

A representational analysis of secondary stress in Italian

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This paper surveys various analyses of secondary stress assignment in Italian and argues that they suffer from both descriptive and explanatory shortcomings. An alternative account will be developed, in which stress is not assigned by rule but is selected from a set of conceivable candidates by a system of constraints on representations. The stress patterns that are considered are those of words when pronounced in isolation. It will be shown that monomorphemic and derived words differ only in their stress patterns in that derived words are subject to the requirement that stress from the embedded word be preserved. This requirement, though, is overridden by constraints on metrical and prosodic wellformedness. Optional reranking of these requirements in the relevance hierarchy accounts for the variability of secondary stress which is found mainly in the southern varieties of Standard Italian. Finally, it will be argued that compounds generally consist of more than one stress domain, whereas adverbs ending in *-mente* show hybrid behavior; they cannot be classified either with derived words or with compounds.

1. Introduction

It is well-known that in Italian, main word stress falls on one of the word's last three syllables, but is further unpredictable on the basis of phonological information (cf., among others, Di Pietro (1971); Muljačić (1972); Vogel (1982)). Thus, we find minimal pairs such as *áncora* 'anchor' - *ancóra* 'still', and *finí* 'ends' - *finí* '(he) finished'. Lepschy (1968) argues that secondary stress, too, has a distinctive function. According to this hypothesis, which is discussed in Lepschy & Lepschy (1977) and Lepschy (1992) as well, the compound *cuciréte* 'sewing machine for nets' and the verb form *cuciréte* '(you) will sew' are distinguished from one another by virtue of the presence of secondary stress in the former versus its absence in the latter. Similarly, the compounds *áuto-reattóre* 'self-reactor' and *autóre-attóre* 'authoractor' are argued to be distinguished from one another by virtue of the different positions of secondary stress in these words.

The hypothesis that secondary stress in Italian is contrastive, though, is not uncontroversial. For instance, according to Camilli (1965), secondary stress is predictable: unstressed syllables and syl-

lables with secondary stress essentially alternate to the left of the main stress. Muljačić (1972) and Bertinetto (1976, 1981) also argue against the contrastiveness of secondary stress. Bertinetto claims that secondary stress in Italian is rhythmical only. That is, prominence can be given to syllables that do not bear main stress in order to avoid long sequences of unstressed syllables. Bertinetto argues that the position of these additional prominences is dependent on the rhythmic contour of entire utterances rather than on single words. Secondary stress, therefore, is not lexical.

An account that claims to unify the contrastiveness hypothesis of Lepschy and the predictability hypothesis of Camilli, is proposed by Vogel & Scalise (1982). They show, in fact, that the surface differences in pairs with contrasting secondary stress patterns found by Lepschy are predictable on the basis of morphological information. In Vogel & Scalise's approach, then, secondary stress is assigned by a set of four ordered rules. Other accounts of Italian secondary stress in Italian are Roca (1986) and Sluyters (1990), stated in the framework of metrical phonology.

In this paper, I will first discuss the proposals by Vogel & Scalise (1982), Roca (1986), and Sluyters (1990). I will point out some drawbacks and proceed by developing an alternative account of secondary stress assignment within Optimality Theory (Prince & Smolensky 1993). In Optimality Theory, stress is not assigned by rule; rather, a set of hierarchically ranked constraints on surface forms selects the best of all conceivable stress patterns. Stress is thus subject to a checking mechanism (cf. Burzio 1994). It will be shown that the proposed representational account is superior to the various rule-based approaches.

2. Data

The analysis presented in this paper will be based mainly on data from the northern variety of Standard Italian as reported in Vogel & Scalise (1982). It is important to keep in mind that the patterns to be considered are those of words pronounced in isolation. Within phrasal contexts, stress is subject to various readjustment rules which will not be considered here (cf. Nespor & Vogel 1979, 1989).

Lepschy & Lepschy (1977) argue that secondary stress in Italian is to a large extent optional, but that a distinction must be drawn between syllables that can be stressed and those that cannot. For instance, in the word *mercoledì* 'Wednesday', the first syllable

optionally bears secondary stress, but the second and the third cannot be stressed: *mèrcoledì*, **mercoledì*, **mercoledì*. Following Lepschy & Lepschy (1977), Vogel & Scalise (1982) use this notion of stressability and put a stress mark on those syllables that can be stressed. In what follows, one can thus read 'stressable' for 'stressed'. Vogel & Scalise observe that the distribution of secondary stress in both monomorphemic and derived words is subject to the following generalizations:¹

- (1) (i) There are no stress clashes (i.e. no sequences of stressed syllables).
- (ii) Words begin with a stressed syllable (unless this would lead to a clash).
- (iii) There are no sequences of more than two unstressed syllables.

