a language may employ more than one correspondence relation of the same type. Under Urbanczyk's proposal morpheme-specific phonological behavior is governed by morpheme-specific faithfulness relations. Elaborating on Urbanczyk's claims, I propose that different types of correspondence relations are oriented to different types of morphological constituents, governing various morpheme-specific and, in the case of Italian derivation, stem-specific phonological behavior[7].

This follows from the definition in (11) as well if in fact Correspondence governs both phonological and morphological relations. Just as S_1 and S_2 are related as a phonological input-output pair, I argue S_1 and S_2 are further related as morphological sub-constituents within an input-output pair. My claim is that morphological sub-constituent identity between the input and the output candidate is required by the grammar, and enforced in the same way as other types of grammatical faithfulness, by ranked and violable constraints on correspondence relations. Thus, multiple sets of faithfulness constraints, belonging either to morphology or phonology, compete in the grammar, interacting with one another and with the over-all hierarchy of markedness constraints.

The set of morpheme faithfulness constraints applicable to analyzing both Italian derivational prefixation and suffixation are defined in (14). Nearly all these constraints are identical to those proposed by Casali (1996, 1997) and are also consistent with the notion of positional faithfulness as described by Beckman (1998).

(14) *Morpheme Faithfulness*

Max-MI: "Every morpheme-initial segment in the input must have a corresponding

[7] Benua (1997) makes a similar proposal.

segment in the output."

Max-WIσ: "Every word-initial syllable in the input must have a corresponding syllable in the output."

IDENT-MI[*f*]: "Correspondent morpheme-initial segments are identical with respect to feature *f*."

IDENTV-WIσ[*f*]: "Correspondent vowels in word-initial syllables are identical with respect to feature *f*."

Faithfulness constraints interact with markedness constraints which assess the well-formedness of linguistic structure at a variety of levels including featural, segmental, syllabic and morphological. Four markedness constraints relevant to analyzing derivation in Italian are defined in (15).

(15) *Markedness Constraints*

ONSET: "Syllables must have onsets."

NoCoda "Syllables must not have codas"

*V]μ[V: "No vowel hiatus at morpheme boundaries"

*CC: "No consonant clusters in syllables onsets."

The morpheme faithfulness constraints defined in (14) in effect shield particular morphological material from phonological loss or erosion. Such privileged status has been justified by the greater semantic content encoded in particular morphemes as captured in the notion that roots typically carry greater meaning than affixes (Steriade, 1993). Similarly, the perceptual and psycholinguistic prominence of positions like the root and word-initial syllables is argued by Beckman (1998) to justify an array of positional faithfulness constraints not unlike those in (14). Furthermore, Beckman offers the following diagnostics for identifying privileged positions.

(16) *Beckman's Diagnostics*

a. Privileged positions maintain contrasts neutralized elsewhere
b. Privileged positions trigger phonological processes
c. Privileged positions resist processes applicable elsewhere

The privileged status conferred by the morpheme faithfulness constraints that are active in the morphophonological processes of Italian derivation is predicted by each of these diagnostics.

Peperkamp makes a persuasive argument that satisfying the constraint ONSET by consonant epenthesis is not productive in modern Italian. Some examples are given in (17), but in general there are few, the epenthetic segment varies and alternate forms in some cases co-exist[8].

(17)	*Base*	*Suffix*		
a.	carita**D**	-e**D**vole	carita**t**e**D**vole	'charitable'
b.	Forli**D**	-ese	forli**v**e**D**se	'inhabitant of Forli'
c.	citta**D**	-ina	citta**d**i**D**na	'small town'

[8]cf. *caffetti**D**no ~ caffei**D**no* (small cup of coffee); *regi**D**na* (queen) but *reu**D**ccio* (small king)

Thus the constraint DEP militating against epenthesis is taken to be high-ranking and dominating ONSET as depicted by the tableau in (18).

(18) DEP >> ONSET

sessuale	DEP	ONSET
a.☞ sessuale		*
b. sessu**t**ale	*!	

