

Form and Meaning of Bahuvrihi Compounds: Evidence from Modern Greek and Its Dialects

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Abstract This paper offers a detailed investigation of bahuvrihi compounds in Greek with a focus on their form and semantics. First, we present a classification of bahuvrihis according to the lexical category of the compound structure and the lexical category of the compound members and we provide examples of the rarest attested type, that is, verbal bahuvrihis (e.g. *kaloizo* < *kal(i)* ‘good’ *zo(i)* ‘life’, ‘to have a good life’). Second, we raise the question of *where the meaning ‘having/to have X’ comes from in bahuvrihis*. Based on the distinction between nominal, adjectival, and verbal bahuvrihis, we propose that the former type should be accounted for by metonymy, whereas the latter two types, that is, adjectival and verbal bahuvrihis should be analyzed as “extended bahuvrihis” in that they combine compounding and derivation in this particular order. As such, adjectival and verbal bahuvrihis can be better understood if we examine the relation between compounding and derivation.

Keywords Compounding • Bahuvrihi • Exocentricity • Metonymy • Zero-derivation • Dialectology

1 Introduction

The term *bahuvrihi* was introduced by the Sanskrit grammarian Pāṇini in his *Aṣṭādhyāyī* (Vasu 1894), in which he classifies compounds into four types: *avyayībhāva*, *tatpuruṣa*, *bahuvrihi*, and *dvandva*. According to Pāṇini, bahuvrihis

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are those compounds which denote a new thing not connoted by the constituent members individually (P.2.2,24). The Sanskrit compound *bahuvrīhi* exemplifies this type of compounding since its literal meaning is ‘much rice’ and is used to denote something which is not connoted by the compound members, that is, ‘having much rice, i.e. a rich man’. Given that the meaning of most bahuvrīhis is ‘having X’, these formations are also attested as *possessive* compounds in the relevant literature (Bopp 1871; Whitney 1879).

A review of the relevant literature (see among others Bloomfield 1933; Marchand 1969; Bauer 2001, 2008, 2010; Lieber 2004; Melloni and Bisetto 2010; Ralli and Andreou 2012; Ralli 2013; Andreou 2014) shows that an open question is the relation between the terms *bahuvrīhi*, *possessive* and *exocentric* compound. Consider the following:

- (1) a. [...] in *gadabout* and *turnkey* the head member is an infinitive verb, but the compound is a noun; these compounds are exocentric (Sanskrit *bahuvrīhi*). (Bloomfield 1933: 235)
- b. [...] the large class of English compounds that is exemplified by *whitecap*, *longnose*, *swallow-tail*, *blue-coat*, *blue-stocking*, *red-head*, *short-horn* has noun function and a noun as head member, and yet is to be classed as exocentric, because the construction implies precisely that the object does not belong to the same species as the head member: these compounds mean ‘object *possessing* such-and-such an object (second member) of such-and-such a quality (first member).’ (Bloomfield 1933: 236)
- c. Bahuvrīhi compounds are also known as possessive compounds, *Dickkopfkomposita*, or exocentric compounds (Bloomfield 1933: 235), although exocentric is a rather more inclusive label. (Bauer 2001: 700)
- d. Items like *blockhead* or *air head* are also exocentric, and might be termed POSSESSIVE compounds (similar to the Sanskrit designation BAHUVRIHI) (Bauer et al. 2013: 465)
- e. [*Bahuvrīhi*] has been used for identifying nominal compounds with possessive interpretation but ended up by indicating exocentric compounds *tout court* . . . The use of the term *bahuvrīhi* as a generic label for exocentric compounds is thus an incorrect extension; *bahuvrīhi* in fact refers to a specific subclass of exocentric compounds, i.e. possessive compounds. (Scalise and Bisetto 2009: 36)

Observe that in modern literature the term *bahuvrīhi* has been used in two ways: (a) as equivalent to the term *exocentric*, as for example in the work of Bloomfield (1933), or (b) as a subset of *exocentric* compounds which is defined based on the meaning ‘having X’ (*possessive* meaning).

As shown by Andreou (2014: 291–293), Bloomfield’s use of the term is closer to Pāṇini’s original classification, in that *bahuvrīhis* are not just a subset of *exocentric*

compounds based on the meaning ‘having X’. As a result, it is not an incorrect extension to identify bahuvrihi with exocentric compounds, since in Pāṇini’s classification, the term bahuvrihi is a rather generic term. A closer inspection of Bloomfield’s work and compounding in Sanskrit and Greek, however, reveals the following: possessive compounds such as *red-head* and *short-horn* which have noun function and a noun as head member are considered as exocentric by Bloomfield. A fundamental difference, however, between the English *red-head* and possessive compounds in Greek and Sanskrit is that the latter function as adjectives and not as nouns. In other words, exocentricity in Greek and Sanskrit is morphologically marked and it is not a semantically defined phenomenon only. To anticipate later discussion, this difference in function is partly responsible for the formally distinct ways scholars have analyzed bahuvrihi compounds.

In this paper, following Andreou (2014), we will assume that we should not collapse the two categories, that is, bahuvrihis and exocentric compounds despite that this diverges from the original proposal by Pāṇini. For us, the term bahuvrihi should be used only with respect to those compounds which exhibit the meaning ‘having X/to have X’ (possessive compounds). As we will show in Sect. 4, in a language such as Greek in which exocentricity is formally marked, bahuvrihis cannot be identified with exocentric compounds, since morphological configurations with the meaning ‘having X/to have X’ may belong to either endocentric or exocentric formations. Our evidence will be drawn from Standard Modern Greek (hereafter Greek) and Modern Greek Dialects.¹

Before proceeding with the analysis of bahuvrihis, let us give a brief sketch of the main characteristics of Greek compounds which are crucial for the argumentation. According to Ralli (2007, 2013), Greek compounds are one-word formations which obey the lexical integrity hypothesis (Lapointe 1980), in that their internal structure is never accessible to syntax. More specifically, their structure involves morphologically-proper constituents, i.e. either two stems ([stem stem] compounds) or a stem and a word ([stem word] ones). As illustrated in Table 1, in the first case, the stress and the inflectional ending are different from those of the second member when taken in isolation, as in *lulúði* vs *nixtolúluðo*. In the second case, stress and

Table 1 [Stem Stem] compounds

Compound	Compound Member 1	Compound Member 2
nixtolúluðo	nixt(a)	luluð(i)
‘night-flower’	‘night’	‘flower’
kuklóspito	kukl(a)	spit(i)
‘doll-house’	‘doll’	‘house’

¹Throughout the paper, the origin of the examples will be noted if they appear in the dialects but not in Standard Modern Greek.