These generalizations do not suffice to unambiguously determine the pattern of secondary stress in a given word. In words with an odd number of syllables preceding the main stress, different patterns can in fact satisfy the conditions in (1). Vogel & Scalise show that the two logically possible patterns for words with five syllables preceding the main stress are both attested. Furthermore, in words with six syllables preceding the main stress, we find two different patterns as well. This is illustrated in (2a) and (2b), respectively.

- (2) a. $\acute{\sigma} \sigma \acute{\sigma} \sigma \acute{\sigma} \dots$ *accettabilitàá* 'acceptability'
- $\acute{\sigma} \sigma \acute{\sigma} \acute{\sigma} \sigma \dots$ *sentimentalitàá* 'sentimentality'
- b. $\acute{\sigma} \sigma \acute{\sigma} \acute{\sigma} \sigma \acute{\sigma} \dots$ *classificabilitàá* 'classifiability'
- $\acute{\sigma} \sigma \acute{\sigma} \acute{\sigma} \sigma \acute{\sigma} \dots$ *rappresentativitàá* 'representativity'

It is this difference in stress patterns that an adequate analysis of secondary stress should account for.

As noted by Vogel & Scalise, a certain amount of variability is present in secondary stress patterns. In particular, they observe that a small group of words does not necessarily begin with a stressed syllable, in violation of condition (1ii). Some examples are given in (3).

- (3) a. $\acute{\sigma} \sigma \acute{\sigma} \sigma \acute{\sigma} \dots$ *elettricità* 'electricity'
- $\acute{\sigma} \sigma \acute{\sigma} \sigma \acute{\sigma} \dots$ *elettricitá* 'electricity'
- b. $\acute{\sigma} \sigma \acute{\sigma} \sigma \acute{\sigma} \dots$ *caratterizzábile* 'characterizable'
- $\acute{\sigma} \sigma \acute{\sigma} \sigma \acute{\sigma} \dots$ *caratterizzábile* 'characterizable'
- $\acute{\sigma} \sigma \acute{\sigma} \sigma \acute{\sigma} \dots$ *comunicazióne* 'communication'
- $\acute{\sigma} \sigma \acute{\sigma} \sigma \acute{\sigma} \dots$ *comunicazióne* 'communication'

Vogel & Scalise mention three factors that might influence the choice

of the stress pattern. First, the pattern in (3a) is more characteristic for northern standard Italian, and the pattern in (3b) for the southern varieties. Second, relatively familiar words tend to be pronounced with the pattern in (3a), while relatively unknown words are more likely to be pronounced with the pattern in (3b), which preserves the main stress of the embedded word (*elétrico* 'electric', *caráttere* 'character', *comúnica* 'communicate') as a secondary stress. Third, for reasons of phrasal eurhythm, the pattern in (3a) is preferred if it is immediately preceded by more than one unstressed syllable, while that in (3b) is preferred if the preceding word has final stress.

In order to study variability in the stress patterns of words pronounced in isolation, I asked native speakers to read aloud over 200 words, while putting emphasis on those syllables that they felt could be stressed. Five informants were from northern Italy, four from the southern part. The results can be summarized as follows. In monomorphemic words no variation is present. Thus, words like *particoláre* 'particular', *temperatúra* 'temperature' and *universále* 'universal' cannot be stressed on the second syllable; these words always have initial secondary stress. As to derived words, speakers of the northern varieties almost invariably put stress on the first syllable (unless this would lead to a clash with the primary stress); speakers of the southern varieties also stress the first syllable in the majority of cases, but they exhibit more variation. In particular, they sometimes have non-initial stress in suffixed words, such as *perversità* 'perversity'. Moreover, my informants from Palermo but not those from Rome (both southern varieties) can also have non-initial stress in words with a monosyllabic prefix, such as *indipendente* 'independent'. Interestingly, the words that individual speakers of the northern varieties pronounce with non-initial stress are all drawn from a small group, e.g. *elétricitá* 'electricity' and *carátterizza* 'characterizes'. For these speakers, variation thus appears to be related to specific lexical items. This observation goes counter to Vogel & Scalise's suggestion that non-initial stress is especially found with relatively unfamiliar words. Speakers from the southern varieties, in contrast, exhibit more variation in which items they pronounce with non-initial stress.

