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ANGELA RALLI (Patras)

## Compound Markers and Parametric Variation\*

### Abstract

This paper investigates the existence of a compound marker in Modern Greek and other typologically different languages. It argues that its presence relates to a parameter of an overtly realized paradigmatic inflection, and that its systematic or non-systematic character depend on the type of constituency with respect to the categories of *stem* or *word* that are involved in compound formation. It also shows that with respect to its origin, the marker may be the synchronic residue of a phonological epenthesis, or the product of evolution of other functional or lexical elements that have undergone the process of morphologization.

Η εργασία διερευνά την ύπαρξη ενός δείκτη σύνθεσης στη Νέα Ελληνική και σε άλλες τυπολογικά διαφορετικές γλώσσες. Υποστηρίζει ότι η παρουσία του σχετίζεται με την παράμετρο μιας μορφολογικά εκπεφρασμένης κλίσης και ότι ο συστηματικός ή μη συστηματικός χαρακτήρας του εξαρτάται από τον τύπο των συστατικών που συμμετέχουν στη σύνθεση, ειδικότερα αυτών του θέματος και της λέξης. Αποδεικνύει επίσης ότι αναφορικά με την καταγωγή του, ο δείκτης σύνθεσης μπορεί να αποτελεί το συγχρονικό κατάλοιπο μιας φωνολογικής επένθεσης, ή το προϊόν της εξέλιξης άλλων λειτουργικών ή λεξικών στοιχείων τα οποία έχουν υποστεί μορφολογοποίηση.

### 1. Variation in compounding: general remarks

Compounding is a word-formation process characterizing languages of various types and families. It combines *words* or *stems*, depending on the type of morphology of the particular language. For instance, in English, compounds are formed out of words, while in Modern Greek (hereafter Greek), compounding is generally stem based, particularly as far as the first constituent is concerned (cf. RALLI 1992):

(1)a. English	vs.	b. Greek
car driver < car driver		psarokaiko < psar-(i) kaik-(i) <sup>1</sup>
		fishing boat fish boat

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<sup>1</sup> Inflectional endings are given in parenthesis. Full word forms of the particular constituents are *psari* 'fish' and *kaiki* 'boat'. It should be noticed that most Greek [Stem Stem] compounds have a different inflection ending from the one of the second constituent taken in isolation. See (1b) as an illustration of this observation, and Ralli (forthcoming) for additional details.

In some languages, compounds display a semantically empty segment between the first and the second compound constituent (2), while in compounds of other languages this segment does not surface (3). In the literature, it has been given various names. For instance, it is often called ‘linking element’ (BOOIJ 1992, RALLI 1992, SCALISE 1992), ‘interfix’ (MALKIEL 1958, DRESSLER 1984, 1986), or more rarely ‘confix’ (MEL’ČUK 1982).

(2)a. Greek		b. German	
kukl-o-spito < kukl(a) spit(i)		Wirt-s-haus < Wirt Haus	
doll house doll house		inn host house	
c. Dutch		d. Russian	
schaap-s-kooi < schaaap kooi		les-o-park < les park	
sheep fold sheep fold		forestpark forest park	
	vs.		
(3)a. English		b. Italian	
apple tree		capostazione < capo stazione	
		station master head station	
c. French		d. Chinese	
timbre-poste < timbre poste		bīngshān < bīng shān	
postage stamp stamp post		iceberg ice mountain	

It should be noticed that most languages like the ones listed under (3) display a similar segment in the so-called ‘neoclassical compounds’ (e.g. English *erythr-o-cyte*, French *hiér-o-glyphe*, Italian *antrop-o-logo*). These formations, however, are built on the basis of stems of an Ancient Greek or Latin origin. They will not be examined here, since the paper deals with native productive compounding only.

## 2. Previous analyses

In the literature, the semantically empty elements appearing between the first and the second constituent of productive compounds have been examined in a number of languages. See, for instance, German (BECKER 1992), Dutch (BOOIJ 1992, 2002, 2004, JAREMA et als. 2002, KROTT et als. 2002ab), Spanish (MALKIEL 1958, DRESSLER 1986, FABREGAS 2004), Italian (SCALISE 1992, 1994, VOGEL & NAPOLI 1995, DRESSLER & MERLINI BARBARESI 1989, 1991), Greek (RALLI 1992, CROCCO-GALEAS 2002), and Russian (MEL’ČUK 1982).

With respect to their status, they are assigned various analyses, on synchronic grounds. They are considered to be thematic vowels (SCALISE 1992), parts of an allomorphic variant of the first compound constituent (VOGEL & NAPOLI 1995, BOOIJ 2005), simple epenthetic vowels, related to the compound process (RALLI 1988, 1992), interradical derivational affixes, proper to fusional languages only (MALKIEL 1958, MEL’ČUK 1982, DRESSLER 1986, DRESSLER & MERLINI-BARBARESI 1989, 1991, CROCCO-GALEAS 2002), and structural functional elements linking the compound parts to each other (DI SCIULLO 2005, ms.). In particular, DRESSLER (1986), DRESSLER & MERLINI-BARBARESI (1991) and