The tableau in (19) shows, furthermore, that the constraint MAX also crucially dominates ONSET.

(19) MAX >> ONSET

sessuale	MAX	ONSET
a.☞ sessuale		*
b. sessule	*!	

The rankings illustrated in (18-19) account for the fact that tolerance for vowel hiatus is pervasive in Italian. Yet, as illustrated in (20), there are exceptions to this tolerance for vowel hiatus most conspicuously at morpheme boundaries.

(20) DEP >> MAX

semi + interraDto	DEP	MAX
a.☞ sem[interraDto		*
b. semi[**t**interraDto	*!	

The tableau in (20) also demonstrates that DEP dominates MAX in addition to dominating ONSET. The loss of the prefixal vowel cannot be due to ONSET because as previously shown in (19), MAX crucially dominates ONSET. A logical alternative is to posit a morpheme-sensitive markedness constraint such as *V]μ[V prohibiting vowel hiatus at morpheme boundaries[9]. As shown below this constraint must necessarily dominate MAX and by transitivity ONSET as well.

(21) DEP, *V]μ[V >> MAX >> ONSET

semi + interraDto	DEP	*V]μ[V	MAX	ONSET
a.☞ sem[interraDto			*	
b. semi[**t**interraDto	*!			
c. semi[interraDto		*!		*

The ranking depicted in (21) readily accounts for vowel hiatus occurring morpheme-internally in Italian but not across morpheme boundaries. Still unexplained, however, is why the vowel which fails to

[9] *V]μ[V also plays a role in suffixation cf.§3.

surface is that of the prefix and not the stem-initial vowel. Here too a morpheme-sensitive constraint is plausibly at work, but in this case a faithfulness constraint like that of MAX-MI requiring every morpheme-initial segment in the input to have a corresponding segment in the output.

(22) DEP, *V]μ[V >> MAX-MI, MAX

semi + interraD'to	**DEP**	***V]μ[V**	**MAX-MI**	**MAX**
a.☞ sem[interraD'to				*
b. semi[**t**interraD'to	*!			
c. semi[interraD'to		*!		
d. semi[nterraD'to			*!	*

Satisfying *V]μ[V thus drives the violation of MAX while MAX-MI dictates which vowel deletes and DEP prevents repair by epenthesis. The ranking given in (22) above, however, fails to properly account for an additional aspect regarding vowel hiatus and prefixation as depicted in the tableau below.

(23) DEP, *V]μ[V >> MAX-MI, MAX

pre + avv D'so	**DEP**	***V]μ[V**	**MAX-MI**	**MAX**
a. ☞ pre[avv D'so		*!		
b. pre[**t**avv D'so	*!			
c. pre[vv D'so			*!	*
d. 💣 pr[avv D'so				*

The vowel of a single-syllable prefix never fails to surface, even though a candidate in which it does would better satisfy both *V]μ[V and MAX-MI. These facts motivate positing that *V]μ[V is dominated by a third morpheme-sensitive constraint, MAX-WIσ, requiring every word-initial syllable in the input to have a corresponding syllable in the output. Simply including Max-WIσ in the ranking used in (23) is still not sufficient.

(24) DEP, MAX-WIσ >>*V]μ[V >> MAX-MI, MAX

pre + avv D'so	**DEP**	**MAX-WIσ**	***V]μ[V**	**MAX-MI**	**MAX**
a.☞ pre[avv D'so			*!		
b. pre[**t**avv D'so	*!				
c. pr[avv D'so		*!			*
d. 💣pre[vv D'so				*	*

As clearly seen in (24), MAX-MI must necessarily dominate *V]μ[V in order for the ranking to properly account for all of the facts. The revised ranking is illustrated in (25).

