ON THE PARALLEL BETWEEN NEOCLASSICAL COMPOUNDS IN ENGLISH AND MODERN GREEK

EVANTHIA PETROPOULOU

Abstract

This paper investigates a group of English words consisting of bound elements of classical origin, (i.e. Ancient Greek or Latin), which are commonly known as 'neoclassical compounds'. The aim is to examine the structure of these words i) by considering the status of their constituent elements, and ii) by drawing a parallel with certain types of compounds in Modern Greek. It is argued that the structure of neoclassical compounds in English, contrary to what is commonly argued, is greatly influenced by the idiosyncratic properties of the constituent element appearing in final position, which derive from its categorial properties in the language of origin, and impose a number of restrictions on its combinations. Two distinct types of structures have been recognized in neoclassical compounds of English, namely, deverbal compounds and determinative compounds bearing an endocentric or exocentric structure.

Key words: neoclassical compounding, exocentricity, deverbal compounds, English, Modern Greek.

1 Neoclassical compounds in English

1.1 Some background on the issue

Neoclassical compounding has been a very prominent phenomenon in the morphology of many European languages, alongside English, in the past centuries. This word formation process has received limited attention in the literature, with the exception of few works concentrating on the issue (e.g. Cannon 1992, Bauer 1998, Luedeling et al. 2002, Baeskow 2004). One of the major controversies about it, is whether it can be incorporated in the native word-formation system of the language where it appears, or lies out of it. The main reason for this controversy is the fact that, although this word formation process involves borrowed items (from Ancient Greek and Latin), nevertheless it presents a rather high degree of productivity, in the sense that new words resulting from it enter the vocabulary of a number of languages on a daily basis.

There are also other controversies concerning a number of parameters of the so-called 'neoclassical compounds'. As an example, we refer to the ongoing discussion about the morphological status of their constituent elements. There is no better proof for that, than the number of the different terms adopted, or invented, in order to name them, the most prominent of which being 'Classical Roots', '(Bound) Stems',

'Affixes', 'Affixoids', '(Initial/Final) Combining Forms', 'Confixes', each of them corresponding to a different analysis applied to the constructions they participate in. However as we will see below, there are some characteristics that most of these compounds share and could help clear out the picture.

1.2 The 'affix' vs. the 'combining form' view

To begin with, neoclassical compounds mainly consist of morphemes that are of Ancient Greek or Latin origin and usually do not appear as free elements. The reason I say 'usually' is because there are cases where free forms that are morphologically related to such an element, have also been borrowed. An example is that of the word *history* and the element *histori(o)* that appears in the compound *historiography*. They share the same origin but present a different distribution inside the language.

As far as the term 'morpheme' is concerned, it is deliberately used above, as any other more explicit morphological term adopted for this class of items, would also correspond to a different analysis, as we pointed out. Specifically, if we decided to name these elements 'affixes', then they should be separated into prefixes and suffixes. In that case, *micro-*, *hydro-*, *bio-*, *auto-*, *electro-* etc. would stand as prefixes and *-(o)graphy*, *-(o)logy*, *-(o)cracy*, *-graphic*, *-scopic*, *-logic*, *-pathic* etc. as suffixes. If, on the other hand, we considered them as stems (ten Hacken 1994, Baeskow 2004), this would give rise to a further set of affixes that combine with them quite productively. An example, is the bound stem *graph*, often found in combinations with the affixes *-y*, *-ic*, *-ical*, *-er*, or the stem *morph* appearing along with *-ous*, *-y*, *-ic*, and so on. Finally, by choosing the term 'combining form' (or the French 'confixe'), these items could basically have any form, as for example the combining forms *econo-*, *cyber-*, *bio-*, *Euro-* and *petro-* (Warren 1990), described by Bauer (1983) as Initial Combining Forms, and *–nography*, *-(a)holic*, *-(a)thon*, *-gate*, *-phobia* and *–logy*, referred to as Final Combining Forms respectively.

All the above terms and the different analyses they point to, have received a certain amount of criticism. To begin with, the status of an affix has been early defeated, by the simple, but significant, argument that an affix cannot be a prefix in some words and a suffix in others. As Scalise (1984) points out, many of these elements appear both in initial and in final position (e.g. *atmosphere* vs. *spheral*, *hydrophobe* vs. *phobia*). Moreover, under the same analysis, neoclassical compounds, like for example *biography*, would have to be analyzed into a prefix and a suffix (**bio- -graphy*). And if these elements were affixes, how would we account for the 'real' affixes that appear in them, such as the ones we mentioned above? For instance, what would *-y* in *biography* be, *-ous* in *heterogeneous*, *-ical* in *archaeological* and so on? Therefore, these elements are different from mere affixes (Scalise 1984). However, the most serious argument against this view is the fact that these elements have greater semantic density than normal affixes, and this property should put them under a different prism as morphological entities.