DRESSLER et al. (2001), assign interfixes to the class of derivational affixes, since according to their analysis, they fulfill a number of criteria based on the following properties: a) lack of obligatoriness. Interfixation is rarely obligatory, as opposed to inflection which is compulsory. b) Form variation and competition between interfixes. This is a typical characteristic of German interfixes, which display a considerable form variation (e.g. *Fünffjahr-plan* / *Fünffjahr-e-plan* / *Fünffjahr-es-plan* ‘five-year plan’). c) Non-peripheral position, as opposed to inflection which is generally peripheral. d) A semantically empty character. According to the authors above, this property fits better the semantically opaque derivation, contrary to inflection that always bears a specific grammatical meaning. e) A productivity rate comparable to the one of derivation, in the sense that interfixes, like derivational affixes, are subject to exceptions. Most of these criteria are questionable, however, on the basis of evidence drawn from various languages. With respect to the obligatoriness criterion, we saw in (2a) that in Greek there is an *-o-* between the first and the second compound constituent. This *-o-* is compulsory in Greek compounds, and with few exceptions that are lexically marked (see [29] illustrating compounds with the adverb *ksana* ‘again’), its absence is generally phonologically motivated. The effect of phonology is shown in (5), according to which *-o-* deletion is triggered by the sonority and stress hierarchy displayed in (4), as argued by NIKOLOU (2003: 55), on the basis of a corpus of 283 compounds:

(4) á >> a >> é >> e >> ó >> o >> í >> i >> ú >> u

(5)a. agriánthropos < agri- ánthropos    b. ladémboros < lad- émboros  
     wild man                      wild man                      oil merchant    oil merchant  
     \*agri-o-ánthropos                      \*lad-o-émboros

In the examples above, the *-o-* is deleted because the second constituent starts by a stressed /a/ or a stressed /e/. Thus, constructions such as *\*agrióanthropos* and *\*ladoémboros* are ungrammatical.

Properties such as form variation, and the existence of exceptions characterize inflectional affixes too. For instance, Greek verbal endings in the passive/reflexive imperfect paradigm vary in form, as the third person plural of the verb ‘to wash’ suggests: *plenotan* / *plenotane* / *plenontan* / *plenontane* / *plenondusan* ‘they were washing themselves’.

Finally, the properties of the semantically-empty character and the non-peripheral position are also doubtful. First, we will see below that there are languages (e.g. Turkish) with elements behaving like the ones we examine here at the periphery of compound words. Second, it is possible to find semantically empty categories in inflection: inflection class is such an example, which, as shown by RALLI (1999), has no meaning, but a pure taxonomic role.

It is worth noticing that along the lines of DRESSLER (1986), and the natural morphology framework, CROCCO-GALEAS (2002) argues that interfixes function like morphological indexes, which in compounds point to contiguous lexical morphemes, and help transforming a weak boundary, that is a boundary between stems, into a strong boundary, that is a boundary between words. For the author,

this function relates interfixes to fusional languages, since fusional languages tend to prefer stem-based morphology, while non-fusional languages have word-based morphology.

### 3. Compound markers

#### 3.1. The parameter of overtly expressed paradigmatic inflection

In what follows, I assume the position that the so-called ‘confixes’, ‘interfixes’, or ‘linking elements’ are compound markers, the primary function of which is to indicate the process of compound formation.<sup>2</sup> As such, they should not constitute an exclusive property of fusional languages only. As already known, both inflection and derivation involve their own functional elements, i.e., affixes, that differentiate them from other linguistic processes.<sup>3</sup> Within this spirit, I would like to propose that compounding, being a word formation process, also needs its own functional element that renders it distinct from the other processes. Seen like a simple marker, and being semantically empty, this element has no affixal status, and does not need to be assigned any derivational (or even inflectional/morpho-syntactic) properties. It is just a morphological element, deprived of any meaning, whose function is to indicate the word-formation process of compounding. Greek offers strong evidence in favour of the marker status of the vowel *-o-* appearing between the first and the second constituent of compounds, since it appears even in cases where it should be absent. For instance, in loose compounds with a coordinative structure, like the ones given in (6), the *-o-* is present, contrary to the phonology of the language: according to the sonority hierarchy described in [4], the *-o-* does not show when the second constituent begins by stressed /a/ or /e/:

- (6)a. ital-o-ánglos / \*italánglos < ital- ánglos  
 Italian-English Italian English  
 b. pijen-o-érxome / \*pijenérxome < pijen- érxome  
 coming and going go come

The presence of *-o-* in loose coordinative compounds, against the general phonological rule of /o/ deletion, adds evidence in favour of this segment being a compound-marker, since it shows that a marker is needed to signal the process, in cases where the compounding process does not create any strong ties between the constituents. It is true, however, that compound markers do not appear in all languages with productive compounding. We saw such cases in (3). What is the parameter defining the presence or the absence of a marker? In a first attempt to provide an answer to this question, let us assume (following DRESSLER 1986 and CROCCO-GALEAS 2002) that the existence of a marker is closely related to the form of the compound-internal constituents, which can be combinations of *stems* or

<sup>2</sup> A more or less similar idea is found in MEL’ČUK (1982), where the so-called ‘confix’ has a function to indicate the combination of two roots to form a compound.

<sup>3</sup> Inflection and derivation also have their own specific features. See, for instance, the feature of inflection class which is a purely morphological feature that classifies nominals and verbs, as argued by RALLI (1999, 2005).

*words*, depending on the language. In other words, let us postulate that compound markers are allowed in languages with stem-based compounding, and not in languages with word-based one, since, according to the authors mentioned above, a marker stresses the boundary between the stem constituents and helps avoiding morphotactic fusion. English and Greek seem to confirm this assumption. On the one hand, English produces compounds by combining words, and does not display any compound-specific marking:

(7)a. towel rack < towel rack      b. blackboard < black board

On the other hand, Greek compounding, which mostly involves stems at least as far as the first constituent is concerned (see RALLI 1992, NESPOR & RALLI 1996), displays a compound marker:

(8)a. nixt-o-lulud(o) < nixt(a) lulud(i)      b. mer-o-nixt(o)      mer(a) nixt(a)  
       night flower            night flower      day and night      day night

There is counter-evidence to this assumption, however, provided by Chinese, a language which is extremely poor in affixation, but rich in compounding. As shown by PACKARD (2000), there are two kinds of Chinese compounds: compounds that are built on the basis of words (9a,b), and those that are formed on the basis of bound stems (9c,d):

(9)a. zhǐhuā      < zhǐ huā      b. huàzhǎn      < huà zhǎn  
       paper flower      paper flower      paint exhibition      paint exhibition  
       c. mùbǎn      < mù- -bǎn      d. mùcài      < mù- -cài  
       board            wood plank      lumber            wood material

What Chinese examples suggest is that compound markers are absent not only from word-based compounds, but also from stem-based ones. Thus, an explanation for the presence or absence of compound markers should be searched elsewhere, and not in the parameter of stem- or word-based compounding.