As a second part of the test, I also confronted the informants with their pronunciations and asked them whether they would accept an alternative suggested by me. For instance, if an informant had said *capacitá* 'capacity' I would ask if (s)he would accept *capàcità* as well. All speakers, regardless of the variety they speak, were liberal in this part of the test. Non-initial stress tends not only to be accepted if the embedded word has stress on the second syllable, e.g. *mirácoloso* 'miraculous' from *mirácolo* 'miracle', but often also if this

correlation is absent, e.g. *occidentále* 'Western' (cf. *occidente* 'West'). It might be the case that speakers hear both initial and non-initial stress for all types of words in phrasal contexts and therefore tend to accept both patterns. According to Bertinetto (1985) and Lepšcy (1992), variability holds for a much larger class of words than Vogel & Scalise suggest, an observation which is thus confirmed by my data. Given that the acceptance of alternative stress patterns is likely to be conditioned by phrasal contexts, I will not consider it any further.

3. Rule-based approaches

Vogel & Scalise (1982) argue that the differences in the secondary stress patterns in (2) are due to the morphological structure of the words. For instance, *accettábilitá* in (2a) is derived from *accettábile* 'acceptable', with main stress on the antepenult, while *sèntimentálità* is derived from *sèntimentále* 'sentimental', with main stress on the penult. It is the main stress of these words that surfaces as secondary stress in the derived words. Similarly, *clássificábilitá* in (2b) is derived from *clássificábile* 'classifiable', with antepenultimate stress, whereas *rappresentatívitá* is derived from *rappresentatívo* 'representative', with penultimate stress. In other words, secondary stress assignment is dependent upon the morphological composition of the word.

Vogel & Scalise thus assume primary stress to be assigned cyclically; each affix contributes to the stress pattern and no stresses of earlier cycles are erased. At the end of the derivation, all stresses but the rightmost one are reduced to secondary stress. Vogel & Scalise argue that the following set of four linear readjustment rules derive the surface secondary stress patterns.

- (4) a. Initial Stress (IS): $\sigma \rightarrow [+ \text{stress}] / \# _ \sigma_1 \acute{\sigma}$
 b. Stress Insertion (SI): $\sigma \rightarrow [+ \text{stress}] / \sigma _ \sigma$
 c. Clash Avoidance (CA): $\acute{\sigma} \rightarrow [- \text{stress}] / _ \acute{\sigma} \left\{ \begin{array}{l} \sigma \\ \# \end{array} \right.$
 d. Stress Reversal (SR): $\sigma \acute{\sigma} \rightarrow \acute{\sigma} \sigma / \# _ \dots \acute{\sigma}$

Initial Stress (4a) stresses a word-initial syllable if it is followed by at least one unstressed syllable. Stress Insertion (4b) places a stress on the second one of a series of three adjacent unstressed syllables.

* * * * * → * * * * *

* * → (*)(*)(*)(*) Clash (*)(*)(*) *

[[dolo]oso] [[dolo]oso] Deletion [[dolo]oso]

The second readjustment rule, Stress Reversal, is needed to deal with the strong preference to have word-initial stress. It operates in words with an odd number of syllables preceding the main stress, changing, for instance, unattested **tempèratúra* into the correct form *tèmpèratúra*.

A problem with Roca's account, however, is that it cannot derive the alternative accentuations in (3b). For instance, *còmunicazione* 'communication' can also be parsed *comùnicaçãoe*. But the former pattern with perfectly alternating stressed and unstressed syllables is yielded in one step by Roca's algorithm, and the latter pattern is beyond reach.

Another point that can be put into question is Roca's assumption that feet in Italian are right-headed. In fact, there are two reasons for which Italian is generally argued to have left-headed feet. First, main stress falls on one of the word's last three syllables, with penultimate stress being the unmarked case. This is accounted for naturally by positing a disyllabic trochee and by assigning final syllable extrametricality to words with antepenultimate stress (den Os & Kager 1986). Second, according to the rhythmic Iambic/Trochaic Law (Hayes 1985, 1995), iambic feet universally correlate with durational contrasts while trochaic feet correlate with intensity contrasts. The canonical iamb therefore consists of a light syllable followed by a heavy one, whereas trochees consist of either two syllables or two moras. In Italian feet are not formed on the basis of syllable weight (cf. Vogel & Scalise 1982; den Os & Kager 1986).⁵ The Iambic/Trochaic Law therefore implies that the foot form is a trochee rather than an iamb.

An alternative metrical analysis, based on cyclic main stress, is put forward in Sluyters (1990). Sluyters proposes that secondary stress be assigned by building syllabic trochees from left to right. No monosyllabic feet preceding the main stress are built; as a consequence, word-initial stress is assigned if and only if the second syllable is unstressed. Stress clash, however, still occurs as a result of cyclic main stress assignment. For instance, in deriving *doloróso* 'painful' from *dolóre* 'pain', the stress of the base word *dolóre* comes to constitute a clash with the main stress introduced by the suffix *-óso*

in the derived word. Sluyters does not consider frequent cases like these, but a clash resolving device should clearly be added to his algorithm.