As far as the term 'combining form' is concerned, it is a term usually adopted in order to describe disputable elements, such as the ones at hand, elements that are found in various contexts, as well as elements that are difficult to appoint to one

category or another, like forms arising from blends, or clippings, like *Euro-* or *–(a)holic* that we saw above. The situation of the constituents of neoclassical compounds seems to be rather similar, as they regularly appear not only in combinations with each other, but also with native free forms (e.g. *microcomputer*, *filmography*) resembling in this way, combining forms. The idiosyncratic behaviour of neoclassical elements, which appear both in combinations with one another and with native forms, could possibly prevent us from classifying neoclassical compounds in a category of their own. In this way, they would fit somewhere in between native and non-native words, simple and complex, abbreviated and non-abbreviated ones, within the cline proposed by Bauer (1998) for the English lexicon, according to which, words do not belong only to clear-cut categories, but also in between them, depending on whether they could be described as more or less native, more or less complex and more or less abbreviated items. This would be a more accurate classification, if our aim were simply to study the behaviour of neoclassical elements in all the contexts they might appear. In that case, we would probably reach the same conclusion, that Luedeling et al. (2002) have reached for German, namely that neoclassical word formation does not differ in principle from native word formation, as the elements involved in it share a number of similar characteristics with certain native elements of German, with the feature of boundness being one among others.

However, in this way, we would definitely miss an important fact, which is that there is a vast amount of words involving elements from classical languages, that share very similar characteristics, and can therefore form a class of their own; that of neoclassical compounds. The criterion for belonging to that class could be the degree to which a particular word containing elements of classical origin, complies with what would be described as the prototype of neoclassical compounding.

1.3 Neoclassical compounding: the 'prototype'

The notion of prototype in neoclassical compounding, also referred to by Bauer (1998), has been thoroughly discussed by Baeskow (2004: 72), who defines it as the combination of two (or more) bound roots of classical origin. This process takes place in level 1 of the lexicon (as defined in Kiparsky's (1982) terms), alongside the formation of idiosyncratic word forms like *went* or *children*. Examples of prototypical neoclassical compounds formed under this process[1], as presented by Baeskow (2004: 72), are:

(1) [[micro][scope]] [[astro][naut]] [[anthropo][morph]]
[[bio][log] [[fungi][cide]] [[geo][graph]]
[[phono][electro][cardio][scope]] etc.

[1] In the same process Baeskow (2004: 73) also includes the combination of a free and a bound root both of which are of classical origin (e.g. [[volcano][log]], [[zoo][log]], [[oceano][graph]]. These are quite different from the hybrid formations, where a native form combines with a classical one and the word that is formed is the result of morphological productivity in the sense of Lieber (1981) (Baeskow 2004: 76).

Some of the words above are free forms, like *microscope*, *astronaut*, *fungicide*, *phonoelectrocardioscope*, while others constitute only bound root combinations, such as *biolog-*, *anthropomorph-* and *geograph-*. According to Baeskow's (2004: 73) analysis, when these bound bases are selected by suffixes, they give rise to full words like *biology*, *anthropomorphic* and *geographer* respectively. Suffixation in this case, takes place either in level 1 or level 2 of the lexicon, depending on the class of the selecting suffix (e.g. *biolog+y* (Class-I suffix), *geograph#er* (Class-II Suffix)[2]), and this process is referred to as 'neoclassical compound derivation', which is considered to be a special type of derivation applied after compounding. Both of these processes comprise what we call the 'prototype' of neoclassical compound formation, which Baeskow (2004: 74) summarizes as follows:

> "Prototypical neoclassical compounds consist of at least two roots of Greek or Latin origin, one of which may be free. If such a compound is subjected to a derivational process, the result will be a neoclassical compound derivative".

As far as the morphological status of the elements of neoclassical compounds is concerned, under this analysis, they are regarded as bound stems, rather than as affixes or combining forms. Baeskow's approach incorporates two very important features: i) the recognition of a nominal status for the bound stems, and ii) the existence of a linking element between the bound elements. Both of these parameters have been the topic of much discussion among linguists who deal with neoclassical word formation, and are considered as sensitive issues, because of the implications they may have.

To begin with, both ten Hacken (1994:133), who supports the 'bound stem' analysis, and Cannon (1992: 486), who favours the 'combining form' view, argue that bound stems or combining forms lack categorial properties. More specifically, according to ten Hacken, these elements can only acquire categorial features if they combine with suffixes. The example he provides is that of the bound base *anthropomorph*, which consists of the bound stems *anthropo* and *morph*[3]. When this base combines with the suffix *–ic*, the adjective *anthropomorphic* is generated, the categorial properties of which (adjectival in this case), are inherited by the suffix. This was considered as a strong claim for Baeskow, who noticed the existence of neoclassical compounds that belong to the nominal category without containing any nominalizing suffix. Such an example is the word *telephone* consisting only of the

[2] If the bound base is selected by a class-II suffix, its internal structure is no longer visible due to the Bracket Erasure Convention (Kiparsky 1982).

[3] The form of bound stems, according to the Hacken (1994), is quite different from that presented so far for classical bound stems. Taking into account the fact that most of them appear also as 1st constituents in several combinations, ten Hacken proposes the existence of two surface forms for each bound stem, namely with and without the linking element (e.g. '*morpho'*, '*morph'*).

bound stems *tele* and *phone*, an allomorph of the stem *phon,* or the word *microscope* containing the elements *micro* and *scope*. Therefore, she assigns a nominal category to all bound stems that have a classical origin.