(25) DEP, MAX-WIσ, MAX-MI >>*V]μ[V >> MAX

Pre + avv D'so	**DEP**	**MAX-WIσ**	**MAX-MI**	***V]μ[V**	**MAX**
a.☞ pre[avv D'so				*	
b. pre[**t**avv D'so	*!				
c. pr[avv D'so		*!			*
d. pre[vv D'so			*!		*

The additional fact that the vowel of a monosyllabic prefix surfaces without any type of alternation, such as becoming a glide,[10] is ensured by the faithfulness constraint IDENTV-WIσ[*f*] requiring Correspondent vowels in word-initial syllables to be identical with respect to feature *f*.

(26) DEP, IDENTV-WIσ[*f*], MAX-MI, >>*V]μ[V >> MAX

pre + avv D'so	**DEP**	**IDENTV-WIσ[*f*]**	**MAX-MI**	***V]μ[V**	**MAX**
a.☞ pre[avv D'so				*	
b. pre[**t**avv D'so	*!				
c. pry[avv D'so		*!			
d. pre[vv D'so			*!		*

The combined ranking of these constraints is depicted in tableau (27) below.

(27) DEP, MAX-WIσ, IDENTV-WIσ[*f*], MAX-MI >>*V]μ[V >> MAX

pre + avv D'so	**DEP**	**MAX-WIσ**	**IDENTV-WIσ[*f*]**	**MAX-MI**	***V]μ[V**	**MAX**
a.☞ pre[avv D'so					*	
b. pre[**t**avv D'so	*!					
c. pr[avv D'so		*!				*
d. pry[avv D'so			*!			
e. pre[vv D'so				*!		*

[10] A high-ranking glide-formation constraint does have a role in suffixation cf. §3.

The morpheme faithfulness constraint Max-WIσ shields the vowel of a monosyllabic morpheme from being unrecognizably truncated in attempting to satisfy vowel hiatus at a morpheme boundary. Just preventing the vowel from being deleted is not sufficient though, in addition IDENTV-WIσ[*f*] ensures the vowel doesn't undergo some alternation such as becoming a glide. The constraint pair, Max-WIσ and IDENTV-WIσ[*f*], cannot be dominated by a single constraint like MAX-MF requiring a morpheme-final segment in the input to have a corresponding segment in the output. This is because, as seen with two-syllable prefixes, a second (morpheme-final) syllable is subject to deletion in order to satisfy *V]μ[V[11]. The tableau in (27) also serves to highlight how little a role the constraints MAX >> ONSET play (despite being active in other areas of Italian phonology) in the morphophonological processes of Italian derivation.

Lastly pairing MAX-MI with the constraint IDENT-MI[*f*], which requires correspondent morpheme-initial segments to be identical with respect to feature *f*, provides an account for both the intervocalic *s*-voicing and regressive assimilation described in §1. The final ranking regarding prefixation is shown in (28)a-b.

(28)a MAX-WIσ, IDENTV-WIσ[*f*] MAX-MI, IDENT-MI[*f*] >>*V]μ[V >> MAX >> V[Z]V,*CC

sopra + saturare dis + onseto	**MAX-WIσ**	**IDENTV-WIσ[*f*]**	**MAX-MI**	**IDENT-MI[*f*]**	***V]μ[V**	**MAX**	**V[Z]V**	***CC**
a.☞ sopra[saturare							*	*
b. sop[saturare						*!*		
c. sopra[z]aturare				*!				*
x. ☞ di[z]onesto								*
y. di[s]onesto							*!	*
z. di[onesto					*!	*		*

(28)b MAX-WIσ, IDENTV-WIσ[*f*] MAX-MI, IDENT-MI[*f*] >>*V]μ[V >> MAX >> IDENT-IO[PLACE],NO-CODA

In + morale iper + sensibile	**MAX-WIσ**	**IDENTV-WIσ[*f*]**	**MAX-MI**	**IDENT-MI[*f*]**	***V]μ[V**	**MAX**	**IDENT-IO (PLACE)**	**NOCODA**
a.☞ im[morale								*
b. in[morale							*!	*
c. in[norale				*!				*
x. ☞ iper[sensibile								**
y. ipes[sensibile							*!	**
z. iper[rensibile				*!			*	**

The markedness constraints responsible for both intervocalic *s*-voicing, V[Z]V, and homorganic cluster assimilation, IDENT-IO(PLACE), are low ranking (*i.e.* relative to the morpheme-sensitive constraints).