Comparing the languages mentioned so far, an important question that arises is what makes the difference between Greek on the one hand and English and Chinese on the other. As an answer, I would like to propose that the crucial factor is the parameter of *an overtly expressed paradigmatic inflection*, where paradigmatic inflection refers to a set of phonologically related forms with the same category of the base and the same semantic contribution, the morphosyntactic features of which vary according to the context. In this sense, an inflectional paradigm is seen as a network of morphosyntactic relations between different forms of the same word. Greek is a highly inflecting language with overtly realized case/number features for nouns and person/number features for verbs. On the contrary, English and Chinese have no overt paradigmatic inflection. In English, overtly realized inflection is extremely poor (a plural mark in nouns, usually *-s*, a third person mark in the present tense of verbs *-s*, and a past mark *-ed*). Accordingly, following PACKARD (2000), there are traces of inflection in Chinese,

since some independent words are prefixed to nouns in order to mark them as agentive, locative, instrumental, dative, accusative and ablative. This inflection, however, has no paradigmatic character, as clearly stated by PACKARD (2000: 131).

If overt paradigmatic inflection is the specific parameter, which accounts for the presence of a compound marker, we have an explanation why in German (10) and Russian (11) compound markers are also present: both languages have morphologically marked inflectional paradigms:

- |        |             |             |      |              |      |              |            |      |      |      |
|--------|-------------|-------------|------|--------------|------|--------------|------------|------|------|------|
| (9) a. | Wirt-s-haus | <           | Wirt | Haus         | b.   | Jahr-es-zeit | <          | Jahr | Zeit |      |
|        | inn         |             | host | house        |      | season       |            | year | time |      |
|        | c.          | Aff-en-haus | <    | Affe         | Haus | d.           | Tag-e-buch | <    | Tag  | Buch |
|        |             | monkey cage |      | monkey house |      | calendar     |            | day  | book |      |
- 
- |         |               |               |       |         |         |                |                  |       |              |            |
|---------|---------------|---------------|-------|---------|---------|----------------|------------------|-------|--------------|------------|
| (10) a. | vod-o-voz     | <             | voda  | voz     | b.      | neft'-e-pravod | <                | neft' | pravod       |            |
|         | water-carrier |               | water | cartoil |         | pipeline       |                  | oil   | conductor    |            |
|         | c.            | hlebo-zavod   | <     | hlebo   | zavod   | d.             | mir-o-vozzrenije | <     | mir          | vozzrenije |
|         |               | bread factory |       | bread   | factory |                | world theory     |       | world theory |            |

In German, a compound marker appears between the two constituents. In most cases it comes from a former inflectional ending of a genitive, singular or plural, as argued by BECKER (1992). Accordingly, in Russian, a systematic marker *-o-* (pronounced /a/ in unstressed position) appears between the compound constituents. This marker becomes *-e-* (pronounced /je/) when the final segment of the first constituent is a coronal or a strident consonant (see KOUTSANTONI 2005).

Further proof to the relation between an overtly expressed paradigmatic inflection and the existence of a compound marker is also provided by Dutch. According to BOOIJ (2002), Dutch does not have a rich nominal inflection system, although it is formally richer than the English one, but has an overt paradigmatic inflection as far as verbs are concerned. As shown in (2c) above and further illustrated in (11) below, compound markers may appear between the first and the second constituent of Dutch compounds (BOOIJ 1992):

- |        |      |                |   |        |       |    |      |               |   |        |      |
|--------|------|----------------|---|--------|-------|----|------|---------------|---|--------|------|
| (11)a. | -e-: | schaap-e-vlees | < | schaap | vlees | b. | -s-: | schaap-s-kooi | < | schaap | kooi |
|        |      | mutton         |   |        |       |    |      | sheep fold    |   |        |      |

### 3.2. Compound markers in Romance languages

An impoverished nominal inflection system, although more developed than the English one, is also found in Romance languages, where, however, there is a particularly rich paradigmatic inflection in verbs. If our hypothesis is true about the close relation between overt paradigmatic inflection and the presence of compound markers, we should expect the latter in a number of Romance languages as well. In fact, although marking in Romance compounding is not as systematic as in other languages with rich inflection (e.g. Greek or Russian), and is limited to specific compound categories, there are instances of this marking in certain types of productive compounds. According to FABREGAS (2004), with some lexically

marked exceptions, Spanish displays a marker in the productive exocentric [N-Adj] compounds:

- (12)a. pel-i-rrojo < pelo rojo    b. brac-i-largo < brazo largo  
       redhair        hair red        longarm        arm long

As observed in languages with a compound marker (e.g. Greek in [9], Russian in [10]), this marker is subject to phonological restrictions, because in order to be realized it requires that the first constituent consists of two syllables. Moreover, in Sardenian, there is a similar situation as the one described in Spanish, where a compound marker *-i-* appears within [N-Adj] exocentric compounds (IGNAZIO PUTZU 2005, personal communication):

- (13)a. pill-i-murtihu (pillu 'hair')    b. conch-i-malu (conca 'head')  
       Redhair                                badhead