One other important feature in this analysis is the recognition of the vowel *–o-* (or *–i-* in the case where a bound stem is of Latin origin) appearing in between stems in neoclassical compounds. This vowel is no longer considered as part of the 1st or the 2nd constituent of these compounds, but rather as a linking element. In the language of origin, namely Ancient Greek, this vowel used to serve as a thematic vowel that later evolved into a compound marker for Greek compounds, as shown by Ralli (2008b, 2009), and Ralli & Raftopoulou (1999). The fact that in English there are no linking elements, or such compound markers, led previous analyses to considering it as part of the initial or the final stem. Bauer (1998), who has dealt with the issue, taking into account both its prior status as thematic vowel in the language of origin, and also the fact that it is retained in abbreviated forms of neoclassical compounds (e.g. *photo* from *photograph*), suggests that it should belong to the initial stem (initial combining form in his analysis (ICF), e.g. *astro-*, *bio-*, *crypto-*, *anthropo-* etc).

Baeskow (2004: 87), on the other hand has noticed some cases, especially of 'hybrid formations', which are combinations of native free forms with bound stems of classical origin, such as *Egyptologist* or *filmography*, where the *–o-* (or *–i-*) also appears, although it does not constitute part of the ICF (**Egypto*, **filmo*). Moreover, many of the bound stems that appear in the initial position of neoclassical compounds also appear as bases for plain suffixation, as the words *phonal*, *graphic* and *cephalic* show, without the vowel *–o-*. For these reasons, she considers this vowel as a linking element of neoclassical compounds (e.g. *astr-o-physics*, *gastr-o-scopy*), thus being consistent with the compound structure in the language of origin. In this way, she can dispense both with allomorphic variants, as ten Hacken has proposed ('*morpho*', '*morph*'), and with the combining forms specifically invented for combinations with stems of classical origin, such as *filmo* in the word *filmography*.

What Baeskow proposes as the prototype of neoclassical compounds, shows great similarity with the structure of words that once served as models for the formation of neoclassical compounds, namely, Ancient Greek compounds like *θeoloγos* ('theologist'), *vioγrafia* ('biography'), and others. It is not generally denied that neoclassical compounds were formed on the basis of Ancient Greek compounds, but other analyses seem to ignore that fact, to such a degree that it seems as if no parallel can be drawn anymore concerning the structure of each category. However, the constituents of those prototypical neoclassical compounds that Baeskow describes have moved out of the borders of the prototypical neoclassical compounding, by appearing in new contexts and adopting new roles. Nevertheless, the prototype of neoclassical compounding, as proposed by Baeskow, seems to suffice for the majority of what we call neoclassical compounds in English.

Up to this point, we have dealt with neoclassical compounds in English, by looking at the most prevailing analyses and supporting the one that in our opinion, seems to be more appropriate. As we mentioned earlier, the phenomenon of neoclassical compounding exists in many European languages, and a comparative

study would definitely provide an interesting insight to it. The language chosen in our case is Modern Greek (MG). The reason for this choice is the fact that, whereas in other languages, neoclassical compounds consist of non-native bound stems and their formation differs considerably from native compounding processes, in MG, the elements involved are native and the formation of neoclassical compounds follows the rules of native compound formation (Ralli 2007, 2008a). However, we will see that the phenomenon of neoclassical compounding as such, also exists in MG, and shares many more similar characteristics with the same phenomenon in English than what has been so far presumed.

2 Neoclassical Compounds in Modern Greek

2.1 Why 'neoclassical'?

Before we begin looking at examples of neoclassical compounds in MG, it is necessary to mention that so far, there has not been any reference to such a distinct class in MG. The reason for that is because what we could characterize as neoclassical compounds in MG, constitute members of other major categories of native compounds. Therefore, the term 'neoclassical compound' is used rather experimentally, and in order to draw a parallel between similar items in Greek and another European language, in our case English. For instance, the words *biography* in English and *vioɣrafia* in MG belong to the vast class of the so-called 'internationalisms' (Wexler 1969), a term that is used more like a pragmatic description of morphophonologically similar words occurring in different languages, which are formed with elements from Ancient Greek and Latin, and express the same concept.

As we saw in English, there are some criteria that would classify a certain word as a neoclassical compound, and concern mainly its constituents, which have to be non-native, preferably of classical origin, and bound. A similar class of compounds also exists in MG, the members of which share a very important common feature with the English ones i.e. they contain bound elements. Some examples are the following:

(2) iðr-o-ɣon(o)[4] 'hydrogen'
γloss-o-loɣ(os) 'linguist'
vi-o-ɣraf(os) 'biographer'
sism-o-ɣramma 'seismogram'
ipn-o-va-ti(s) 'sleepwalker'
paθ-o-ɣen(is) 'pathogenic'
mikr-o-skop-i(o) 'microscope'
aktin-o-vol-ia 'radiation'

[4] From now on, inflectional suffixes and other material which are not part of compound structures are presented in brackets (e.g. (*os*)). Derivational suffixes are separated from the base with a hyphen (e.g. *–ti(s)*).

As can be seen from the translations provided above, some of the examples are instances of internationalisms, namely v*i-o-ɣraf(os)*, *iδr-o-ɣon(o)*, *mikr-o-skop-i(o)*, *sism-o-ɣramma* and *paθ-o-ɣen(is)*. The others are not, but can also be regarded as neoclassical compounds for reasons that we will see below.