[11] The inapplicability of Max-MF also occurs in suffixation cf.§3.

Whereas, the high-ranking morpheme faithfulness constraint IDENT-MI[*f*] ensures that the initial segment of the stem is not the target of these processes, restricting them instead to the final segment of the prefix. Furthermore, as suggested by Beckman, the ranking in (28) is consistent with that of a general ranking schema responsible for positional phonological asymmetries.

(29) IDENT-$_{\text{POSITION}}$(*f*) >> ℳℂ >> IDENT(*f*)

The general ranking in (29) reflects a situation in which some context-free faithfulness constraint such as IDENT-IO(VOICE) is dominated by an alternation-favoring markedness constraint like V[Z]V being excluded from a privileged position by, in this case, a morpheme-sensitive faithfulness constraint, IDENT-MI[*f*]. To conclude, this general ranking schema is responsible in Italian derivation for the positional maintenance of contrasts neutralized elsewhere (*e.g.* intervocalic *s*-voicing), positional triggering of phonological processes (*e.g.* regressive assimilation) and positional resistance to phonological alternation (*e.g.* preservation of word-initial syllables). The same ranking described above for prefixation is shown in §3 to provide an accounting for derivational suffixation in Italian as well.

3. *A constraint based analysis of derivational suffixation*

As described in §1 with few exceptions (*e.g.* the allomorphs *–cino* or *–cello*) denominal and deadjectival suffixes in Italian all begin with a vowel, while deverbal suffixes may begin with either a consonant or a vowel. As shown in (30) neither consonant-initial deverbal suffixes such as -*DDbile* or -*mento*, which always affix to a verbal stem ending with a vowel; nor vowel-initial deverbal suffixes such as -*iDo* or -*eDvole*, which always affix to a verbal stem ending with a consonant, are subject to any phonological processes[12].

(30) DEP, MAX-WI , IDENTV-WI [*f*], MAX-MI, IDENT-MI[*f*] >>*V]μ[V >> MAX >> NOCODA

canterell + iDo riferi + meDnto	**DEP**	**MAX -WIσ**	**IDENTV-WIσ[*f*]**	**MAX-MI**	**IDENT-MI[*f*]**	***V]μ[V**	**MAX**	**NOCODA**
a. ☞ canterelliDo								**
b. canterell**a**iDo	*!					*		**
c. canterello				*!			*	**
d. canterelliDo							*!	*
w. ☞riferimeDnto								*
x	*!*							*

[12] Other than resyllabification

riferi**ti**meD′nto								
y riferieD′nto				*!		*		*
z rifermeD′nto							*!	**

Similarly, as depicted in (31), vowel-initial denominal and deadjectival suffixes as well as the consonant-initial allomorphs, *–cino* and *–cello*, are also not subject to any phonological processes when adjoining a consonant-final stem.

(31) DEP, MAX-WIσ, IDENTV-WIσ[*f*], MAX-MI, IDENT-MI[*f*] >>*V]μ[V >> MAX >> *CC / NOCODA

libr + aio leon + ciD′no	**DEP**	**MAX -WIσ**	**IDENTV-WIσ[*f*]**	**MAX-MI**	**IDENT-MI[*f*]**	***V]μ[V**	**MAX**	***CC NOCODA**
a.☞ libr]aD′io								*
b. libr]**et**aD′io	*!*							*
c. libr]io				*!			*	*
d. lib]aD′io							*!	*
w. ☞leon + ciD′no								*
x. leon**e**ciD′no	*!							
y. leoniD′no				*!			*	
z. leociD′no							*!	