To sum up this section, Vogel & Scalise (1982) propose a linear account of secondary stress assignment that assumes secondary stress to be related to the morphological composition of words, while Roca (1986) and Sluyters (1990) propose metrical accounts. While the latter approaches have the advantage over a linear analysis of relating the Italian facts to universal metrical principles, I have shown that they have their drawbacks as well. In particular, both analyses still need a repair strategy in order to resolve accentual clashes, while Roca's account has the additional problem that in words with an odd number of syllables preceding the main stress, initial stress is not obtained by the basic algorithm.

In the next section, I will propose an analysis of the Italian facts within the framework of Optimality Theory, which is entirely output-oriented. As a consequence, no repair strategies need to apply. The proposed analysis therefore does not suffer from any of the drawbacks discussed above.

4. Principles of stress checking

In Optimality Theory (Prince & Smolensky 1993), phonological processes are not described by a set of ordered rules that modify underlying forms; rather, the relation between underlying form (or *input*) and surface form (or *output*) is established on the basis of a set of hierarchically ranked constraints on the well-formedness of phonetic forms. These constraints are assumed to be universal; that is, they are operative in every language. The ranking of the constraints, though, is language specific. Constraints often conflict, and the basic tenet of the theory is that constraints are violated under compulsion of higher ranked constraints. That is, an output form can violate a constraint as long as it satisfies higher ranked constraints which are violated by other conceivable output candidates, making the latter ill-formed.

Several typological blocks of constraints can be distinguished. For instance, constraints on syllabic well-formedness state that syllables should have an onset and lack a coda. These constraints thus express the universal preference for the core syllable of the form CV (cf. Prince & Smolensky 1993, Chapter 6). Constraints on faithfulness of input representation ban deletion and insertion by requiring that underlying material should surface in the output and that the

output should not contain material which is not present in the input, respectively. Constraints on metrical structure state the preference for iambic or trochaic feet, the enhancement of the strong syllable of the leftmost or rightmost feet to primary stress, the requirement for feet to be binary, etc. Finally, constraints on the alignment of grammatical categories demand that a designated edge of some (morphological or prosodic) constituent coincide with a designated edge of some other constituent (McCarthy & Prince 1993b).

Technically, the selection of the output form on the basis of a given input works as follows. A function that operates on input forms generates a large set of possible output forms. These forms are evaluated recursively against the set of ranked constraints. The highest ranked constraint is considered first. Any candidate with more violations of this constraint than at least one other candidate is regarded as having a fatal violation, resulting in the exclusion of the candidate. The remaining candidates are then evaluated further with respect to the next most highly ranked constraint. The evaluation process continues until there is only one candidate left, i.e. the correct output form. This candidate gives the best satisfaction of the ordered set of constraints and it is thus called optimal.

4.1. *Monomorphemic words: Basic ranking arguments*

With this theoretical background in mind, we are ready to reconsider the Italian facts. Vogel & Scalise (1982) stated three surface generalizations regarding the distribution of secondary stress, given in (1), and repeated below as (8).

- (8) (i) There are no stress clashes (i.e. no sequences of stressed syllables).
 (ii) Words begin with a stressed syllable (unless this would lead to a clash).
 (iii) There are no sequences of more than two unstressed syllables.

The generalizations in (8) are conditions on surface forms which translate naturally into the following universal constraints on the structure of metrical feet, which have all been argued for previously. First of all, the absence of stress clashes is accounted for by FtBIN (McCarthy & Prince 1993a:43):

- (9) FtBIN: Feet must be binary under syllabic or moraic analysis.

Under the assumption that Italian is quantity insensitive, i.e. that the units composing feet are syllables, FtBIN requires feet to consist of exactly two syllables. As a consequence, satisfaction of FtBIN entails that no two adjacent syllables can both be the head of a foot, hence that there can be no sequences of stressed syllables. Furthermore, I assume that feet are left-headed (cf. den Os & Kager 1986). In other words, well-formed feet in Italian are syllabic trochees.

Second, word-initial stress follows from an alignment constraint, which requires the left edge (L) of every prosodic word (PW) to coincide with the left edge of a foot (Ft). McCarthy & Prince (1993b) show that this type of alignment is operative in various unrelated languages with different effects. Formally, the constraint is stated as in (10).

- (10) ALIGN-PW: Align(PW, L; Ft, L)

Given the assumption that feet in Italian are trochaic, the effect of ALIGN-PW is that words start with a stressed syllable.