Table 2 [Stem Word] compounds

Compound	Compound Member 1	Compound Member 2
domatosaláta	domat(a)	saláta
‘tomato-salad’	‘tomato’	‘salad’
lemonanθós	lemon(i)	anθós
‘lemon blossom’	‘lemon’	‘blossom’

inflection follow the word constituent as in *saláta* vs *domatosaláta* as depicted in Table 2².

In addition, Greek compounds are phonological words, i.e. they bear a single stress, independently of the stress of their constituent parts when taken in isolation. They also bear a compound marker, namely *-o-*, between the two constituents which has a compulsory character. For example, in *nixt-o-lúluðo*, the compound members are linked together by the element *-o-*. Finally, Greek compounds are inflected at their right edge and their inflectional ending may be different from that of the second constituent, in the case of [stem stem] compounds. By way of example, the [stem stem] *nixtoluluð-o* belongs to inflection class (IC) 5 despite the fact that its second constituent, *luluð-i*, inflects according to IC6.³ To anticipate later discussion, the distinction between the two main classes of Greek compounds and whether the second member is a stem or a word, can be used as a criterion for the identification of endocentric and exocentric bahuvrihis.

The structure of the rest of this paper is as follows: in Sect. 2, we present a classification of Greek bahuvrihi compounds based on two criteria: (a) the lexical category of the compound structure and (b) the lexical category of the compound members. In Sects. 3 and 4, we delve more deeply into the analysis of the form and the semantics of bahuvrihi formations. We present the various analyses of these compounds based on metonymy and zero-derivation and provide evidence in favour of the idea that Greek compounds with the meaning ‘having X/to have X’ belong to two formally distinct types. Section 5 concludes the paper.

2 Classification of Greek Bahuvrihis

By the criterion of the lexical category of the compound structure as a whole, Greek bahuvrihi compounds can be classified into adjectives, nouns, and verbs. Let us first consider adjectival bahuvrihis since the bulk of Greek bahuvrihis belongs to this category.

²Examples will be given a broad phonological transcription and stress will be noted only on word forms. Parts of words which do not appear within compounds will be included in parentheses.

³It should be noted that several Greek compounds do not exhibit the same morphosyntactic features as their second constituent that is responsible for the computation of the lexical category of the compound. This casts doubts on the idea that the head should be identified with the morphosyntactic determinant (for a discussion see Andreou 2014: 45–65).

2.1 Adjectives

As shown in Table 3, the most productive way to build an adjectival bahuvrihi is to combine an adjective and a noun, as in *γλικόfonos* ‘having a sweet voice’, which is composed of the stems of the adjective *γλικ-ia* ‘sweet’ and the noun *fon-i* ‘voice’.⁴

Table 4 provides examples of bahuvrihis composed of two nouns. For example, *farmakóγlosos* ‘sharp-tongued’ combines the noun *farmak(i)* ‘poison’ and *γlos(a)* ‘tongue’.

An adjectival bahuvrihi can also be based on the combination of a numeral and a noun. To adduce an example, *eksásferos* in Table 5, combines the numeral *eks(i)* ‘six’ and the noun *sfer(a)* to denote ‘(a gun) with six bullets’.

Table 3 Adjective + Noun adjectival Greek bahuvrihis

Compound	Compound Member 1	Compound Member 2
<i>anixtoxéris</i>	<i>anixt(o)</i>	<i>xer(i)</i>
‘open-handed, generous’	‘open’	‘hand’
<i>γλικόfonos</i>	<i>γλικ(ia)</i>	<i>fon(i)</i>
‘with a sweet voice’	‘sweet’	‘voice’
<i>elafrómialos</i>	<i>elafr(i)</i>	<i>mial(o)</i>
‘scatterbrained’	‘light’	‘brain’
<i>kakótixos</i>	<i>kak(i)</i>	<i>tix(i)</i>
‘ill-fated’	‘bad’	‘luck’
<i>kalókarðos</i>	<i>kal(i)</i>	<i>karð(ia)</i>
‘kind-hearted’	‘good, kind’	‘heart’
<i>kokinotríxis</i>	<i>kokin(i)</i>	<i>trix(a)</i>
‘red-haired’	‘red’	‘hair’

Table 4 Noun + Noun adjectival Greek bahuvrihis

Compound	Compound Member 1	Compound Member 2
<i>teratómorfos</i>	<i>terat(os)</i> ^a	<i>morf(i)</i>
‘lit. having the form of a monster, monstrous’	‘monster’	‘form’
<i>farmakóγlosos</i>	<i>farmak(i)</i>	<i>γlos(a)</i>
‘sharp-tongued’	‘poison’	‘tongue’
<i>alupomútsunos</i> (Cypriot)	<i>alup(os)</i>	<i>mutsun(a)</i>
‘fox-faced’	‘fox’	‘face’

^a*Terat-* is an allomorph of the stem *ter-* ‘monster’. *Terat-* appears in the genitive singular and in plural, while *ter-* is used in the other slots of the paradigm, i.e. in the nominative, accusative and vocative cases of the singular number. For the presence of allomorphy in adjectival bahuvrihis see Andreou (2014: 235–243)

⁴The tables in this section aim to provide the reader with the lexemes which form part of Greek bahuvrihi formations and do not give a morpheme-by-morpheme analysis. For the structural analysis of bahuvrihis see Sect. 4.