Generally, MG compounds have one of the following main internal structures (Ralli 2007, 2009):

(3) a. Stem + Stem, e.g. *nixt*-o-*luluδ*(*o*) 'nightflower'
nixt(*a*) *luluδ*(*i*) (infl.suffix)
night flower

b. Stem + Word, e.g. *laxan-aɣora* 'grocery market'
laxan(*o*) *aɣora*
cabbage market

The words we examine, examples of which we saw in (2), belong to the first type (3a.), as they consist of stems. Some of them were formed in earlier periods of the language, like *vioɣrafos*, while others are recent formations, like *ipnovatis*, *paθoɣenis*, *iδroɣono*, *mikroskopio*, *sismoɣramma*, *ɣlossoloɣos* and *aktinovolia*. This is not odd, since, as Ralli & Raftopoulou (1999) point out, the process of compounding in the Greek language has retained some of its characteristics throughout the centuries, and thus recent formations co-exist alongside older formations, sharing similar structures.

However, what makes these words unique, in comparison to other compounds is the fact that the stem in final position does not appear as a free form in the language. As Ralli (1992) points out, stem constituents of Greek compounds and other morphologically complex words are usually bound, but may become free words with the addition of an inflectional suffix, as we can see in the examples *nixt(a)* and *louloυδ(i)*, provided above. However, this is not the case with the stems under consideration in this paper, which remain bound, even after the addition of an inflectional suffix. Consider *-ɣraf(os)*, *-ɣon(os)*, *-va-ti(s)*, *-skop(os)*, *-ɣramm(a)*, *-loɣ(os*, *-ɣen(is)* and *-vol(os),* which are the final bound stems of the examples above (Ralli 1988, 1992, 2005, 2007, 2008a).

In most European languages, these bound stems have been recognized as learned elements that were resurrected from the past, in order to serve certain needs of the language, particularly the need to express scientific concepts. However, Ralli (2007, 2008a) argues that compounds with bound stems have always existed in the Greek language, many of them coming from ancient times while others being recently formed, in order to serve specific terminological needs. Moreover, Ralli points out that their structural and semantic transparency as well as their high degree of productivity in both scientific and everyday discourse show that these compounds are not mere fossilized structures.

2.2 The 'confix' view

As noticed in the case of bound stems in English neoclassical compounds, there are different opinions concerning the status of learned bound stems in MG. One view, expressed by Giannoulopoulou (2000), is that these elements, such as *-γrafos* in *sismoγraf(os)* ('seismograph') and *-γrafia* in *sismoγraf-ia* ('seismography'), have gradually acquired suffixal characteristics, and should therefore be considered under a new category, namely 'confixes' (Martinet 1979, Anastasiadi-Symeonidi 1986). She bases her analysis on Jespersen's (1925) approach of secretion, also proposed by Warren (1990). According to that approach, part of a complete word is secreted and acquires a new specialized meaning. Warren incorporates in the same analysis, both combining forms of classical origin, such as *aqua-*, *astro-*, *neuro-*, *eco-*, *bio-*[5], *-nography*, *-(a)thon*, *-meter* etc., and other non-classical combining forms like *–gate* as in *Yuppiegate* (arising from *Watergate*), *-(a)holic* as in *workaholic* (from *alcoholic*), *-ware* as in *firmware* (from *software*). Giannoulopoulou treats as similar elements the MG *evro-* ('Euro-'), *meta-*, *neo-*, *iko-* ('eco-'), *paleo-*, *poli-*, *raδio-*, *tile-*, *-iδis* ('-oid'), *-ismos*, *-pio* ('make'), *-piisi* ('making'), i.e. both initial and final combining forms, which she calls 'confixes'. The process in which they participate, namely 'confixation', could be described as a type of derivation rather than one of compounding.

It is true, as we also mentioned for their English counterparts, that all the above elements, through language usage, have gradually acquired a new status. However, it would probably be a wrong generalization to consider them as separate morphological entities, despite their apparent differences. Even if we considered only those elements that appear in final position, as for example, *-ktonos* ('-cide' (agentive)), *-ktonia* ('-cide'), *-loγos* ('-loger'/'-logist') and *–loγia* ('-logy') from the list above, such an analysis would have the following negative implication: words like *violoγos* ('biologist') and *violoγia* ('biology'), would be no longer morphologically related, but rather constitute products of parallel instances of the same word formation process, i.e. confixation:

(4) a. vio- + -loγos → violoγ(os)
b. vio- + -loγia → violoγia
c. vio- + -γrafia → vioγrafia

Following a confixation process, the stem *vio-* combines with *-loγ(os)* and *-loγia* to produce the words *violoγos* and *violoγia* respectively, as it combines with *–γrafia* for example, in order to create the word *vioγrafia*. All these items are members of a

[5] *Bio-* and *eco-* are proposed by Warren (1990) as combining forms with an extended meaning, i.e. 'biological' and 'ecological' respectively, which they have in the words *biocomputer* and *eco-socialism*. Therefore, they should not be confused with the bound stems *bio-* and *eco-* that appear in the prototypical neoclassical compounds *biology* and *ecology*, respectively. The situation is similar with *–nography* and others.

closed class, with no apparent morphological relation between them: the obvious morphological association between items like *-loγos* and *–loγia* and *–γrafos* and *–γrafia* is blurred, because there is no word-formation process that can depict their relationship.

2.3 The 'bound stem' view

A rather different view on the status of these elements, is expressed by Ralli (1988, 1992, 2005, 2007, 2008a 2009). To begin with, Ralli recognizes a number of properties that weaken the suffixal character of these items. She argues that:

(i) They serve as bases to prefixed words, as for example, in the words *ipo-loγos* ('responsible for one's actions') and *iper-maxos* ('defender'), which is evidence that such elements, as *–loγos* and *–maxos* in this case, should be considered as stems rather than suffixes (Ralli 2008a: 156).