In Vogel & Scalise's formulation, the requirement of word-initial stress (8ii) is overridden by the prohibition on stress clashes (8i): no stress is assigned to the initial syllable if this would introduce a clash. In Optimality Theory, this result is typically obtained by constraint ranking. That is, the constraint on foot binarity outranks the one that calls for initial stress. This is illustrated by the constraint tableau in (11). Given the input /felice/ 'happy', two output candidates are considered. In the tableau, feet are enclosed in round brackets. In candidate (a), a monosyllabic foot is built on the first syllable. This candidate violates FtBIN, but it satisfies ALIGN-PW. In candidate (b), by contrast, the first syllable remains unfooted, hence FtBIN is satisfied but ALIGN-PW is violated. Constraint violation is indicated by *'. The violation of FtBIN by candidate (a) is fatal, since the alternative candidate satisfies this constraint; this is indicated by the exclamation mark. Candidate (b) is thus the winner, despite its violation of ALIGN-PW. This constraint is irrelevant for the fate of the candidates, since the correct output form has already been selected on the basis of higher ranked FtBIN. The cells of ALIGN-PW are therefore shaded. Candidate (b), the optimal output form, is pointed at by 'i'.

(11)

	/felice/	FtBIN	ALIGN-PW
a.	(fe)(lice)	*!	*
b. <i>i</i>	fe(lice)		

Thus, the underlying form /felice/ yields an output form with a single foot preceded by an unfooted syllable. This is in accordance with the fact that the first syllable of *felice* cannot bear secondary stress.

Finally, in order to account for the fact that there are no sequences of more than two unstressed syllables, as stated in (8iii), the following constraint is needed.

- (12) $\text{PARSE-}\sigma$: Syllables must be dominated by feet. (McCarthy & Prince 1993a:14)

According to $\text{PARSE-}\sigma$, every syllable should be part of a foot. Hence, this constraint bans stray syllables, which are directly linked to the prosodic word. For short words like *felice*, $\text{PARSE-}\sigma$ and ALIGN-PW always have the same violation marks, hence ALIGN-PW could be replaced by $\text{PARSE-}\sigma$ in (11) without changing the result. But for longer words, like *temperatura* 'temperature' $\text{PARSE-}\sigma$ and ALIGN-PW are both crucially dominated by FTBIN . To see this, consider the tableau in (13), which evaluates four output candidates.

(13)

	/temperatura/	FTBIN	ALIGN-PW	$\text{PARSE-}\sigma$
a.	(tèm)(pèra)(tura)	*!		
b.	tem(pèra)(tura)		*!	*
c.	(tèmpe)(rà)(tura)	*!		
d. $\text{E}\Phi$	(tèmpe)ra(tura)			*

Candidates (a) and (c) satisfy $\text{PARSE-}\sigma$, but they both contain a monosyllabic foot and are ruled out by top ranked FTBIN . The remaining candidates, (b) and (d) differ with respect to the position of the unfooted syllable. Candidate (d) wins over (b), since the former but not the latter begins with a foot and hence satisfies ALIGN-PW .⁷ Candidate (d) is thus defined optimal. It has a word-initial stress followed by two adjacent unstressed syllables, the first one of which is the weak member of a foot; the word-medial syllable remains unfooted, in violation of $\text{PARSE-}\sigma$. This violation, though, is irrelevant, since the competing candidates violate at least one higher ranked constraint.

4.2. Derived words

So far we have only considered monomorphemic words. As

shown by Vogel & Scalise (1982), derived words satisfy the same surface generalizations as underived words, and the stress patterns of both types often coincide. For instance, monomorphemic *felice* 'happy' patterns with prefixed *incónscio* 'unconscious' and suffixed *barista* 'bartender'; monomorphemic *temperatura* patterns with prefixed *ipe-rattivo* 'hyperactive' and suffixed *sentimentále* 'sentimental'. Derived words thus appear to be subject to the constraint hierarchy established above for monomorphemic words.

The constraint $\text{PARSE-}\sigma$, although low-ranked in the constraint hierarchy, has an additional effect in derived words. That is, in longer words it accounts for Vogel & Scalise's observation that there are no word-internal sequences of three unstressed syllables (8iii). This is illustrated in (14) for *rinocerontino* 'small rhinoceros'. Output candidate (a) contains three adjacent unstressed syllables. This candidate is ruled out, since it has two unfooted syllables. The competing candidate (b), in fact, satisfies both FTBIN and $\text{PARSE-}\sigma$, and hence is the winner.⁸

(14)

	/rinocerontino/	FTBIN	ALIGN-PW	$\text{PARSE-}\sigma$
a.	(rino)ceron(tino)			*!*
b. $\text{E}\Phi$	(rino)(cèron)(tino)			