However, when a vowel-initial suffix adjoins to a stem ending with a vowel, the final vowel of the stem *does* surface despite the markedness constraint *V]μ[V prohibiting vowel hiatus at morpheme boundaries. As illustrated in (32), neither the MAX-WI nor MAX-MI constraints shield a morpheme-final segment. Also, as argued in §2, a constraint like MAX-MF (requiring a morpheme-final segment in the input to have a corresponding segment in the output) must necessarily be low-ranking because, as seen with two-syllable prefixes, a second (morpheme-final) syllable is subject to deletion in order to satisfy the constraint *V]μ[V. Thus a candidate truncating the stem-final segment would be incorrectly selected as more harmonious.

(32) DEP, MAX-WIσ, IDENTV-WIσ[*f*], MAX-MI, IDENT-MI[*f*] >> *V]μ[V >> MAX

ero + ina	**DEP**	**MAX-WIσ**	**IDENTV-WIσ[*f*]**	**MAX-MI**	**IDENT-MI[*f*]**	***V]μ[V**	**MAX**
a.☞ ero]ina						*!	
b. ero]**t**ina	*!						
c.💣 er]ina							*
d. ero]na				*!			*

These facts justify positing a 'stem – affixed form' morpheme-sensitive, faithfulness constraint such as SA-MAX defined in (33).

(33) SA-MAX: Where S is a stem morpheme of A every segment in the grammatical output S' of S has a correspondent in the candidate output A' of A under evaluation

This version of SA-MAX is a variation of a stem faithfulness constraint proposed by Benua (1997) as interpreted by Bakovi D' (forthcoming). The definition crucially relies on an expanded notion of a *stem* which includes bound-roots posited to be *grammatical* output whether they also surface as *independent words* in a language or not. In Bakovi D's view evaluation of candidate outputs by SA-MAX proceeds both asymmetrically and recursively. Stem identity relations are asymmetrical in that a derived word may copy its base, but the base cannot "anticipate" the phonology of a derived word. Stem identity relations are also recursive if all affixed forms are evaluated relative to their immediate morphological sub-constituents. I contend that the facts pertaining to Italian derivation, while supporting the supposition that stem identity relations are asymmetrical, provide evidence that languages may avail an SA-MAX constraint in a non-recursive manner as well as in a recursive manner.

The example of *eroiDna* given in (32) has just one suffix *–ina* which adjoins to the stem *ero-*. The final vowel of the stem is shielded from deletion by the constraint SA-MAX which must necessarily dominate the constraint *V]µ[V as shown in (34) below.

(34) DEP, SA-MAX, MAX-WIσ, IDENTV-WIσ[*f*], MAX-MI, IDENT-MI[*f*] >> *V]µ[V >> MAX

ero + ina	**DEP**	**SA-MAX**	**MAX-WIσ**	**IDENTV-WIσ[*f*]**	**MAX-MI**	**IDENT-MI[*f*]**	***V]µ[V**	**MAX**
a.☞ ero]iDna							*	
b. ero]**t**iDna	*!							
c. er]iDna		*!						*
d. ero]na					*!			*

This example contrasts with derived words containing two or more 'compounded' suffixes. A word like *vanitoDso* is derived by adjoining both the suffix *–ita* and the suffix *-oso* to the stem *van-*. However, the final vowel of the two-syllable affix *–ita* does not surface in the resulting form. This is clear evidence that SA-MAX in Italian is not recursive; otherwise the initial affixation of *–ita* would produce an 'intermediate' stem *vaniDta* which would then be restricted by SA-MAX from having any of its segments truncated including the final vowel. The same ranking given in tableau (34) accounts for loss of specifically the affix-final vowel of the intermediate suffix only.

(35) DEP, SA-MAX, MAX-WIσ, IDENTV-WIσ[*f*], MAX-MI, IDENT-MI[*f*] >> *V]µ[V >> MAX

van + ita + oso	DEP	SA-MAX	MAX-WIσ	IDENTV-WIσ[*f*]	MAX-MI	IDENT-MI[*f*]	*V]μ[V	MAX
a.☞ van]it]oD'so								*
b. van]ita]oD'so							*!	
c. van]ita]**t**oD'so	*!							
d. va]it]oD'so		*!					*	*
e. van]itaD']so					*!			*

Tableau (35) also illustrates how the morpheme-sensitive markedness constraint *V]μ[V plays a role in Italian derivational suffixation as well as in prefixation. The most harmonious candidate satisfies *V]μ[V while simultaneously preserving the entire stem as well as any morpheme-initial segments.