Table 5 Numeral + Noun adjectival Greek bahuvrihis

Compound	Compound Member 1	Compound Member 2
eksásferos	eks(i)	sfer(a)
‘with six bullets’	‘six’	‘bullet’
oxtáγonos	oxt(o)	γon(ia)
‘octagonal’	‘eight’	‘angle’
ðekáplevros	ðek(a)	plevr(a)
‘with ten sides’	‘ten’	‘side’
ikosáleptos	ikos(i)	lept(o)
‘having/lasting twenty minutes’	‘twenty’	‘minute’

Table 6 Pronoun + Noun adjectival Greek bahuvrihis

Compound	Compound Member 1	Compound Member 2
aftokéfalos	aft(os)	kefal(i)
‘autocephalous’	‘self’	‘head’
aftoðínamos	aft(os)	ðinam(i)
‘self-reliant’	‘self’	‘power’
alóγylosos	al(i)	γylos(a)
‘speaking a foreign language’	‘other’	‘language’
alóθriskos	al(i)	θrisk(ia)
‘having a different religion’	‘other’	‘religion’

A few adjectival bahuvrihis can be composed of a pronoun, usually *aft(os)* ‘self’ and *al(os)* ‘other’, and a noun as exemplified by *aftokéfalos* ‘autocephalous’ in Table 6, which consists of the pronoun *aft(os)* ‘self’ and the noun *kefal(i)* ‘head’ and *alóγylosos* ‘lit. having a different language, speaking a foreign language’ which is composed of *al(i)* ‘other’ and *γylos(a)* ‘language’.

2.2 Nouns

Greek exhibits a number of bahuvrihis which are nouns. This type is formed on the basis of nouns and adjectives as first constituents and nouns as second ones. Table 7 illustrates [Adjective Noun] and Table 8 includes [Noun Noun] combinations (from Andreou 2014: 226).

This type includes both subordinate (*voïðokiliá*) and attributive (*vromóγylosa*) compounds and in these compounds, the second constituent is a body part. To anticipate later discussion, some of these formations may have both a literal and a figurative meaning, whereas others may only be used in a figurative manner. To adduce an example, *arkuðómutro* may refer to ‘the face of bear’ and to someone ‘who has the face of a bear, a malformed person’, whereas, *anostókormo* is only used to refer to someone ‘with a bad-shaped body’.

Table 7 Noun + Noun verbal Greek bahuvrihis

Compound	Compound Member 1	Compound Member 2
arkuðómutro	arkuð(a)	mutr(o) ^a
1. 'the face of bear' 2. 'who has the face of a bear, a malformed person'	'bear'	'face'
voιδokiliá (Naxos)	voιδ(i)	kilia
1. 'ox-belly' 2. 'who has a big belly'	'ox'	'belly'

^a*Arkuðómutro* contains two stems, *arkuð-* and *mutr-* while its inflectional ending *-o* is homophonous to that of the wordform *mutro*. On the contrary, *kilia* participates in the compound with its entire wordform, that is why the ending *-a* is not included in parenthesis. See Ralli (2007, 2013) for the criteria according to which one can decide whether a compound consists of two stems or of a stem and a word

Table 8 Adjective + Noun nominal Greek bahuvrihis

Compound	Compound Member 1	Compound Member 2
anostókormo	anost(o)	korm(i)
'who has a bad-shaped body'	'bad-shaped'	'body'
vromóγlosa	vrom(iki)	γlos(a)
1. 'a filthy tongue' 2. 'who has a filthy tongue'	'filthy'	'tongue'

Table 9 Adjective + Noun verbal Greek bahuvrihis

Compound	Compound Member 1	Compound Member 2
varikartízo (Cypriot)	vari(a)	karð(ia)
'lit. to have a heavy heart, to be sad'	'heavy'	'heart'
kaloziízo (Cephalonia)	kal(i)	zo(i)
'to have a good life'	'good'	'life'
kakonixtízo (Cypriot)	kak(i)	nixt(a)
'to have a bad night'	'bad'	'night'

2.3 Verbs

Some Modern Greek dialects, as for instance Cypriot, also exhibit verbal⁵ bahuvrihis which according to Bauer (2008) is the most rarely attested type of bahuvrihis. In these formations the compound has the meaning 'to have X' and of importance is that none of the two stems is a verb. Table 9 provides examples of [Adjective Noun]⁶ verbal bahuvrihis (for more data see Andreou 2014: 271–272).

⁵It should be noted that verbal exocentric compounds such as *varikartízo* 'lit. to have a heavy heart, to be sad' differ from exocentric compounds of the type *misojínis* 'who hates women', in that the latter do not belong to bahuvrihi compounds, are verbs and are formed on a different structural pattern (e.g. they are verb-first).

⁶The absence of [Noun Noun] verbal bahuvrihis should only be attributed to the lack of sources and not to any particular constraint.

To sum up, the creation of bahuvrihis, and especially adjectival bahuvrihis, is a very prolific process in the compounding system of Greek and these compounds may belong to the three major categories, that is, adjectives, nouns, and verbs. The examination of the above mentioned compounds shows that although in the first (non-head) stem-position one may find nouns, adjectives, numerals, and pronouns, the second stem-position is always occupied by nouns. This is of course expected, for bahuvrihis denote ‘having X/to have X’ and ‘X’ is always an entity which belongs to the lexical category of noun.

3 Metonymy or (Zero-)Derivation?

The analysis of the form and meaning of bahuvrihis is a frequently debated issue among scholars. In what follows, we present the distinct ways bahuvrihis have been analyzed by scholarship.

To begin with, compare the English bahuvrihi *redhead* to the compound *blackbird*. The bahuvrihi formation exhibits the same attributive relation between its members as *blackbird*, in that in both compounds the first member, which is an adjective, acts as a modifier of the second constituent, which is a noun. In addition, in both compounds, the second constituent is responsible for the determination of the lexical category of the whole; that is, both compounds are nouns and not adjectives. These compounds, however, differ with respect to their denotation, since *blackbird* denotes a kind of bird, whereas *redhead* does not refer to a kind of head that is red, but to someone having red hair. The question which arises, and which is central to the study of bahuvrihis, is the following: *Where does the meaning ‘having/to have X’ come from in bahuvrihis?* The rest of this paper addresses this question in detail.

A possible solution to this issue is to assume that bahuvrihis, such as *redhead*, are a special semantic category of endocentric compounds. In fact, several authors have argued that bahuvrihi compounds are a category of endocentric compounds which is based on metonymy (Booij 2002, 2007; Bauer 2008, 2010; Lieber 2004, 2005, 2009). In other words, bahuvrihis are instances of the stylistic trick *pars pro toto* according to which a salient feature/part of an entity is used to denote the whole entity (*part-for-whole* relationship). By way of example, *redhead* is used metonymically to denote ‘a person who has red hair’.