What remains to be explained is the cyclic effect of stress assignment. That is, we should account for the fact that primary word stress is often carried over as a secondary stress in derived words. A way of doing this is proposed by Burzio (1994), who puts forward a theory of stress checking, in which stress is not assigned by rule but is present underlyingly and subject to well-formedness conditions on derived representations (see also Burzio & DiFabio 1994). Burzio defines a principle of Metrical Consistency, according to which morphemes, stems and affixes alike, maintain fixed accentual properties in word-formation. In fact, Burzio argues that stress is one of the stable properties of form and meaning by which morphemes are defined. Metrical Consistency is not unviolable but subordinate to conditions on metrical well-formedness. In the Optimality Theoretic approach adopted in this paper, Metrical Consistency can be formulated as a faithfulness constraint which requires morphemes to surface with their underlying stress:

- (15) METRCONS : morphemes surface with their underlying stress.

Burzio points out that whether a morpheme surfaces with primary or secondary stress is irrelevant for satisfaction of METRCONS. In fact, the enhancement of one of the word's stressed syllables (in Italian the rightmost one) to primary stress, is the consequence of an independent principle.

We have seen that in Italian, words with six syllables preceding the main stress can surface either with two secondary stresses, as *classificabilità* 'classifiability', containing two ternary spans, or with three, as *rappresentatività* 'representativity', presenting a perfectly alternating pattern of stressed and unstressed syllables. The difference is due to the position of main stress in the embedded words: on the antepenult in *classificabile* 'classifiable' and on the penult in *rappresentativo* 'representative'. Given that *classificabilità* surfaces with two unstressed syllables, PARSE-σ must be dominated by a constraint that calls for preservation of main stress on the preceding cycle as secondary stress in the output, ruling out the pattern **clàssificabilità*. This constraint is thus METRCONS.

Satisfaction of METRCONS is computed recursively over the morphological constituents. Thus, in words containing more than one affix, secondary stress should fall on the syllable bearing main stress in the immediately embedded word. In (16), METRCONS is violated by candidate (a), *clàssificabilità*, since the stress of the immediately embedded word *classificabile* is not preserved. Candidate (b), *clàssificabilità*, on the other hand, satisfies METRCONS, and hence is the winner.⁹

(16)

/classificabilità/	FtBIN	ALIGN-PW	METRCONS	PARSE-σ
a. (clàssi)(fìca)(bìli)(tà)	*		*!	
b. ^{ES} (clàssi)(fì)(càbi)(lì)(tà)	*			**

In (17), the (a) candidate, *rappresentatività*, with alternating stressed and unstressed syllables wins, since it preserves the stress of the embedded word *rappresentativo*. The fact that it fares better with respect to PARSE-σ as well, is irrelevant, given the domination of METRCONS over PARSE-σ.

(17)

/rappresentatività/	FtBIN	ALIGN-PW	METRCONS	PARSE-σ
a. ^{ES} (ràppre)(sènta)(tìvi)(tà)	*			
b. (ràppre)sen(tàti)(vì)(tà)	*		*!	**

The effect of METRCONS on words with an add number of syllables preceding the main stress is illustrated in (18). In these cases, the competing candidates all have one unparsed syllable. Which syllable is left unparsed depends on the position of main stress in the embedded word. Thus, *accettabilità* 'acceptability', from *accettabile* 'acceptable' has the unstressed syllable after the second foot, while in *sentimentalità* 'sentimentality', from *sentimentale* 'sentimental', the unparsed syllable follows the first foot. For completeness, the tableaux also contain candidates in which the word-initial syllable is left unparsed. These candidates are ruled out since they violate higher ranked ALIGN-PW.

(18)

/accettabilità/; /sentimentalità/	FtBIN	ALIGN-PW	METRCONS	PARSE-σ
a. ac(cètta)(bìli)(tà)	*	*!	*	*
b. (àccet)ta(bìli)(tà)	*		*!	*
c. ^{ES} (àccet)(tàbi)(lì)(tà)	*			*
a. sen(tìmen)(tàli)(tà)	*	*!		*
b. ^{ES} (sènti)men(tài)(tà)	*			*
c. (sènti)(mènta)(lì)(tà)	*		*!	*