(ii) They carry a concrete meaning, in comparison to suffixes which have a more functional role (categorial or relational), or carry a more abstract meaning. In particular, the formations in which they participate generally express an agentive or instrumental meaning, or that of an experiencer (Ralli 2008a: 156)

(iii) Contrary to suffixes they carry valency information, i.e. information about the obligatory complements of the verbs they come from. This means that "they impose an argument structure to their constructions, inherited from the underlying verb base" (Ralli 2008a: 157). More specifically, as we will see shortly, the left-hand nominal element in the constructions they form, serves as a complement of the verb base they derive from.

(iv) The words they appear in have a compound structure, that is recognizable both from the presence of the linking element *–o-*, which constitutes a compound marker in MG (Ralli 2008b), and from the fact that they exhibit recursivity in their structures (e.g. [[kinoni]-o-[γloss-o-loγos]] ('sociolinguist'), the latter being a common characteristic of compounds in Greek (Ralli 2008a: 158).

What is interesting in Ralli's analysis is what constitutes characteristic (iii) above, namely the fact that they have a deverbal nature. More specifically, Ralli argues that the structures in which these elements participate, formulate part of a broader class of verbal or deverbal compounds in Greek, like *xartopez(o)* ('play cards') and *xartopekti(s)* ('card player'), respectively. The only difference they present in comparison to the latter is the fact that their final elements are bound.

As far as the syntactic and grammatical status of these elements is concerned, Ralli supports that they constitute nominal derivatives of a verb base, which are produced through certain processes. Although overt suffixation is the most common nominalizing process that gives rise to similar elements of common deverbal compounds in MG (e.g. the deverbal compound *xartopek-ti(s)*, where the 2nd constituent is formed on the basis of the verb *pez(o)* with the derivational suffix *–ti(s)*), other processes are mostly at play. One of these processes is derivation by ablaut, which has been a very productive process in Ancient Greek, but today is limited only to a closed class of verbal bases. According to it, "the change of category is accompanied by the change of the internal vowel of the stem" (Ralli 2005: 58),

giving rise to words such as *trox(os)* ('wheel'), which derives from the verbal base *trex(o)* ('run') (*trex*-$_V$ → *trox*-$_N$), and also to bound elements, such as *-loγ*. Some examples are the following (Ralli 2008a: 160):

(5)

Verb	*Free derived noun*	*B.S. in compounds*
leγo ('talk')	loγos ('word, speech')	-loγ- as in θeoloγos ('theologist')
klepto ('steal')	klopi ('theft')	-klop- as in loγoklopos ('plagiarist')
temno ('cut')	tomi ('cut')	-tom- as in ilotomos ('woodcutter')

This identical change in vowel that occurs in both free and bound elements during the specific nominalizing process, as can be seen above, is probably the strongest argument against the claim that the bound elements under consideration have a nominal rather than a verbal category, as is proposed by Namer & Villoing (2007).

Another nominalizing process which actually gives rise to most of the bound elements in deverbal compounds in Greek is that of conversion, which is limited to the mere change of the grammatical category of the stem:

(6) γraf-$_V$ → γraf-$_N$ as in xoroγrafos ('choreographer')

Finally, a common nominalizing process in MG, which also produces bound elements of deverbal compounds, is that of overt suffixation (e.g. with the nominalizing suffix is *–ti(s)* which also occurs in free forms that serve as second constituents in deverbal compounds in MG, as already mentioned). As far as bound elements are concerned, examples of overt suffixation are the following (Ralli 2008a: 161):

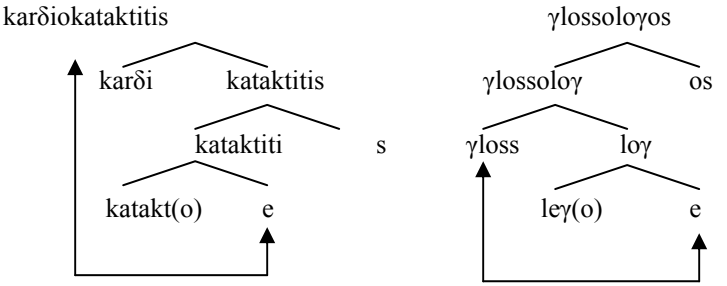
(7) a. δen(o)$_V$ → δe-tis$_N$ as in vivlioδetis ('bookbinder')

b. θet(o)$_V$ → θe-tis$_N$ as in onomatoθetis (lit.'name giver')

All the above processes justify the deverbal nature of the nominal bound elements appearing as second constituents of compounds. As a result, their formations are part of the broader class of MG deverbal or synthetic compounds (Ralli 2005, 2007). According to Di Sciullo & Ralli (1999), who have dealt with them, the deverbal stem carries the features of the verb it derives from. These features call for theta role saturation by the first constituent of the compound, which appears to satisfy a number of different thematic roles. For example, it can be that of the theme, as in *ixθiokalieryia* ('fish breeding'), the agent, as in *pontikofaγoma* ('eating by mice'), the

instrument, as in *oksiɣonokolisi* (‘oxygen gluing’), the patient, as in *karδiokataktitis* (‘heart conqueror’), and others.