Consider now the lexical semantic representations of a bahuvrihi such as *bird brain* in (2a) that is used to denote someone who has a brain no bigger than the brain of a bird and the compound *dog bed* in (2b) from Lieber (2009: 98–99):

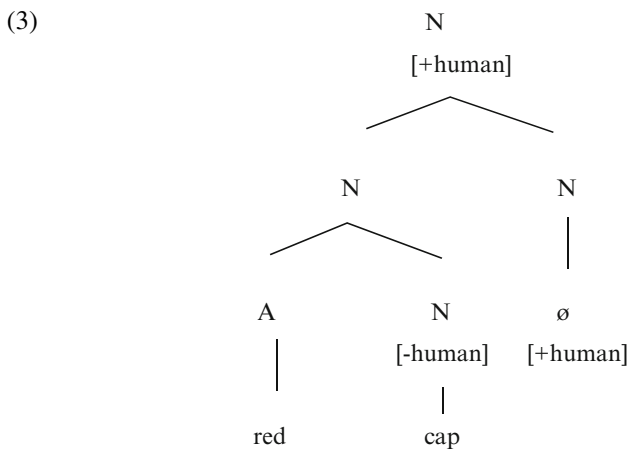
- (2) a. *bird brain*
- | | |
|--------------------------|-------------------------------------|
| <i>bird</i> | <i>brain</i> |
| [+material ([i])] | [+material ([i])] |
| <+animate> | <−animate> |
| <−human> | <−artefact> |
| {flies, lays eggs, ... } | {body part, part of nervous system} |

b. *dog bed*

<i>dog</i>	<i>bed</i>
[+material ([i])]	[+material ([i])]
<+animate>	<-animate>
<-human>	<-artefact>
	<function>
{four legs, wags tail, ... }	{for sleeping, ... }

Lieber argues that in both compounds, the dissimilarity of the bodies of the compound members does not allow for the complete identification of reference; as a result, *bird brain* and *dog bed* cannot be interpreted as co-compounds. In addition, given that there is no argumental relation between the compound members these compounds cannot be interpreted as subordinate. Therefore, both compounds are interpreted as attributive ones. Despite that *bird brain* and *dog bed* have very similar lexical-semantic representations and that they do not differ in terms of indexing, the former exhibits a meaning which is not evident in the latter. In order to explain the extra meaning ‘having X’, Lieber assumes, along with other scholars, that *bird brain* is interpreted metonymically.

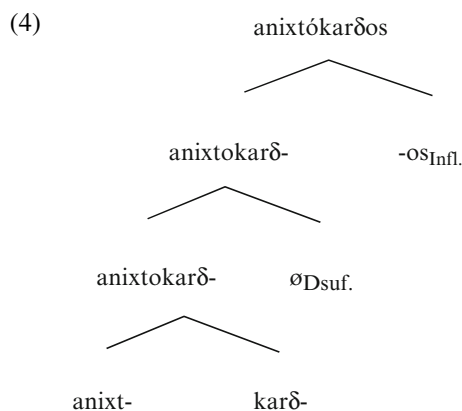
Another solution to this issue is to assume that bahuvrihis of the *redhead* type undergo (zero-)derivation. That is, the meaning ‘having X’ comes from a (zero-)suffix which attaches to the combination of two stems/words (Marchand 1969; Kiparsky 1982; Sproat 1988; Kastovsky 1992, 2005; Melloni and Bisetto 2010). Consider the schema in (3) which illustrates the derivation of the bahuvrihi *red cap* (from Bauer 2008: 59):



Observe that in this schema, the head is a zero-derivational suffix which attaches to the combination *red cap* and is responsible for the feature [+human].

The analysis of Greek bahuvrihi compounds as bearing a suffix which is responsible for the category and the semantics of the formation has been proposed

by Ralli (2005, 2007, 2013) and Ralli and Andreou (2012). Consider for instance the Greek compound *anixtókarðos* ‘open hearted’ (< *anixt(i)* ‘open’ + *karð (ia)* ‘heart’):



Observe that in this example, a zero-suffix attaches to the configuration *anixtokarð-* ‘open heart’ which is the result of the combination of the stems *anixt-* and *karð-*.

4 Nominal and Adjectival Bahuvrihis

Although metonymy and suffixation are considered diametrically opposite views on the analysis of bahuvrihi compounds, following Andreou (2014), we will show that both analyses are theoretically motivated and justified. Based on the distinction between nominal and adjectival bahuvrihis, we will show that the former should be analyzed as endocentric compounds based on metonymy and that the latter can be better understood if a relation between compounding and derivation is established.

First, let us comment on the use of zero-affixation in compounds of the *redhead* type. It is the contention of this paper that the postulation of a zero-affix in bahuvrihis of the *redhead* type is not well justified since the function of this affix is not particularly clear. As illustrated in (3), this affix is responsible for the feature [+human] (Bauer 2008) and the meaning ‘who has X’, but it is not clear, at least to us, whether this should be a motivation for the introduction of a zero-suffix.

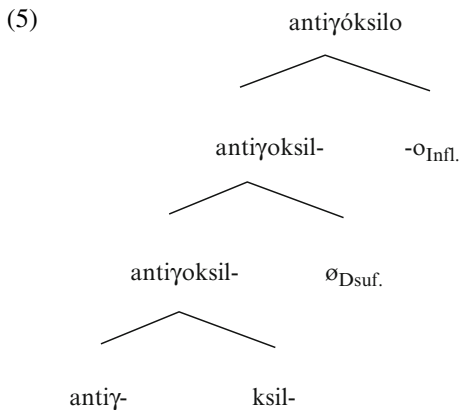
A basic problem with the assumption that compounds such as *redhead* are the result of zero-derivation relates to whether we should allow the presence of zero-affixes in other compounds which exhibit semantic drift. Consider for example the metaphorical compounds in Table 10 (from Andreou, 2014: 219).