Other Romance languages, however, like Italian or French, seem to be counter examples to my proposal. Both Italian and French have an overt paradigmatic inflection, especially verbal, but no obvious marker in native compounds. If the thesis on the relation between an overtly expressed paradigmatic, inflection and a compound marker is towards the right direction, we should expect a trace of a compound marker inside French and Italian productive compounds as well, other than the *-o-* or *-i-* that we see in neoclassical formations like in the French *soci-ologue* or *agr-i-culture*. Let us examine the [N prep N] constructions, which are almost unanimously characterized as being the most productive compounds in French,<sup>4</sup> and are extensively studied (cf., among others, GUILBERT 1971, GROSS 1988, ANSCOMBRE 1990, BARBAUD 1991, etc.):

- (14) French [N prep N]  
       a. moulin à vent            b. étoile de mer  
           wind mill                sea star

In particular, CADIOT (1991), BOSREDON & TAMBA (1991), and KAMPERS-MANHE (2001) notice that in these compounds the prepositions *de* and *à* do not have a referential value, are semantically empty, and their function is to introduce the complement of the noun head. CADIOT (1991) and BARTNING (1993) call them 'prépositions incolores' (colorless prepositions) and claim that they are different from regular prepositions, the latter being lexically meaningful elements. This explains why in some compounds it may be possible to delete the preposition-like element without any substantial change in the meaning, as KAMPERS-MANHE (2001: 107) correctly observes:<sup>5</sup>

<sup>4</sup> With the exception of CORBIN (1992) who considers them as lexicalized noun phrases.

<sup>5</sup> According to KAMPERS-MANHE (2001: 107), cases like the ones in (15a) are structurally analysed as head-complement structures, while the (15b) ones as head-adjunct structures. Compounds formed with a noun and a verb (e.g. *machine à laver* 'washing machine') do not appear without the

- (15)a. robe à fleurs                      vs.    b. robe-fleurs  
       dress with flowers  
       sac de poubelle                      sac-poubelle  
       garbage sac

Following these observations, we could suppose that the semantically empty, but preposition-like elements appearing between the two nouns in [N prep N] compounds may be considered as kinds of compound markers.<sup>6</sup>The same role for preposition-like elements may be assumed as far as the Italian corresponding constructions are considered (16), where there is a richer form variety:

- (16) Italian [N prep N]  
       a. giacca a vento            b. carta di credito    c. ferro da stiro  
       wind jacket                      credit card                      (electric) iron

As noted by BISETTO & SCALISE (1999: 35), there is no doubt that formations like the ones in (16) constitute productive compounds, although they have not been sufficiently studied in Italian. They display a behavior similar to the French corresponding constructions, since they respond positively to the criteria that are used to determine compoundhood. For instance, it is impossible to insert new material between their internal constituents.

An interesting case, where it might be possible to identify a compound marker in Italian is the one displaying the [V-N] pattern (cf. DARDANO 1978, ZUFFI 1981, SCALISE 1992, 1994, BISETTO 1999, VOGEL & NAPOLI 1995, BISETTO & SCALISE 1999, RICCA (2005)).

- (17) Italian [V – N]  
       a. giradischi < gir(are)    dischi    b. scendiletto    < scend(ere)    letto  
       record-player    turn    disks            ‘little bed carpet    get down    bed  
       c. apribottiglie < apr(ire)    bottiglie  
       bottle-opener    open    bottles

[V–N] constructions have been a favourite topic of Romance word-formation, on both synchronic and diachronic grounds (see RAINER 2001), and have the peculiarity of showing syntactic and semantic properties (e.g. syntactic category and basic meaning) that do not follow from any of their constituent parts. That is why, with the exception of some generative analyses (e.g. ZUFFI 1981, BISETTO 1999), these compound formations are considered to be headless, i.e. exocentric. There is a controversy in the literature regarding the nature of the verbal element in these compounds. Traditional analyses (see, among others, ROHLFS 1968) consider

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preposition-like element between the constituents (\*machine-laver) because the inflected verbal form cannot be used as an adjunct.

<sup>6</sup> If they have not yet acquired the full status of a marker we could ultimately suppose that they are on the way of becoming compound markers.



it to be an imperative form because the verb final vowel resembles to a singular imperative marker. According to RAINER (2001), this analysis can be maintained on diachronic grounds, and most historical linguists agree that it probably follows from a reanalysis in Late Latin or early Romance of imperative sentences. There is no synchronic relevance of this thesis, however, since the verbal element has no imperative semantic value, and does not vary in number, depending on the context (SCALISE 1992, DI SCIULLO 1992, BISETTO 1999, VOGEL 1993, PEPERKAMP 1997). For instance, the verbal constituent does not inflect as far as the plural number is concerned, as opposed to the normal imperative forms:

(18)	Singular		Plural		Imp/ve singular	Imp/ve plural
	a. giradischi	vs.	*giratedischi		gira	girate
	record-player				turn.SG	turn.PL
	b. apriscattole		*apritescattole		apri	aprite
	can-opener				open.SG	open.PL

Beside the imperative solution, there are other analyses that have been proposed. Each one, however, has its own weak points. Without entering into a detailed presentation of these analyses, it is worth mentioning that the verbal constituent has been considered as:

- An indicative third person singular form (TOLLEMACHE 1945, GIURESCU 1965, DI SCIULLO 1992). As correctly observed by SCALISE (1992) and VOGEL & NAPOLI (1995), the verb constituent does not always coincide with the third person singular form in Italian compounds (19)<sup>7</sup>, and there is no compound-internal evidence for tense or subject marking:

(19)	Compound		3P.SG		Verb in the Infinitival Form
	spremilimoni	vs.	spreme		spremere
	lemon juicer		squeeze		to squeeze

- A deverbal nominal form, resulting from the combination of the verb with a zero affix (ZUFFI 1981), or with a *-tore* affix, which is deleted in the specific context of compounds (BISETTO 1999):<sup>8</sup>

(20)	Verb		Derived noun in <i>-tore</i>		Derived noun in compounds
	spremere <sub>V</sub>		spremitore <sub>N</sub>		spremi- $\emptyset$ <sub>N</sub>

According to this position, the first compound constituent is a derived noun with an agentive or instrumental meaning. Thus, [V-N] compounds should be viewed as endocentric constructions with the head on the left. As Ricca (2005: 479)

<sup>7</sup> This is not the case for Spanish compounds where, as noticed by RAINER & VARELA (1992: 128), the first constituent formally coincides with the third person singular present indicative.