Below we give the tree structures of a deverbal compound in MG, *karδiokataktiti(s)* (‘heart conqueror’) in Schema 1, as proposed by Di Sciullo and Ralli (1999) and Ralli (2007), and a deverbal compound with a bound stem deriving by ablaut, e.g. *ɣlossoloɣ(os)* (‘linguist’) in Schema 2. Theta role saturation takes place in both cases, as the arrows show:



Schema 1 **Schema 2**

The difference in the two structures lies in the fact that while in Schema 1 compounding takes place between a stem and a word, in Schema 2 compounding occurs at the level of the stem (see Ralli 2007, 2008a, 2009). Therefore, the structure proposed by Ralli (2008a, 2009) for complex formations containing a deverbal bound element is the following: ‘[[stem][bound stem]](infl.suffix)’, in which the bound stem can be the outcome of ablaut, conversion or overt suffixation, deriving from a verbal base. This structure can be applied to most of the examples of existing or potential neoclassical compounds in MG, some of which we saw in (2), namely, v*i-o-ɣraf(os)* (‘biographer’)*, sism-o-ɣramma* (‘seismogram’), *iδr-o-ɣon(o)* (‘hydrogen’), *ɣloss-o-loɣ(os)* (‘linguist’), *ipn-o-va-ti(s)* (‘sleepwalker’), *paθ-o-ɣen(is)* (‘pathogenic’).

Another important characteristic that Ralli (2008a) has recognized in deverbal compounds with bound elements is the fact that most of them serve as bases for the derivation of nouns, such as the words *mikr-o-skop-i(o)* (‘microscope’) and *aktin-o-vol-ia* (‘radiation’) from our list in (2), which are formed on the basis of the existing or potential deverbal compounds *mikroskop(os)* and *aktinovol(os)*, with the addition of the suffixes *–io* and *-ia* respectively. In fact, there is a great number of such derivatives, deriving from compounds with bound stems and receiving suffixes from a small set, namely *-ia*$_{N}$, *-io*$_{N}$, *-o*$_{V}$, *-ik*$_{A}$. These derivatives have the following structure: [[stem]$_{N}$[bound stem]$_{N}$]+derivational suffix.

3 Neoclassical Compounds in English ‘revisited’

3.1 Verbal properties of neoclassical bound stems

Bearing in mind the structure of compounds with bound stems in MG, we now turn back to neoclassical compounds in English. Below there are some examples of

prototypical neoclassical compounds and neoclassical compound derivatives, according to the analysis proposed by Baeskow (2004):

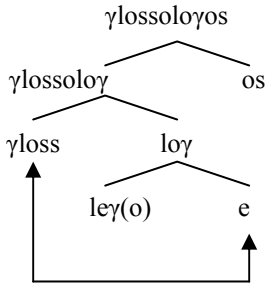
(8)	microcosm	polyglot	microbe
	Anglophile	gastroscope	vermicide
	xenophobe	carnivore	atmosphere
	pachyderm	francophone	hydrogen

Baeskow argues that there is an infinite number of possible combinations between classical roots, which can give rise to prototypical neoclassical compounds, and no restrictions apply to their combinations. However, she admits that this is not completely true, as there are some bound roots, which are not freely combinable, but impose certain restrictions on their non-heads (2004: 101-102). As an example, she provides the bound root *graph*, which, in the language of origin (i.e. Greek), derives from the verb *γraf(o)* ('write') and its non-head is interpretable either as an internal argument, as in *biography* ('description of life') and *hydrography* ('description of the waters of the earth'), or as an adjunct, as in *autograph* ('written with one's own hand) or *cryptograph* ('something written in secret code').[6] There is a parallel that can be easily drawn with bound stems in MG that we have examined above. Indeed, if we look at neoclassical compounds in English we observe that theta-role saturation takes place, as the non-head satisfies an internal argument of the base verb, which the bound root derives from in the language of origin:

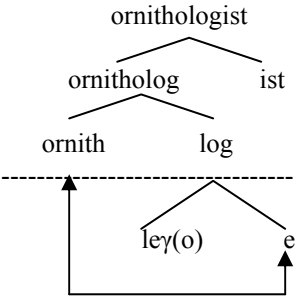
(9)	*Neocl. Comp.*	*B.S. with verbal base*	*Nonhead*
	anglophile	<-phile ('that likes')	Angl- (Int.)
	carnivore	<-vore ('that eats')	carn- (Int.)
	hydrogen	<-gen ('that bears')	hydr- (Int.)
	xenophobe	<-phobe ('that dislikes')	xen-(Int.)
	gastroscope	<-scope ('that observes')	gastr- (Int.)
	bibliophage	<-phage ('that eats')	bibli- (Int.)

Following the structure of deverbal compounds in MG seen in Schemas 1 & 2 we can create a similar tree diagram for a neoclassical compound in English that contains a bound root with verbal features:

[6] The definitions provided by Baeskow (2004) come from Klein (1971).



Schema 3



Schema 4

What is shown above is that the bound root *log* in English carries the same verbal features like the MG bound stem *loγ*, and receives as its complement the empty symbol 'e', which is satisfied by the non-head of the compound, i.e. the bound root *ornith*.

However, if we have a closer look at the list of English neoclassical compounds, we find formations that do not fit in the same structure. This is what we examine below.