According to Roca (1986), the data reported in Vogel & Scalise (1982) contain several counterexamples to the hypothesis that stress is assigned cyclically. In particular, Roca mentions the following three cases. First, *probabilità* 'probability' does not preserve the stress of the embedded word *probabile* 'probable'. It is easy to see, though, that this is a case of conflicting requirements; that is, the higher ranked constraint ALIGN is satisfied at the cost of violation of METRCONS. Second, *razionalizzabilità* 'rationalizability' does not preserve the stress of the embedded word *razionalizzare* 'rationalize'. The native speakers I consulted, however, all gave *razionalizzabilità*, as predicted by the cyclicity hypothesis. Finally, Roca mentions *ipersensibilità* 'hypersensitivity'. The prefix *iper-* attaches to both adjectives and nouns, but given the semantic analysis of *ipersensibilità* as 'the state of being hypersensitive', the immediate constituent must be the adjective *ipersensibile*, 'hypersensitive' rather than the noun *sensibilità*. 'sensitivity'. We would thus expect the pattern *ipersensibilità*, with stress carried over from *ipersensibile*, but this pattern is attested with very few speakers. I argue, however, that the

more common pattern *ipersensibilità* is not a counterexample to the relevance of primary stress of embedded words. On the contrary, under the assumption that prefixation induces recursive prosodic structure, it is predicted to be the unmarked pattern. Prefixes often exhibit independent phonological behavior, and accordingly it has been proposed for various languages that prefixes be adjoined to the prosodic word (Inkelas 1989; McCarthy & Prince 1993ab). Carried over to Italian, this hypothesis thus gives (ipersensibilità)_{PW}/PW as the prosodic structure of *ipersensibilità*, and the attested stress pattern satisfies ALIGN-PW with regard to both the inner and the outer prosodic word.¹⁰ The less common pattern *ipersensibilità* with non-initial stress in the embedded prosodic word, then, is a case of variability of secondary stress, to be discussed below.

Let us now turn to words containing a monosyllabic prefix. Consider, for instance, *areligioso* 'irreligious', from *religioso* 'religious'. The prosodic structure is (a (religioso)_{PW})/PW, and given that feet are binary, alignment cannot be satisfied with regard to both the inner and the outer prosodic word. Two output candidates should be compared, one in which a foot begins at the left edge of the outer prosodic word, and one in which a foot begins at the left edge of the inner prosodic word. It is the former candidate that should win, but the constraint hierarchy established so far cannot select this surface form. In fact, both candidates incur exactly the same violation marks, since one syllable is necessarily left unparsed, and alignment of the inner prosodic word induces misalignment of the outer prosodic word and *vice versa*. In the tableau, the desired selection of the attested output is indicated by '§'.

(19)

	/areligioso/	FtBIN	ALIGN-PW	METRCONS	PARSE-σ
a. §	(àre)li(giòso)		*		*
b.	a(rèli)(giòso)		*		*

Apparently, there is an additional constraint which favours candidate (a) over (b). I propose that this be ALIGN-MW, requiring that the morphological word begin with a foot.

(20) ALIGN-MW: Align(MW, L; Ft, L)

In words without prefixes, ALIGN-PW and ALIGN-MW are equivalent. In prefixed words, however, the left edge of the inner prosodic word

does not coincide with a morphological word boundary. In words with a monosyllabic prefix, then, ALIGN-MW is decisive, picking out the candidate with initial stress. This is illustrated in (21). Note that this case does not provide any arguments for the ranking of ALIGN-MW with respect to the other constraints. Below it will be shown that ALIGN-MW must be dominated by METRCONS. In the tableau, ALIGN-MW is therefore ranked at the bottom of the hierarchy. The dotted line which separates the columns of PARSE-σ and ALIGN-MW indicates that these constraints are unranked with respect to each other.

(21)

	/areligioso/	FtBIN	ALIGN-PW	METRCONS	PARSE-σ	ALIGN-MW
a. §	(àre)li(giòso)		*		*	
b.	a(rèli)(giòso)		*			*

A final issue to be discussed concerns the variability of secondary stress. We have seen that in words with an odd-numbered syllable string preceding the main stress, secondary stress tends to be on the word-initial syllable rather than on the second one. This holds for both monomorphemic words (see e.g. *temperatura* 'temperature', not **tempèratúra* in (13)) and derived words (e.g. *sentimentale* 'sentimental', not **sentimèntale*). The tendency of having a ternary span word-initially rather than having a word-initial unstressed syllable is dubbed the Initial-dactyl effect by Prince (1983:49); in fact, it is characteristic of many unrelated languages with a trochaic stress pattern (see also McCarthy & Prince (1993b) and Hayes (1995)). In Optimality Theory, high-ranked ALIGN-PW is responsible for the effect. Now, recall from section 2 that some variability is present in Italian; especially in the southern varieties secondary stress can sometimes be on the second syllable of derived words. Two cases should be distinguished. First, in suffixed words, for instance *perversità* 'perversity' from *perverso* 'perverse', main stress of the embedded word is respected at the cost of misalignment.¹¹ This type of variability is found in both southern varieties of which I collected data, spoken in Rome and Palermo, respectively. In order to account for this type, I propose that, optionally, the ranking of ALIGN-PW and METRCONS be reversed. This is illustrated in the tableau in (22).¹²