<sup>8</sup> The nominalist position has also been adopted for French [V-N] compounds by ZWANENBURG (1990, 1992), as well as by VARELA (1990) for Spanish. The difference between all these works relies on the nature of the agentive nominal. For instance, ZUFFI derives it by means of a zero-morpheme, while for BISETTO it results from the deletion of the agentive nominal suffix.

observes, a considerable number of [V–N] creations are adjectival, a fact that renders the deverbal noun solution less attractive, as far as the first constituent is concerned. Moreover, according to RAINER (2001: 390) this analysis has awkward implications from a diachronic point of view, since [V–N] compounds with an instrumental meaning are attested in the 13<sup>th</sup> century (e.g. *guardaroba* ‘wardrobe’), while the corresponding *–tore* formations are a rather later phenomenon.

- A root plus a thematic vowel (SCALISE 1992). However, the form of the hypothetical thematic vowel in Italian [V–N] compounds is not always the same as the one displayed by the infinitival form. In fact, it is different in verbs belonging to the second conjugation class, as illustrated by the example in (19), and further represented below:

(21)	Italian Conjugation	I	II	III
	Thematic vowel	a	e	i
	Vowel in composition	a	i	i

The thematic vowel solution is not an economical solution though because it requires the operation of an adjustment rule, as SCALISE (1992) proposes, which changes the thematic vowel /e/ into /i/ for all Italian compounds containing a verb form of the second conjugation class. It is worth noticing that the presence of a thematic vowel is not without problems even outside compounds. As shown by DRESSLER & THORNTON (1991) (see also MAIDEN 1992, PIRELLI & BATTISTA 2000, and RAINER 2001), only *–a–* is regularly present in the paradigm formation of the Italian first conjugation class (e.g. *gir-a-re* ‘to turn’). As far as the paradigm formation of other Italian classes are concerned, there is no systematic presence of a thematic vowel. Therefore, as proposed by THORNTON (1999, 2003), it is better to consider the thematic vowel as being part of the stem, on synchronic grounds, where this stem is taken to be a default form of the infinitive minus the ending (e.g. Italian *dormi-re*, French *dormi-r* ‘to sleep’). In fact, this is the analysis that is proposed for Italian [V–N] compounds by VOGEL & NAPOLI (1995), who claim that the verbal first constituent is an uninflected stem form. Although particularly appealing, the stem solution does not offer a sufficient account of the highly systematic character of the vowel in question, which renders it distinct from the rest of the stem.

In an effort to provide an explanation, I would like to propose here that this vowel is (or on the way to become) a *compound marker*. This proposal has several advantages. First, it accommodates the form inconsistency that we find mostly in Italian between the thematic vowel characterizing verbs of the second conjugation class and the compound-internal vowel (see (19) *sprem-e-re* vs. *sprem-i-limoni*). Second, we may interpret the fact that in compounds like *pulitutto* ‘multi-cleaner’ (< *pulire* ‘to clean’ *tutto* ‘all’) and *condipasta* ‘pasta spicer’ (< *condire* ‘spice up’ pasta, DRESSLER & THORNTON 1991, Thornton ms.) the verbal stem is not followed by the *–isc–* element, which usually appears in the third person singular of the present tense, as well as in the imperative forms (*pulisce*, *pulisci*, *condisce*, *condisci*). Third, we avoid the semantic incompatibilities observed with both the singular imperative and the third person singular present indicative forms. It

remains unexplained, however, why the same vowel appears in a considerable number of Italian derivative nouns as well, as the following examples indicate:

(22) Verb	Derived noun	Compound
a. portare	portatore	portafiori
bring	who brings	vase
b. spremere	spremitore	spremilimoni
squeeze	squeezer	lemon juicer

Crucially, this phenomenon is systematic only for nouns deriving from verbs of the first conjugation class (22a). As shown by the following examples, the presence of the vowel is not systematic in derivative nouns that are formed on the basis of verbs of other conjugation classes:

(23) Verb	Derived noun
spremere	spremuta/*spremita
to squeeze	squeezing (of a fruit)

Thus, the non-systematic presence of the vowel in derivation, as opposed to the systematic character in compounding, leads me to suppose that the status of the vowel appearing in derivative nouns is not the same as the one of the vowel showing in [V-N] compounds, the presence of the latter being very systematic. I assume that in derivation, the vowel in question should be considered as part of the noun ending. This assumption is in accordance with the observations made by THORNTON (1999, 2003), about the non-existence of a possible thematic vowel in derived nouns, contrary to what has been proposed by SCALISE (1994: 67).

### 3.3. Compound markers in Mohawk and Turkish

We have seen that the existence of a marker in compound formation seems to be closely related to the overtly realized inflection that is expressed paradigmatically. The relation between the presence of a marker and overt paradigmatic inflection, in general, allows the following predictions:

- a. Since paradigmatic inflection is not a property of fusional languages only, compound markers should appear in other types of languages as well.
- b. Compound markers should not be restricted to the word internal position only, but may show in other positions as well.