These compounds can be used metaphorically to denote a person. In particular, *antiyóksilo* which literally denotes ‘an old, hard wood’ can be used metaphorically to refer to ‘a crusty person’. A comparison between *redhead* and the compounds in Table 10, such as *antiyóksilo*, shows that although the head of each formation

Table 10 Metaphorical compounds

Compound	Compound Member 1	Compound Member 2
antiyóksilo (Cephalonia)	antiy(o)	ksil(o)
metaph. ‘a crusty person’	‘old’	‘wood’
arkuðóyatós (Peloponnese)	arkuð(a)	yat(os)
metaph. ‘a boorish person’	‘bear’	‘cat’
alifópita (Epirus)	alif(i)	pit(a)
metaph. ‘who has the habit of flattering’	‘ointment, pig fat’	‘pie’

is [−human], both *redhead* and *antiyóksilo* can be used to refer to a person, i.e. [+human]. If we, however, accept that the change in the value of the semantic feature [human] in the case of *redhead* should be attributed to zero-suffixation, we would have to assume that such a suffix exists in metaphorical compounds as well, as depicted in (5):



Instead of proposing that there is zero-derivation in compounds of the *redhead* (metonymical) and *antiyóksilo* (metaphorical) types, we are of the opinion that the extra meaning in these compounds is the result of semantic drift; metonymy is needed to explain the meaning ‘having X’ in the former and metaphor is employed in the latter type of compounding. The postulation of a zero-suffix in metonymical and metaphorical compounds would introduce unnecessary complexity into the study of compounding.

4.1 Nominal Bahuvrihis in Greek

Let us now turn to the way the distinction between nominal and adjectival bahuvrihis manifests itself in Greek compounding. Although the bulk of Greek bahuvrihi

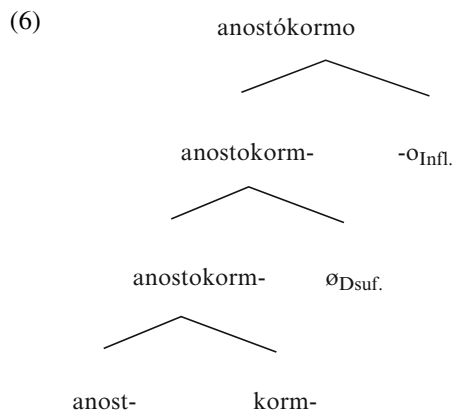
Table 11 Nominal bahuvrihis

Compound	Compound Member 1	Compound Member 2
voiðokiliá	voið(i)	kiliá
1. 'ox-belly' 2. 'who has a big belly'	'ox'	'belly'
vúkranon (Kos)	vu(s)	kran(a)
1. 'ox-head' 2. 'a silly person'	'ox'	'head'
anostókormo	anost(o)	korm(i)
'who has a bad-shaped body'	'bad-shaped'	'body'

compounds belongs to the adjectival type, nominal bahuvrihis are manifested by few examples, which can nevertheless greatly inform our discussion. Consider the examples in Table 11 (and in Tables 7 and 8).

Observe that most of these formations have two meanings, a literal and a figurative one. The formation *voiðokiliá*, for example, denotes the 'ox-belly' and 'a person having a big belly' (bahuvrihi). In a similar vein, *vúkranon* refers to both the 'ox-head' and to a 'silly person' (lit. having the head of an ox, i.e. bahuvrihi). Other formations, nevertheless, serve as bahuvrihi compounds (of the *redhead* type) only since they do not necessarily have a literal meaning. By way of example, the compound *anostókormo* denotes 'one who has a bad-shaped body' and not 'a bad-shaped body'.

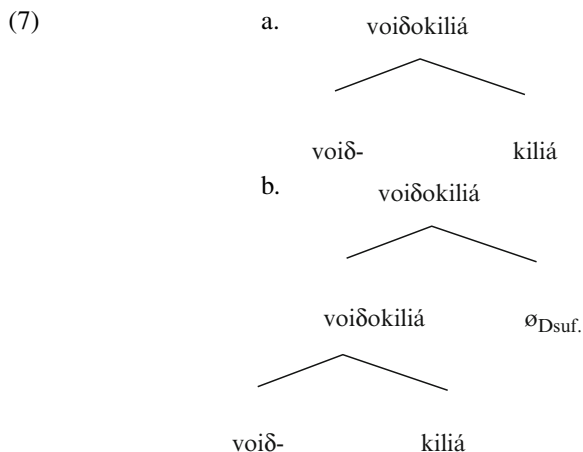
The question which arises is whether the use of these compounds with the meaning 'having X' (bahuvrihi) is the result of zero-derivation or metonymy. Based on the zero-derivation hypothesis, the structure of *anostókormo* is the following:



Based on the schema in (6), the formation *anostokorm-* 'bad-shaped body' undergoes suffixation and the zero-affix is responsible for the feature [+human] and the meaning 'who has X'.

The second solution available to us is to assume that the nominal bahuvrihi *anostókormo* is an endocentric compound which can be used metonymically to

denote a person. Evidence in favour of the second solution comes from compounds which can be used with a literal and a figurative meaning. By way of example, the zero-derivation hypothesis runs into problems when one takes into consideration the structure of a compound such as *voiðokiliá*:



(7a) illustrates *voiðokiliá* with the meaning ‘ox-belly’ and (7b) corresponds to the bahuvrihi reading of this compound, i.e. ‘who has a big belly’. A basic problem with the zero-derivation hypothesis is that it forces us to propose two different structures for the same word. One with and one without derivation. Instead of proposing two different structures, one for each meaning, we will assume that Greek nominal bahuvrihis are true endocentric compounds based on metonymy. That is, in the case of *voiðokiliá*, the salient feature of an entity with a big belly is used to denote the whole entity.

The zero-derivation proposal faces another problem. Given that stress and inflection follows the word constituent *kiliá*, *voiðokiliá* belongs to the [stem word] pattern of Greek compounds (Nespor and Ralli 1996). It is, therefore, highly problematic to assert that *voiðokiliá* undergoes zero-suffixation as depicted in (7b), since suffixation requires a [stem stem] pattern and not a [stem word] one. That is, the second constituent can never be a word. *Kiliá* in *voiðokiliá*, however, appears as a fully-fledged word and not as a stem.