A final circumstance involving suffixation requires attention. As described in §1, the high vowel /*i*/ changes to a glide [*y*] before another vowel. The fact that this occurs throughout Italian phonology, within stems (*e.g. piedi* [py di] 'feet'), within affixes (*e.g. –aio* [yo] 'suffix denoting professions') and at morpheme boundaries (*e.g. veD'chio* [v kyo] 'old') is evidence of an undominated markedness constraint such as GLIDE which requires a high vowel to become a glide when preceding another vowel. An exception to this process, however, is a phonotactic restriction on the sequence of glide + high vowel, [*yi*]. This restriction results in the glide not surfacing as seen when the suffix *-iD'ho* adjoins to the stem *occhi-* resulting in *occhiD'ho* (*not* occh[y]iD'no). Tableaux (36-37) illustrate that the constraint SA-MAX must therefore be necessarily dominated by a markedness constraint like GLCOND[13] banning the sequence of glide + high vowel.

(36) DEP, GLIDE, SA-MAX, MAX-WIσ, IDENTV-WIσ[*f*], MAX-MI, IDENT-MI[*f*] >> *V]μ[V

occhi + iD'no	DEP	GLIDE	SA-MAX	MAX-WIσ	IDENTV-WIσ[*f*]	MAX-MI	IDENT-MI[*f*]	*V]μ[V
a.☞ occh]iD'no			*!					
b.💣occh[y]iD'no								*
c. occhi]**t**iD'no	*!							
d. occh[i]iD'no		*!						*
e. occhiD']no						*!		

(37) DEP, GLIDE, MAX-WIσ, IDENTV-WIσ[*f*], MAX-MI, IDENT-MI[*f*], GLCOND >> SA-MAX >> *V]μ[V

occhi + iD'no	DEP	GLIDE	MAX-WIσ	IDENTV-WIσ[*f*]	MAX-MI	IDENT-MI[*f*]	GL-COND	SA-MAX	*V]μ[V

[13] This constraint is conferred by Peperkamp as holding for a wide variety of languages per Ohala & Kawasaki (1984), Camilli (1965) and Muljac icD' (1972) among others.

a.☞ occh]iD′no								*	
b. occh[y]iD′no							*!		*
c. occhi]tiD′no	*!								
d. occh[i]iD′no		*!							*
e. occhiD′]no					*!				

Apart from *V]µ[V the morpheme-sensitive constraints identified as having a role in Italian derivation (*e.g.*. SA-MAX, MAX-WI , IDENTV-WI [*f*], MAX-MI and IDENT-MI[*f*]) were thus far all seemingly high-ranking relative to other constraints which are not morpheme-sensitive (*e.g.* MAX, ONSET, NOCODA or *CC). However, the activity of the markedness constraints GLIDE and GLCOND show that in fact the morpheme-sensitive constraints do indeed interact with constraints which are not morpheme-sensitive. Thus some morpheme-sensitive constraints such as SA-MAX are crucially dominated by constraints such as GLCOND which is not morpheme-sensitive, while other morpheme-sensitive constraints are not so dominated. Interestingly, GLCOND dominating SA-MAX results in the only exception in Italian to the generalization that the stem is always preserved in morphophonological processes of derivation.

To summarize, all morphophonological processes (excluding glide deletion) in Italian are accounted for by the single, core constraint ranking repeated in (38) below.