According to the first prediction, compound markers are expected to show in polysynthetic and agglutinative languages, unless these languages do not have a productive compounding system. Let us examine two representative cases of these languages, Mohawk and Turkish, which also display an overt paradigmatic inflection.

In the polysynthetic Mohawk,<sup>9</sup> a so-called ‘stem joiner’ *-a-* occurs in compounding between an incorporated noun stem and a following verb stem, if the noun stem ends in a consonant and the verb begins by a non-vowel.

(24) Mohawk (MITHUN 1979, 1984, 1986)

- a. yo-nvst-**a**-yvthu  
she-corn-stem.joiner-to plant.STATIVE  
‘she has planted the corn’
- b. wa?-ke-nakt-**a**-hnimu-?  
FACTUAL-I-bed-stem.joiner-buy-PERFECTIVE  
‘I bought a bed’

According to Mithun (2005, personal communication), this stem joiner is present in compounding, does not otherwise appear as part of the first or the second constituent, and has a special phonological behavior, for instance, it does not take stress. Since, the *-a-* has no other function than linking the two main constituents of the compounding process, it would be legitimate to assume that it has the role of a compound marker. Thus, Mohawk confirms the hypothesis that a compound marker may exist in a language other than fusional, on condition that it bears overt paradigmatic inflection.

A first look at the agglutinative Turkish reveals that there is no compound-internal marker in compounds. However, if we look at a particular category of productive compounds, the [N–N] ones, we see an *-I* at the right-hand edge of the constructions:

(25) Turkish (GÖKSEL & KERSLAKE 2005, KORNFILT 1997).

- |                 |   |        |        |                  |   |        |        |
|-----------------|---|--------|--------|------------------|---|--------|--------|
| a. okul kitab-ı | < | okul   | kitap  | b. keçi boynuz-u | < | keçi   | boynuz |
| locust (tree)   |   | goat   | horn   | school book      |   | school | book   |
| c. anadil-i     |   | ana    | dil    | d. taşkömür-ü    | < | taş    | kömür  |
| mother tongue   | < | mother | tongue | carbon stone     |   | stone  | carbon |

This *-I* is phonologically affected: it undergoes the vowel-harmony phenomenon, as shown by the examples in (25), and acquires the form of *-si* when the second constituent ends by a vowel (26a). Moreover, it appears as *-(s)In* when another marker follows, usually a case marker, as is the locative below (26b), or a marker of predicate formation (26c), as noted by GÖKSEL & KERSLAKE (2005):

- (26)a. dilbigi-si < dil bilgi  
grammar tongue knowledge
- b. okul kitap-lar- ın-da-ki-ler  
school book-PL- in -LOC-PRON-PL  
‘the ones [in (the) school books

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<sup>9</sup> Evidence from other polysynthetic languages comes from the Algonquian Montagnais, where a so-called ‘connector’ (DRAPEAU 1979) could also be considered as a kind of compound marker. E.g. mahinaikan-i-tshuâp ‘book-CON-building (office)’.

- c. okul kitap-lar-ı-yımıs  
 school book-PL- ın -EV.COP  
 ‘Apparently, these are school books’

Crucially, *(s)I(n)* is missing from a considerable number of [N–N] constructions:

- |                                     |   |       |         |
|-------------------------------------|---|-------|---------|
| (27)a. kız arkadaş / *kız arkadaş-ı | < | kız   | arkadaş |
| girl friend                         |   | girl  | friend  |
| b. kadın doktor / *kadın doktor-u   |   | kadın | doktor  |
| woman doctor                        |   | woman | doctor  |
| c. taşduvar / *taşduvar-ı           |   | taş   | duvar   |
| stone wall                          |   | stone | wall    |

According to GÖKSEL & KERSLAKE (2005: 102-103), [N–N] compounds without *–(s)I* express various semantic relations between the first and the second constituent, or are lexically specified. For instance, there is no *–(s)I* when the first noun specifies the sex or the profession of the person denoted by the second noun, as well as the material from which the item denoted by the second noun is made. What is worth noticing, however, is that the absence of *–(s)I* cannot be predicted syntactically. As stated by GÖKSEL & KERSLAKE (2005: 104), *(s)I* originates from a third person possessive suffix, but in compounds, bears no meaning of possession. *(s)I* serves as a grammatical indicator of the compounding denoting the combination of the two nouns. Since it is semantically empty, and in some instances (see [27]), its absence is not accounted for syntactically, we could propose that today, the final segment *–(s)I* has acquired a morphological status, the one to indicate compounding. In other words, it is a compound marker, just like the other compound markers denoted so far in the languages under examination. As such, it would be legitimate to assume that it may appear more than once in recursive structures, that is in compounds containing other embedded compounds. In fact, if we compare the Greek and Turkish examples below, we identify more than one instance of compound markers in recursive structures, each marker belonging to its own compound structure:

- (28)a. Greek [megal-o-[ele-o-paragogos]]  
 ‘big (megal-) oil (ele-) producer (paragogos)’  
 b. Turkish [[göz-hastalıklar-ı] hastane-si]  
 ‘hospital (hastane) for the diseases (hastalıklar) of the eye (göz)’  
 (from GÖKSEL & KERSLAKE (2005: 106))