4.2 Differences Between Nominal and Adjectival Bahuvrihis

It should be stressed that the distinction between nominal and adjectival bahuvrihis manifests itself in an interesting way since most of the nominal compounds, have an adjectival counterpart. Consider the following:

Table 12 Minimal pairs of nominal and adjectival bahuvrihis

Nominal bahuvrihi	Adjectival bahuvrihi	Compound Member 1	Compound Member 2
voiðokiliá	voiðokílis	voið(i)	kiliá
‘having a big belly’		‘ox’	‘belly’
vromóγlosa	vromóγlosos	vrom(iki)	γλος(a)
‘having a filthy tongue’		‘filthy’	‘tongue’
γαιðurómutro	γαιðuromútris	γαιður(i)	mutr(o)
‘having the face of a donkey, a malformed person’		‘donkey’	‘face’

Table 12 shows that in Greek, there are two ways of expressing the meaning ‘having X’ in a compound structure. The first is by a nominal bahuvrihi which is used metonymically, e.g. *γαιðurómutro*, and the second is by the creation of an adjectival bahuvrihi, as exemplified by *γαιðuromútris*.

Before examining the structure of adjectival bahuvrihis, let us elaborate upon the differences between the two types of bahuvrihi formations. First, consider the fact that they exhibit different behavior when used in syntactic phrases. A basic difference between the nominal *vromóγlosa* and the adjectival *vromóγlosos* is that the former cannot appear as an attributive modifier (8a), whereas the latter can modify a noun as in (8b):

- (8) a. *O vromóγlosa άνθρωπος.
 The.MASC.SG filthy-tongue.N.FEM.SG man.N.MASC.SG
- b. O vromóγlosos άνθρωπος.
 The.MASC.SG filthy-tongued.A.MASC.SG man.N.MASC.SG

Notice that in (8b), there is agreement between the adjectival *vromóγlosos* and the noun *άνθρωπος*; both are masculine singular. This is important since adjectives in Greek must agree with the noun they modify in number and gender (Ralli 2000). Consider for example the modification of a [+female] noun:

- (9) a. *I vromóγlosa jinéka.
 The.F.SG filthy-tongue.N.FEM.SG woman.N.FEM.SG
- b. I vromóγlosi jinéka.
 The.F.SG filthy-tongued.A.FEM.SG woman.N.FEM.SG

In (9b) we observe that the adjectival *vromoylos-* ‘filthy-tongued’ ends in *-i* since it agrees in gender and number with the feminine *jinéka* ‘woman’. (9a) is ungrammatical despite the fact that there is agreement in gender and number between *vromóγlosa* and *jinéka*; *vromóγlosa* is a nominal bahuvrihi and as such, it cannot appear as an attributive modifier between the article *i* ‘the’ and the noun *jinéka*.

In fact, a second difference between a nominal and an adjectival bahuvrihi is that the latter can appear in all three genders of the Greek language as expected by its adjectival nature, whereas the former belongs to only one gender. In (10), the adjectival *vromoylos-* can appear with the inflectional ending *-os* when masculine, end in *-i* when feminine, and in *-o* when it modifies a noun of neuter gender. The nominal *vromoylosa*, however, does not exhibit this adjectival characteristic with respect to gender since it is always feminine.

- (10) a. O vromóylosos ándras.
 The.MASC.SG filthy-tongued.A.MASC.SG man.N.MASC.SG
- b. I vromóylosi jinéka.
 The.F.SG filthy-tongued.A.FEM.SG woman.N.FEM.SG
- c. To vromóyloso peðí.
 The.NEU.SG filthy-tongued.A.NEU.SG child.N.NEU.SG

A fundamental structural difference between nominal and adjectival bahuvrihis is that the latter are always based on the structural pattern [stem stem] and never on the pattern [stem word]. By way of example, the nominal *voidokiliá* belongs to the pattern [stem word], since the position of stress and the inflectional suffix follow the word *kiliá*, whereas the adjectival *voidokílis* is a [stem stem] compound. In addition, *voidokílis* exhibits the derivational suffix *-i- ~ -id-* which is characteristic of several Greek adjectival bahuvrihis. The following provides more examples of bahuvrihis and shows that these compounds are never formed on a [stem word] pattern but on a [stem stem] one:

With respect to their semantics, a difference between the two types is that an adjectival bahuvrihi such as *vromóylosos* can never refer to ‘a filthy tongue’ but only to ‘someone who has a filthy tongue’. On the contrary, the nominal *vromóylosa* can denote ‘a filthy tongue’ and ‘someone with a filthy tongue’ via metonymy. In a similar vein, *voidokílis* in Table 12 never denotes an ‘ox-belly’, whereas *voidokiliá* has both a literal and a figurative meaning; i.e. ‘ox-belly’ and ‘who has a big belly’ respectively Table 13.

Table 13 [Stem Stem] bahuvrihis

Compound	Stem 1	Stem 2
anixtómialos	anixt(o)	mial(o)
‘broadminded’	‘open’	‘brain’
aspróvullos (Cypriot)	aspr(i)	vull(a)
‘with white spots’	‘white’	‘spot’
stravolémis	strav(os)	lem(os)
‘stiff-necked’	‘wry’	‘neck’
aspronúris (Cypriot)	aspr(os)	nur(os)
‘white-tailed’	‘white’	‘tail’

As a last remark, we would like to mention that the distinction between nominal and adjectival bahuvrihis is also supported by historical research (Brugmann 1889; Jacobi 1897), which shows that this category can be split into two sub-categories: (a) adjectival and (b) nominal bahuvrihis. Given the preponderance of adjectival bahuvrihis in languages such as Greek and Sanskrit, it is usually assumed that nominal bahuvrihis are the result of a nominalization process.

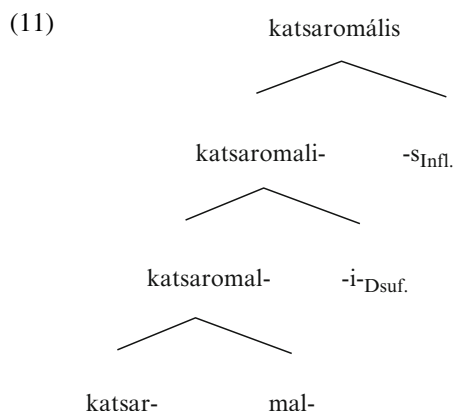
Although in most Indo-European (IE) languages adjectival bahuvrihis are more basic than nominal ones, the Germanic languages have followed a different developmental route. Kastovsky (2009) argues that contrary to other IE languages, Germanic languages have developed a very productive nominal bahuvrihi compounding system of the *paleface* type and also states that the adjectival pattern is manifested by only a handful of formations such as *barefoot*. In addition, he shows that adjectival bahuvrihis have been replaced by the so-called *extended bahuvrihis* which involve suffixation such as *hunchbacked* derived from *hunchback*. A detailed analysis of this kind of bahuvrihi compounds will be presented in the next section.