(22) ALIGN-PW and METRCONS reranked

/perversità/	FTBIN	METRCONS	ALIGN-PW	PARSE-σ	ALIGN-MW
a. (pèrver)si(tá)	*	*!		*	
b. ^{ES} per(vèrsi)(tá)	*		*	*	*

Second, in words with a monosyllabic prefix, for instance *disintegrato* 'disintegrated' from *integrato* 'integrated', it is a secondary stress which is carried over from the base. This type of variable secondary stress is characteristic of only a part of the southern varieties; according to my data, speakers from Palermo often have non-initial stress in prefixed words, but speakers from Rome do not exhibit this pattern.

In this case, the ranking of ALIGN-PW is irrelevant. In fact, given the embedded prosodic word structure, both the candidate with initial stress and the one with non-initial stress incur exactly one violation of this constraint. Reranking of ALIGN-PW and METRCONS therefore does not account for this type of variability. Rather, I would like to propose that, optionally, METRCONS refer to primary as well as secondary stress of the embedded word. Thus, in (23a), METRCONS is violated, since the secondary stress of *integrato* 'integrated' is not preserved in the prefixed word, whereas the candidate in (23b) satisfies this requirement. The latter candidate, then, is selected as the correct output form. Note, furthermore, that ALIGN-MW is crucially dominated by METRCONS, since the winning candidate obeys METRCONS while violating ALIGN-MW, whereas the reverse holds for the other candidate, i.e. it satisfies ALIGN-MW but violates METRCONS.

(23)

/disintegrato/	FTBIN	ALIGN-PW	METRCONS	PARSE-σ	ALIGN-MW
a. (dìsin)te(gráto)		*	*!	*	
b. ^{ES} dì(sinte)(gráto)		*		*	*

This concludes the discussion of secondary stress in derived words. I have shown that a constraint requiring the preservation of stress of the embedded word, METRCONS, should be added to the set of constraints introduced in the previous section for monomorphemic words. Furthermore, I have argued that optional reranking of METRCONS above ALIGN-PW accounts for variability of secondary

stress in suffixed words, while a reinterpretation of METRCONS as referring to both primary and secondary stress of the embedded word accounts for variability in prefixed words.¹³

4.3. Compounds and adverbs in -mente

It was mentioned in section 1 that Lepschy (1968) bases the hypothesis that secondary stress is contrastive on the stress pattern of compounds. Thus, according to Lepschy, the compound *cuciréte* 'sewing machine for nets' has a secondary stress, while the verb form *cuciréte* '(you) will sew' lacks such a stress. The two compounds *autoreattore* 'self-reactor' and *autore-attore* 'author-actor' are distinguished from one another by virtue of the different positions of secondary stress under this view. Vogel & Scalise (1982) also observe that compounds show special stress behavior. In particular, the stress pattern of compounds does not always conform to the surface generalizations given in (1) that hold for monomorphemic and derived words. According to Vogel & Scalise, a clash is present in, for instance, *città dormitorio* 'dormitory town'; word-initial stress is missing in *aspirapolvere* 'vacuum cleaner' and *valigia armadio* 'suitcase-wardrobe'; and a sequence of three unstressed syllables is contained in *carcere modello* 'model prison'.

The assumption of both Lepschy and Vogel & Scalise that all compound words contain a single primary stress, though, is questionable. In fact, it is argued in Nespor & Vogel (1986) on the basis of several segmental rules, that each element of a compound in Italian constitutes an independent prosodic word. For instance, Nespor & Vogel show that the low vowels [E] and [O], which may only occur in syllables bearing primary stress, are found in the first member of compounds such as *t[O]stapáne* 'bread toaster' (cf. the derived word *t[O]statóre* 'toaster', in which [O] is raised to [o]) and *p[E]lterossa* 'red skin' (cf. derived *p[E]llicína* 'small piece of skin', in which [E] is raised to [e]). Under the assumption that a prosodic word is characterized by having one and only one primary stress, the conclusion is that each member of a compound is mapped onto a separate prosodic word. More recently, it has been argued that different types of compounds should be distinguished (Peperkamp 1993; Nespor & Ralli 1996; Nespor to appear; Peperkamp to appear a, b). In lexicalized compounds, [O] and [E] are raised to [o] and [e], respectively, indicating that these compounds contain a single primary stress and hence constitute one prosodic word. For instance, we find *f[è]rrovia* 'railway' (cf. *f[E]rro* 'iron'). That lexicalized compounds do, in fact, conform to the overt generalizations regarding the distribution of secondary