The examples above show that in Greek (28a), the marker *-o-* appears between the first and the second constituent, while in Turkish (28b) the marker is added at the end of each compound structure. The existence of a compound marker in Turkish offers evidence for the second prediction above, according to which compound markers could appear in a position other than the word internal one. As already shown, the compound marker in Turkish is not situated between the first

and the second constituent, but is added after the head, the latter being at the right-hand side.<sup>10</sup> However, headedness does not seem to play any significant role into determining the position of the compound marker across languages. Although both Greek and Turkish compounds are right-headed, the compound marker appears between the first and the second constituent in Greek, while in Turkish follows the head. Therefore, we could further suppose that the position of the compound marker depends on the type of morphology of the particular language. Languages that fuse properties under the same morpheme may allow this marker word-internally (e.g. Greek), while agglutinative languages (e.g. Turkish), that add properties one after the other, as different morphemes, may have it at the periphery of the compound construction. Nevertheless, the position of the compound marker may be subject to certain restrictions, proper to the language in question. As further illustrated by the examples in (27b,c), in Turkish, it may be preceded by a plural marker, and followed by case or a predication marker. In other words, what is considered to be inherent inflection (e.g. number, in terms of BOOIJ 1994) precedes the compound marker, while contextual inflection (e.g. case and predication markers) follows it. Thus, Turkish allows its compound marker to appear at the extreme edge of a construction, only if it is not followed by pieces of contextual information.

### 3.4. The parameter of stem- or word-based compounding

A further question that requires an answer is how we interpret the fact that in most languages, compound markers display a form inconsistency that is interpreted as form variation or as an unpredictable absence of such elements. According to the criterion of form consistency, languages with compound markers are divided into two groups:

a. The first group contains languages where the marker is obligatory in all productive compounds, has a fixed form, and its absence or variation are predicted by a phonological rule. Greek, Russian and Mohawk belong to this group. Particularly in Greek only few cases are lexically marked as not containing a compound marker. For instance, there is no compound marker in Greek when the first constituent is the invariable adverb *ksana* ‘again’:

(29)a. Greek

ksanakimame	<	ksana	kimame
to sleep again		again	sleep

b. The second group consists of languages with no systematic markers in all productive compounds, markers that are unpredictably absent, or markers displaying an unpredictably variable form. Among these languages, we have examined German, Dutch, Turkish as well as some Romance languages.

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<sup>10</sup> A compound marker appearing at the lefthand side of [N deverbal N] compounds may be found in Twi (Kwa) (see *Morphology*, vol. 2, ed. by BOOIJ et als., article 140). I am indebted to Stavros Skopeteas for pointing out this case to me.

To the crucial question what is the determining factor for the non-systematic character of a compound marker, I would like to propose that form inconsistency and form variation are due to the type of morphological categories involved in the compound constituents. Languages of the first group are mostly stem-based, while those of the second group create compounds on the basis of words.<sup>11</sup> In other words, I propose that beside overt paradigmatic inflection there is another parameter, which accounts for the form consistency or inconsistency of the compound marker. According to this proposal, when a language uses stems to build compounds, the compound marker has an obligatory systematic form. As opposed to this, a language that makes no systematic use of stems, but bases its compounding on word forms, it may display a variety of compound markers, the choice of which is a matter of the lexicon. We have seen above that in Turkish and Romance languages a compound marker appears only in some types of productive compounding, and that in German and Dutch it displays a form variety.

To sum up, what I have tried to show is that the difference between languages with respect to the presence of a compound marker on the one hand, and its systematic or non-systematic form on the other, follows from the conjunction of two parameters:

- An overtly realized paradigmatic inflection: it triggers presence or absence of the marker, depending on the case.
- The morphological category of the constituent parts: stem-based compounding is related to the systematic form of a compound marker, while word-based compounding triggers form variation and absence of ‘systematicity’.

Schematically, the following table resumes our findings:

	Compound marker	Systematic form
Parad/ic inflection, Stem-based lg.	yes	yes
Parad/ic inflection, Word-based lg.	yes	no
No parad/ic inflection, Stem/Word-based lg.	no	no

#### 4. The origin of compound markers

This paper would be incomplete if I do not comment on the issue concerning the origin of compound markers, that is, on the kind of elements that give rise to markers characterizing compounding.

The main sources of compound markers in the languages examined so far are a) syntactically functional elements (i.e. prepositions, inflectional affixes, or possessive markers), b) thematic vowels, and c) phonological elements. As seen above, Romance languages provide examples where compound markers originate from prepositions, while in Turkish the compound marker has its source in a third person possessive marker. As for the Germanic languages, e.g. German and Dutch,

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<sup>11</sup> An exception to this prediction may be the case of French [V-N] compounds. According to VILLOING (2002) and BONAMI, BOYÉ & KERLEROUX (ms.) the verbal constituent of French [V-N] compounds is a stem, since it does not have the semantics and the syntactic behaviour of a word. Even if this is the case, this stem coincides with the word form, at least superficially.

the compound markers come mostly from inflectional endings, usually from genitive singular or plural (BECKER 1992, BOOIJ 1992, 2002).<sup>12</sup>

As already mentioned, compound markers originating from prepositions are semantically empty today, while those whose sources are inflectional endings do not have the semantics and the structural behavior of inflectional material. For instance, in German, there are first constituents that do not correspond to any case forms (30a). Also in Dutch, the *-s-* (former genitive singular) appears even after verbal constituents (30b):

- (30)a. German: Liebe-s-brief (genitive Liebe)  
           love letter  
           Hahn-en-schrei (old genitive Hahn-en, but today Hahn-s)  
           cockcrow
- b. Dutch: scheidsrechter < scheid(en) rechter  
           referee                    separate            judge