4.3 Analysis of Adjectival Bahuvrihis

As argued for in the previous sections, instead of proposing that nominal bahuvrihi compounds undergo (zero-)derivation, we assumed that these formations are true endocentric formations which are interpreted metonymically. The question which arises is whether this analysis can be extended to adjectival bahuvrihis as well. In more detail, we argued that the nominal endocentric *voidokiliá* ‘ox-belly’ can be used metonymically to denote ‘one with a big belly’. On the contrary, the adjectival exocentric *voidokilis* ‘one with a big belly’ which has the same meaning as *voidokiliá*, when the latter is used metonymically, exhibits properties, such as its adjectival use, which do not derive from metonymy (see Andreou 2014). It should be noted that Booij (2007: 80) also draws our attention to the fact that the Latin bahuvrihis *auri-com-us* ‘having golden hair’ and *magn-anim-us* ‘magnanimous’ (Oniga 1992) cannot be accounted for in terms of metonymy since they are adjectives.

As argued for by Ralli (2005, 2007, 2013), Andreou (2010, 2014), and Ralli and Andreou (2012), Greek exocentric compounds have a head inside their word limits, which gives them the basic category, meaning, and morphosyntactic features, but this head lies outside the confines of the structure involving the combination of two lexemes. The head is a derivational suffix, which is added at the periphery of this combination, and before the completion of the compound word with the addition of a closing inflectional ending. Thus, the head is part of the word structure and does not have to be inferred, as has been argued by Dressler (2006: 33). For instance, in a compound such as *katsaromális* ‘who has curly hair’, the head, namely the

derivational suffix *-i-*, follows the combination of the two stem constituents, *katsar-* ‘curly’ and *mal-* ‘hair’, and precedes the inflectional ending *-s*:



As claimed by Ralli (2005, 2007), the final vowel /i/ in exocentric compounds such as *katsaromális* is a derivational suffix, and not the ending of the noun *malí* ‘hair’, when the latter is taken as an independent word. Significant proof for this claim is the fact that, in plural, *-i-* is substituted by an allomorphic variation *-ið-* (*katsar-o-mal-ið-es* ‘curly-LE-hair-Dsuf-PL’). On the contrary, the word final *-i* of *malí* remains unchanged in the plural number (*mali-a* ‘hair-PL’). Table 14 provides examples of adjectival compounds with the suffix *-i- ~ -ið-*.

It should be noticed that several adjectival bahuvrihi compounds do not bear an overt derivational suffix. Consider the following examples from Cypriot and Italiot⁷ (Andreou 2014: 235–236) (Table 15).

A morphemic analysis of the Italiot *asprokéfalo* ‘with white hair’ shows that this formation can be decomposed into the adjectival stem *aspr-* ‘white’, the noun stem *kefal-* ‘head’, and the inflectional suffix *-o*. Contrary to other adjectival bahuvrihis with an overt suffix, in *asprokéfalo* there is no marker responsible for the adjectival

Table 14 Adjectival bahuvrihis in *-i(s)*

Compound	Compound Member 1	Compound Member 2
asxim-o-mur-i-s	asxim(i)	mur(i)
ugly-LE-face-Dsuf-Infl ‘ugly-faced’	‘ugly’	‘face’
prasin-o-mat-i-s	prasin(o)	mat(i)
green-LE-eye-Dsuf-Infl ‘having green eyes’	‘green’	‘eye’

⁷For more on compounding in Italiot (i.e. the Greek dialect of Southern Italy) and Cypriot, see Andreou (2013) and Andreou and Koliopoulou (2012).

Table 15 Adjectival bahuvrihis with no overt affixation

Compound	Compound Member 1	Compound Member 2
avr-ó-xilos (Cypriot)	avr(o)	xil(os)
soft-LE-lip.A.MASC 'soft-lipped'	'soft'	lip.N.NEU
aðr-o-mútsunos (Cypriot)	aðr(i)	mutsun(a)
coarse-LE-face.A.MASC 'coarse-faced'	'coarse'	face.N.FEM
anark-ó-friðos (Cypriot)	anark(o)	frið(in)
sparse-LE-eyebrow.A.MASC 'with wide-apart eyebrows'	'sparse'	eyebrow.N.NEU
mon-ó-vidzo (Italiot)	mon(o)	vidz(i)
single-LE-breast.A.MASC 'who has only one breast'	'single'	breast.N.NEU
aspr-o-kéfalo (Italiot)	aspr(o)	kefal(i)
white-LE-head.A.MASC 'with white hair'	'white'	head.N.FEM

Table 16 Minimal pair *vromóstoma/vromóstomos*

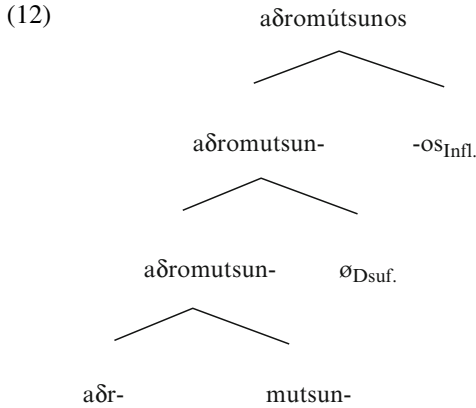
Nominal bahuvrihi	Adjectival bahuvrihi	Compound Member 1	Compound Member 2
vromóstoma	vromóstomos	vrom(iko)	stoma
'having a filthy mouth'		'filthy'	'mouth'

use and the meaning 'having X'. A possible solution to this issue would be to assume that the compounds in Table 15 are used metonymically to denote 'having X'. Metonymy, however, cannot explain the exocentricity of these formations since these are adjectival bahuvrihi compounds. In Sect. 3, we mentioned that only nominal bahuvrihis can be accounted for via metonymy and we presented minimal pairs of nominal and adjectival bahuvrihis which highlight the difference between the two types. Consider for example the Greek pair *vromóstoma/vromóstomos* in which the adjectival bahuvrihi does not exhibit an overt suffix (Table 16).