(38) *core constraint ranking in the derivation of Italian*
DEP, MAX-WI , IDENTV-WI [*f*], MAX-MI, IDENT-MI[*f*], SA-MAX >> *V]µ[V >> MAX

The complementary constraint pairs MAX-WI , IDENTV-WI [*f*] and MAX-MI, IDENT-MI[*f*] shield word-initial syllables (*i.e.* monosyllabic prefixes) and morpheme-initial segments, respectively, from any form of alternation in an attempt to satisfy *V]µ[V; while SA-MAX does the same for the entire stem. Undominated DEP, on the other hand, precludes vowel-hiatus repair by epenthesis. Consequently, only di-syllabic prefixes or (intermediate) suffixes exhibit the loss of the affix-final vowel in order to avoid vowel-hiatus at morpheme boundaries in satisfaction of *V]µ[V.

4. *Conclusion*

Following Peperkamp I have argued that derivation in Italian is *stem*-based as opposed to *word*-based. Unlike Peperkamp, though, my hypothesis does not crucially rely on a notion of prosodic word as a domain of phonological processes. The pre-emption of pervasive and characteristic phonological features of Italian such as syllabic onsets, intervocalic *s*-voicing or homorganic clustering by routine morphophonological processes is evidence that the generalization holding throughout derivation in Italian

is preservation of the stem. In my account the basic stem is equivalent to a word minus any inflectional or derivational affix (including the unproductive suffix *-aD*). A set of morpheme-sensitive faithfulness constraints including the pairs MAX-WI , IDENTV-WI [*f*] and MAX-MI, IDENT-MI[*f*] shield word-initial syllables (*i.e.* monosyllabic prefixes) and morpheme-initial segments, respectively, from any alternation in an attempt to satisfy the morpheme-sensitive markedness constraint *V]μ[V, banning vowel hiatus at morpheme boundaries. In a similar fashion the entire stem is non-recursively shielded by SA-MAX.

Thus morphological sub-constituent identity between the input and output of candidates is a requirement of the grammar, and enforced in the same way as other types of grammatical faithfulness, by ranked and violable constraints on correspondent relations. Multiple sets of faithfulness constraints, belonging either to morphology or phonology, compete in the grammar, interacting with one another and with the over-all hierarchy of markedness constraints. The shielding of particular morphological material from phonological loss or erosion by morpheme-sensitive constraints confers a status of "privileged position" which is justified by the greater semantic content encoded in such morphemes as captured in the notion that stems typically carry greater meaning than affixes. This is consistent with the proposal of McCarthy & Prince (1994b) that faithfulness is relativized to the basic morphological types root (*i.e.* stem) and affix. Universally faithfulness to stem material takes precedence over faithfulness to affixal material. Consequently, affixal material is relatively unmarked with respect to stem material and, *ceteris paribus*, stems exhibit greater contrasts than affixes.

The loss in Italian of affix-final vowels in di-syllabic prefixes and intermediate suffixes attests to affixal material being relatively unmarked with respect to stem material. Furthermore, this loss of affixal material is indication of a much more striking asymmetry between stems and affixes than the perceived asymmetry between prefixes and suffixes. In seeking to find within prosodic constituency an explanation for why suffixes cohere with their bases yet prefixes seemingly do not, Peperkamp entirely disregards any stem-affix asymmetry. Indeed, Peperkamp discounts the not uncommon loss of prefix-final vowels as a "fast speech phenomenon"; and conflates the issue of final-vowel loss in intermediate suffixes by analyzing occurrences of multiple suffixation (*i.e.* compound suffixes) as single, composite affixes. In contrast, stem-affix asymmetry is a direct consequence of my central claim that stem preservation shapes phonological processes associated with Italian derivation.

The unified analysis of Italian derivational prefixation and suffixation I offer is supported by morpheme-sensitive, positional faithfulness constraints akin to those proposed by both Casali (1996,1997) and Beckman (1998). The core constraint ranking which I propose accounts for all the issues raised in Peperkamp's analysis without any need for the alignment constraints on which she relies. Finally, the inclusion of a non-recursive variation of Bakovi D's interpretation of stem faithfulness as proposed by Benua (1997), crucially accounts for additional circumstances in Italian involving the loss of prefix-final

vowels as well as vowel loss when suffixes are combined. Thus, my proposal is a theoretically more comprehensive analysis of the facts relating to derivation in Italian than previously offered.

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