The case of Greek (or of Italian with respect to [V-N] formations, if we accept the thematic vowel interpretation) belongs to the group of languages where the marker has its source in a thematic vowel. It has been shown by ANASTASSIADI-SIMEONIDI (1983) and RALLI & RAFTOPOULOU (1999), that the *-o-* appearing within Greek compounds originates from an old thematic vowel that was contained by both nouns and verbs, the so-called ‘thematic’ ones. This *-o-* had been generalized to all compounds around the Hellenistic period (300 BC.- 300 AC). As a result, it appeared even with the ‘athematic’ compound constituents, that is with those which did not take a thematic vowel. In an attempt to explain the linguistic change from a stage where a syntactically functional element becomes a morphological compound marker, I would like to propose, following JOSEPH (2003), that it involves a morphologization process, in the sense that a syntactically active element at one stage (e.g. a preposition or an inflectional ending) loses its semantic content and syntactic role, and becomes a semantically empty element, whose function is to signal a particular word formation process (cf. also JOSEPH & JANDA 1988).. Within the same spirit, the thematic vowel, which is part of stems, changes from a less to a more morphological status because it gets detached from the stem, and is reanalysed as a marker of a word-formation process, i.e. compounding. Notice that the change of a thematic vowel into a compound marker seems to constitute a borderline case between morphologization and the process of grammaticalization (see HOPPER & CLOSS-TRAUGOTT 1993), assuming that there is a distinction between the two processes (see Joseph 2003 for relevant arguments). Since compound formation is a grammatical process, compound marking displays an active grammatical role, i.e. a greater involvement in the word-formation component of grammar, while the stem-forming character of a

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<sup>12</sup> As noticed by BOOIJ (2005, personal communication), in some Dutch cases, a marker *-e* comes from the last vowel of the first constituent. For instance, the Modern Dutch word *pan* ‘pan’ comes from the Middle Dutch *panne* (Latin *panna*). However, the old word final *-e* is still used as a marker in compounds with *pan* as first member: *pannekoek* ‘pancake’.



thematic vowel has a more static status because it belongs to a lexical piece of information.

According to JOSEPH (2003: 473), for an item, the change from a syntactic stage into a morphological one constitutes only one direction for morphologization. The other direction would involve the morphologization of phonological elements. In fact, this case can be found in the Iroquoian family (MITHUN 1979) - Mohawk is one of them - where, according to MITHUN (2005, personal communication), the marker ('stem joiner') has appeared as a phonological epenthesis 4000 years ago, and had never been part of stems. As shown above, it has no other role than joining stems today, and is locally restricted to the domain of compounding. Crucially, a similar form also appears before Mohawk derivational suffixes (inchoatives, causatives, instrumental, applicatives, benefactive applicatives, purposives, distributives, etc.) following verb stems. However, as claimed by MITHUN (1997), these affixes originate from the second members of [V-V] compounds, and, in some cases, their sources still coexist as verb stems. Therefore, a plausible explanation would be to assume that these affixes have retained some stem-like properties, among which, the stem joiner vowel, than most affixes cross-linguistically. In addition, it would also be legitimate to assume that in derivative constructions, the old stem joiner underwent a functional change involving the loss of its original role.<sup>13</sup>

It should be noticed that coexistence of a new and an old use of some element is not surprising, since divergence is a typical characteristic of linguistic change, according to which existing forms may acquire new meanings in certain contexts, while retaining the old meanings in other contexts. The coexistence between old and new uses may also find an application to the Italian case mentioned before, where the word-internal vowel of Italian [V-N] compounds resembles to the vowel that we find in derived words (e.g. *spremilimoni* vs. *spremitura*). We could suppose that the thematic vowel that has become a marker in compounds, still appears with its old thematic vowel function in derived words (compare *lavare* 'to wash' > *lavapiatti* 'dishwasher', *lavatrice* 'washer.FEM'). In this way, we may explain the non-systematic presence of this vowel in derivation (see [23]), as opposed to the systematic presence of the vowel in compounds. While in derivation it is hardly recognized as a vowel distinct from the root - several linguistic analyses cast doubt on the active role of thematic vowels in derivative words (see THORNTON 1999, among them) - in compounding, the vowel has the clear distinctive role of marking a word-formation process. Accordingly, the same considerations may apply to Greek noun derivatives ending in *-otita* (e.g. *lambrotita* 'splendour' < *lambr(os)* 'splendid') and *-osini* (*kalosini* 'goodness' < *kal(os)* 'good'), where a homophonous to the compound marker *-o-* appears between the stem (*lambr-* and *kal-* respectively), and the derivational suffix (*-tita* and *-sini*). This is another case where we could suppose that the *-o-* in the particular derivatives is a relic of the

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<sup>13</sup> As shown by MITHUN (1997), remnants of stem joiners may also be found in occurrences of the so-called 'lexical affixes', in languages of the Salishan family spoken in British Columbia. Mithun argues that lexical suffixes show characteristics of more root-like than most affixes, and have evolved from a general compound pattern that originally involved roots and stem joiners.

old thematic vowel. This *-o-* comes from the same source as its homophonous compound marker, but it is synchronically different from it. While in compounding it has a clear systematic character, it is not so systematic in derivation: it characterizes only few Greek derivational suffixes, the vast majority of them bearing no such vowel (see RALLI 2005).

## 5. Summary

In this paper, I have argued that compound markers may be realized in languages with overtly expressed paradigmatic inflection, and that stem- or word-based compounding may affect their systematic or non-systematic form. The type of language, e.g. fusional or agglutinative, may determine their position, within the limits of the word. Markers may be morphologized phonological elements (e.g. Mohawk), may derive from functional items (e.g. German) or be parts of lexical elements (e.g. Greek). To the crucial question concerning the similarity of certain compound markers to vowels appearing before suffixation in derivative words, I have shown that the two elements may be diachronically related – those which come from ancient thematic vowels - but have become synchronically different because of a grammaticalization process affecting compounding.

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Angela Ralli

Dept. of Philology, Linguistics Section

University of Patras, GR-26504, Rio Patras