3.2 Nominal properties of neoclassical bound stems

Examples such as *microcosm*, *polyglot*, *microbe*, *atmosphere*, *pachyderm* and *francophone* do not belong to the class of deverbal neoclassical compounds because their final constituent does not carry any verbal characteristics, as it does not derive from a verb in the language of origin. Nevertheless, they constitute determinative compounds, either attributive, like *microcosm* ('small' ∪ 'world'), *polyglot* ('many' ∪ 'language'), *microbe* ('small' ∪ 'life'), *pachyderm* ('thick' ∪ 'skin'), *francophone* ('french' ∪ 'sound') or subordinative, like *atmosphere* ('vapour' ∪ 'sphere'). However, while *microcosm* and *atmosphere* are hyponyms of their heads, *cosm* and *sphere* respectively, thus bearing an endocentric structure, the situation seems to be quite different with the rest of the examples: *polyglot* ('a multilingual person'), *microbe* ('small organism'), *pachyderm* ('large, thick skinned and herbivorous animal') and *francophone* ('a french-speaking person') are not hyponyms of their heads (i.e. their final constituents), as they all refer to entities that do not follow from their constituents. As a consequence, these words display an *exocentric* structure.

Exocentricity is a widespread phenomenon among neoclassical compounds, and concerns only those whose final constituent has nominal features. Like most neoclassical compounds, they usually belong to scientific vocabularies. However, as far as English is concerned, it appears that in most cases, only meaning can determine the endo- or exo-centricity of a neoclassical compound and this is mainly due to the impoverished inflectional system of this language. As we saw before, prototypical neoclassical compounds according to Baeskow's view, and in contrast to neoclassical compound derivatives, consist of two or more stems linked with a linking element, while there is no other suffix. The fact that there is no apparent nominalizing suffix

involved in their formation (e.g. *tele-phone*, *patri-arch*, *micr-o-scope*, *seism-o-graph* etc.) has led Baeskow to the conclusion that these stems carry categorial features themselves, which thus assign a nominal status to the whole compound. Therefore, there is no overt morphological material that can determine the endo- or exo-centricity structure of such a compound. Only semantics can tell.

An example that depicts this situation comes from the vast area of scientific terminology and concerns compounds whose final constituent is the bound root *derm* ('skin'), as in the words *pachyderm* (from the list above) and *mesoderm*. Although, the relationship between their constituents is the same assigning an attributive character to both of them, their meaning witnesses their different structures. Specifically, *pachyderm* refers to a group of large herbivorous animals, such as the elephant or the hippopotamus, characterized by the thickness of their skin. The word *mesoderm*, on the other hand, refers to the inner layer of skin in embryos. Therefore, *pachyderm*, which refers to an animal, has an exocentric structure as a compound, while *mesoderm*, which refers to a skin type, thus being a hyponym of its head (*derm*), has an endocentric structure.

Similar exocentric compounds also exist in MG, and are also cases of 'internationalisms', belonging to scientific and technical terminology. Structurally, they resemble deverbal compounds with bound stems examined above, as they have similar inflectional endings, and are derivatives formed with the suffix *–ia*. However, they have a completely different structure from the latter, as their final constituent is a *nominal* stem, rather than a bound deverbal one, carrying only nominal features. Some examples of Greek exocentric neoclassical compounds and their derivatives are presented in (10) and (11) respectively:

(10) ksenoγloss(os)$_A$ ksen- -γloss (< γlossa 'tongue')
'foreign-language speaking'
idrovi(os)$_A$ idr- -vi (< vios 'life')
'living in water'
γallofon(os)$_A$ γall- -fon (< foni 'voice')
'francophone'

(11) ksiroδerm(os)$_A$ → ksiroδerm-ia
'dry-skinned' 'dry skin condition'
allomorf(o)$_N$ → allomorf-ia
'allomorph' 'allomorphy'

More specifically, as seen in (10), the second constituent of the compounds is the stem of a free form in the language (*γlos(a) 'tongue'*, *vi(os)* 'life' and *fon(i)* 'voice' respectively), in contrast to the second constituent of the deverbal compounds we examined before, which is a bound verbal derivative (e.g. *loγ-*, *γraf-*, *γen-*, *paθ-* etc.). Compare the following examples of a deverbal compound with a bound stem (*γlosoloγ(os)*) and an exocentric determinative one (*ksenoγlos(os)*) in MG:

(12) a. γlosoloγ(os) γlos- (<γlos(a)$_N$ ‘tongue’)
‘linguist’ loγ- (<leγ(o)$_V$ ‘talk’)
b. ksenoγlos(os) ksen- (<ksen(i)$_A$[7] ‘foreign’)
‘foreign lang. speaking’ γlos- (<γlos(a)$_N$ ‘tongue’)

The apparent similarity arising from the identical inflectional suffix *(os)* is obscured by the different nature of the final constituents *loγ-* and *γlos-*, the first of which is a deverbal bound stem (*leγ(o)* > *-loγ*(*os*)) and the latter the stem of the common noun *γlosa ‘tongue’*.