In this pair, the nominal *vromóstoma* can be used metonymically to denote one 'who has a filthy mouth' but this solution cannot be extended to *vromóstomos* which has the same meaning as *vromóstoma*; *vromóstomos* is an adjectival bahuvrihi. Observe that the compounds in Table 15 have the same structure as *vromóstomos*. That is, the Greek *vromóstomos*, the Cypriot *aðromútsunos* 'coarse-faced', and the Italiot *asprokéfalo* 'with white hair' are classified as adjectival bahuvrihis despite the fact that there is no overt suffix marking the change from noun to adjective.

A second solution is to assume that these formations undergo zero-derivation, along the lines of Ralli (2005, 2007, 2013). This means that the adjectival bahuvrihis *aðromútsunos* and *katsaromális* have the same underlying form. In particular, both compounds involve a derivational suffix, which is overt in *katsaromális* but covert

in *aδromútsunos* and which is responsible for the categorial specification. Consider the schema in (12):



Observe that the first step involves the combination of the two stems, namely, *aδr-* and *mutsun-*. The new stem which is the result of composition, i.e. *aδromutsun-*, undergoes suffixation and the addition of the inflectional suffix *-os* closes the structure.

That the structure of Greek adjectival bahuvrihis involves both compounding and derivation is verified by previous evolutionary stages of the Greek language as well. As shown by Andreou (2014), depending on the stage one takes into consideration, a number of different adjectival suffixes can appear in Greek bahuvrihi compounds. In Ancient Greek, for example, adjectival bahuvrihis were productively built with the use of the suffix *-i-*, while *-at-* was used in bahuvrihis of Medieval Greek (Table 17).

It is worth stressing that there are several minimal pairs of adjectival bahuvrihis with an overt and a covert suffix. Consider the following minimal pairs with the suffix *-i- ~ -iδ-* and a zero-suffix from the Cypriot dialect:

- (13) a. *katsar-o-mall-i-s*
curly-LE-hair-Dsuf-INFL
- b. *katsar-o-mall-∅-os*
curly-LE-hair-Dsuf-INFL
‘having curly hair’
- (14) a. *makr-o-nur-i-s*
long-LE-tail-Dsuf-INFL
- b. *makr-o-nur-∅-os*
long-LE-tail-Dsuf-INFL
‘having a long tail’

Observe that in (13a) and (14a), there is an overt suffix, namely *-i-*, whereas, in (13b) and (14b) which have the same meaning and distribution with the examples in (13a) and (14a), the suffix is covert.

Table 17 Bahuvrihis of Ancient and Medieval Greek

Compound	Compound Member 1	Compound Member 2	Origin
hom-o-patr-i-os	hom(o)	pat(e:r)	Ancient Greek
same-LE-father-Dsuf-INFL 'having/by the same father'	'same'	'father'	
trite-mor-i-os	trit(e:)	mor(a)	
third-part-Dsuf-INFL 'equal to a third part'	'third'	'part'	
aliθin-o-ptern-at-os	aliθin(i)	ptern(a)	Medieval Greek
red-LE-heel-Dsuf-INFL 'having red heels'	'red'	'heel'	
aspr-aloy-at-os ^a	aspr(o)	aloy(o)	
white-horse-Dsuf-INFL 'having a white horse'	'white'	'horse'	

^aIn *aspraloyátos* there is no linking element since the second constituent begins with a vowel. See Ralli (2008, 2013) for the presence or absence of a linking element within the structure of a compound word

4.4 Verbal Bahuvrihis

Greek also exhibits verbal bahuvrihis, which belong to the so-called extended type, since they combine derivation and compounding. In particular, in these formations, the verbal suffix *-iz-* attaches to the combination of two stems, none of which is a verb, to create a verbal bahuvrihi compound, that is, a compound with the meaning 'to have X'. The schema in (15) illustrates this derivation:

- (15) a. kak-o-nixt-íz-o
 bad-LE-night-Dsuf-INFL
 'to have a bad night'
- b.
- ```

graph TD
 A[kakonixtízo] --- B[kakonixtiz-]
 A --- C[-oInfl.]
 B --- D[kakonixt-]
 B --- E[-iz-Dsuf.]
 D --- F[kak-]
 D --- G[nixt-]

```

Observe that there is no formal difference between the adjectival bahuvrihis in (11) and (12) and the verbal bahuvrihi in (15), in that these formations combine compounding and derivation in this particular order.

## 5 Conclusions

The purpose of this paper was to report on the form and meaning of bahuvrihi compounds with focus on the Greek language and its dialectal variation. In particular, we argued that we should not collapse bahuvrihi and exocentric compounds and that the term bahuvrihi should be used with respect to those compounds which exhibit the meaning ‘having/to have X’.

In Sects. 3 and 4, we raised the question of *where the meaning ‘having/to have X’ comes from in bahuvrihis*. Although metonymy and (zero-)derivation are considered diametrically opposite views on the analysis of bahuvrihi compounds, following Andreou (2014), we argued that both analyses are theoretically motivated and justified. Based on the distinction between nominal and adjectival bahuvrihis, we showed that the former should be analyzed as endocentric compounds based on metonymy and that the latter can be better understood if a relation between compounding and derivation is established. In particular, a Greek bahuvrihi compound, that is, a compound with the meaning ‘having/to have X’, can be built on the basis of two formally distinct types. The first type is exemplified by *voidokiliá* ‘ox-belly, met. having a big belly’ which is a nominal endocentric compound that can be interpreted metonymically to denote ‘one with a big belly’. The second type involves both compounding and derivation, in this particular order, and is exemplified by both the adjectival *aspraloyátos* ‘having a white horse’ and the verbal exocentric bahuvrihi *kakonixtízo* ‘to have a bad night’.

We hope that cross-linguistic research will lead to a better understanding of the differences and similarities between (endocentric) metonymical and (exocentric) extended bahuvrihis and their distribution in the languages of the world.

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