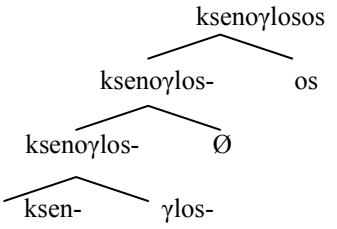
Both in exocentric English and MG neoclassical compounds the syntactic head lies out of the structure, i.e. their categorial features are not inherited from the head of the structure (Ralli 2007). As opposed to English though, in MG, endo- or exocentricity can be sometimes morphologically determined from the different inflectional endings. Let us consider two examples with the same nominal stem in final position, but with an endocentric and an exocentric structure respectively:

(13) a. monoliθ(os) mon- (<mon(os)$_A$ ‘single’)
liθ- (<liθ(os)$_N$ ‘stone’)
b. akroliθ(os)/(i)/(o) akr- (<akr(i)$_N$ ‘edge’)
liθ- (<liθ(os)$_N$ ‘stone’)

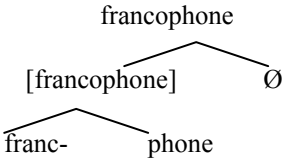
In these examples, *monoliθ(os)* refers to ‘a stone of a great size’. It is a hyponym of its head *liθ(os)*, thus having an endocentric structure. The compound *akroliθ(os)*, on the other hand, can be either an adjective (*akroliθ(os)/(i)/(o)*) referring to ‘a statue, in which only the head, arms and legs are made from an expensive material’, or a noun (*akroliθ(o)*) denoting ‘the type of a statue made with the above technique’. In both cases this compound has an exocentric structure.

How exocentric compounds in MG obtain their categorical features is a matter of dispute, because it cannot be through the suffix *(os)* which, as seen, is only an inflectional one. According to Ralli (2005), these compounds are formed through the process of derivation, either by null suffixation or conversion, which attributes to the compound new categorial, morphological and semantic features, as depicted in the following tree structure in Schema 5. We suppose that the situation in English exocentric neoclassical compounds is similar, except for the fact that no inflectional suffix is involved, as shown in Schema 6. Below we can see the tree structures of an exocentric compound in each language:

[7] The inflectional suffix *(i)* corresponds to the nominative singular feminine form of the adjectival suffix *(os)(i)(o),* thus agreeing with the nominative singular form of the noun *γlos(a)*, which has a feminine gender.



Schema 5: *Exocentric compound in MG*[8]



Schema 6: *Exocentric compound in English*

4 Concluding remarks

This study has attempted to shed some light on the structure of the so-called neoclassical compounds in English, by drawing a parallel with words that could also be considered as neoclassical compounds in MG, and are of two types i) deverbal compounds with bound stems, and ii) exocentric compounds belonging to scientific terminology. This comparative analysis showed that the final constituents of neoclassical compounds, i.e. bound stems of classical origin, depending on the morphological category of their stem, can have either verbal or nominal characteristics, which impose certain restrictions on their combinations and determine the structure of the compounds they form. As a result, the following main types of prototypical neoclassical compounds in English have been recognized:

- NEOCLASSICAL DEVERBAL COMPOUNDS
(bound stem with verbal features in final position)
e.g. *carnivore*, *Anglophile*, *hydrogen*, *vermicide*, *autograph*, *xenophobe*, *psychopath*, *gastroscope*, *bibliophage.*

[8] The semantically corresponding endocentric compound in MG is expressed with the loose multi-word compound *kseni γlossa* ('foreign language'), which apparently has a different structure.

- NEOCLASSICAL DETERMINATIVE COMPOUNDS - ATTRIBUTIVE OR SUBORDINATIVE (bound stem with nominal features in final position).

These are further divided into:

(i) ENDOCENTRIC COMPOUNDS
e.g. *atmosphere*, *microcosm*, *electromagnet, mesoderm*.

(ii) EXOCENTRIC COMPOUNDS
e.g. *allomorph*, *microbe*, *polyglot*, *octagon*, *pachyderm*, *francophone*.

As prototypical neoclassical compounds, we refer to words consisting only of elements with classical origin, as Baeskow (2004) defines them, in contrast to 'hybrid formations', which are combinations of native and classical elements, such as *queenomania* (Bauer 1998) or *microcomputer* (Baeskow 2004). Such formations, according to Bauer (1998), cannot be listed under the category of neoclassical compounds as they diverge from the prototype. However, as far as the combination 'native stem + classical bound stem' is concerned (e.g. *Whiggarchy*, *weedicide*, *Londonologist*, *robotomorphic*, *infosphere*) we can say that the above categorization is also valid.

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Περίληψη

Αυτό το άρθρο εξετάζει μία ομάδα λέξεων της Αγγλικής που αποτελούνται από δεσμευμένα στοιχεία κλασικής προέλευσης (από την Αρχαία Ελληνική ή τη Λατινική) που είναι γνωστά ως «νεοκλασικά σύνθετα». Στόχος είναι η εξέταση της δομής αυτών των συνθέτων α) λαμβάνοντας υπόψη τη μορφολογική υπόσταση των συστατικών τους στοιχείων και β) συγκρίνοντάς τα με ορισμένα είδη συνθέτων στη Νέα Ελληνική. Υποστηρίζεται ότι η δομή των νεοκλασικών συνθέτων της Αγγλικής επηρεάζεται σε μεγάλο βαθμό από τα ιδιαίτερα χαρακτηριστικά του συστατικού στοιχείου που

βρίσκεται σε τελική θέση, τα οποία προκύπτουν από τις κατηγοριακές του ιδιότητες στη γλώσσα προέλευσης και επιβάλλουν μια σειρά περιορισμών στους συνδυασμούς του. Λαμβάνοντας υπόψη τα παραπάνω στοιχεία, διακρίνονται οι ακόλουθοι τύποι στα νεοκλασικά σύνθετα της Αγγλικής: α) ρηματικά σύνθετα και β) προσδιοριστικά σύνθετα με ενδοκεντρική ή εξωκεντρική δομή.

EVANTHIA PETROPOULOU
UNIVERSITY OF PATRAS
evapetro@cc.uoi.gr