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Attitudinal compounds in Modern Greek: An empirical study

Abstract

This study deals with the empirical validation of the six linking patterns of evaluative and grammatical/categorial heads in Modern Greek compounding, proposed in Charitonidis (2014). To accomplish this goal 30 online interviews with native Greek speakers were conducted, on six attitudinal compounds and their constituents. Attributes lists and positivity ratings on a five-point scale were obtained. The analysis validated four out of six head-linking patterns. In the corresponding compounds, the constituent with the highest number of negative attributes points unequivocally to the evaluative head.

1. Introduction

This study deals with the second part of a mainly self-funded project, conducted at the University of Cologne between July 2014 and January 2016, here referred to with the mnemonic label 'EOC' (Evaluative Operations in Compounding). EOC aims at the validation of the head-linking patterns of English (EN) and Modern Greek (MG) attitudinal compounds, proposed in Charitonidis (2014; 2015a).

EOC's first part dealt with the validation of the classes of EN attitudinal compounds proposed in Charitonidis (2014) by using the *valence* ratings in Warriner, Kuperman & Brysbaert (2013).[1] The results are reported in Charitonidis (submitted). The same results are referred to briefly in Section 2.2.

EOC's second part was partially supported by the Department of English 1, Chair of English Linguistics, at the University of Cologne (research assistant position, December 2014 – April 2015). This part deals with the empirical validation of the six linking patterns of evaluative and grammatical/categorial heads in MG compounding, proposed in Charitonidis (2014). To accomplish this goal, 30 online interviews with native Greek speakers were conducted, on six attitudinal compounds and their constituents.

[1] For a description of the semantic variable 'valence', see Section 2.2.

In the following, I would like to give the general properties of MG compounds.[2]

Compounding is a very productive word-formation process in MG. MG compounds belong to the major grammatical categories, noun, adjective, and verb, and have a binary structure.[3] In Table 1, the categorial status of compound constituents is given, together with examples.[4]

Nouns	[N N]	alatopíper(o) 'salt-pepper'	<	alát(i) 'salt'	pipér(i) 'pepper'
	[A N]	stenosókak(o) 'narrow street'	<	sten(ó) 'narrow'	sokák(i) 'street'
Adjectives	[A A]	asprokókin(os) 'white-red'	<	áspr(os) 'white'	kókin(os) 'red'
	[N A]	iliokamén(os) 'sunburnt'	<	íli(os) 'sun'	kamén(os) 'burnt'
	[Adv A]	kakodimén(os) 'badly dressed'	<	kak(á) 'badly'	dimén(os) 'dressed'
Verbs	[V V]	anighoklín(o) 'open-close'	<	anígh(o) 'open'	klín(o) 'close'
	[N V]	xartopéz(o) 'play cards'	<	xart(iá) 'cards'	péz(o) 'play'
	[Adv V]	arghopethén(o) '(lit. slowly die) die slowly'	<	argh(á) 'slowly'	pethén(o) 'die'

Table 1: The main categories of MG compounds

In a stem-word view such as that adopted in Ralli (2013; Ράλλη 2007), four morphological structures are possible in MG compounding, i.e. [stem-stem], [stem-word], [word-stem] and [word-word], whereby a stem is defined as a word stripped off its inflectional ending. Standardly, the right-hand element is the *denotational* (DE, i.e. grammatical and/or categorial) head and carries the inflectional ending. In most cases, a linking vowel *-o-* shows up between the two constituents.

Regular compounds such as those presented up to this point are phonological words and bear one stress. From this crucial property are excluded two-word NPs with a compound-like behavior. Following the terminology in Ralli (2013), these NPs are (a) phrasal compounds, (b) phrasal compound-like phrases, and (c) constructs – see Table 2.[5]

[2] The text referring to the properties of MG compounds is adopted from Charitonidis (2014, 18–20; 2015a, 41–43), with some modifications. The description conforms to Ralli (2013).

[3] Adverbial compounds are secondary formations (Ralli 2013, 37).

[4] For secondary combinations see Ralli (2013, 29–44).

[5] For a detailed presentation of these NPs see Ralli (2013, 243–70).

Phrasal Compounds	[A N]	ethnik(í) odh(ós) 'national road'
	[N N$_{GEN}$]	aghor(á) erghasí(as) '(lit. market.NOM.SG job.GEN.SG) job market'
Phrasal-Compound-Like Phrases	[N N] attributive	nóm(os) plési(o) 'law-frame'
	[N N] appositive	metafrast(ís)-dhierminéa(s) 'translator-interpreter'
Constructs	[A N]	theatrik(í) kritik(í) '(lit. theatrical criticism) drama review'
	[N N$_{GEN}$]	paraghogh(í) kapn(ú) '(lit. production tobacco.GEN) tobacco production'
	[N N$_{ACC}$]	xim(ós) portokáli '(lit. juice orange.ACC) orange juice'

Table 2: NPs with a compound-like behavior

According to Ralli (2013, 250) only phrasal compounds belong to compounding since they are "semi-visible to syntax".[6] Similarly, some of the attributive phrasal-compound-like phrases are in a process of desyntacticization. They respond, among others, negatively to tests regarding the change of inflection of the non-head, cf. the non-head *plésio* in *nómos plésio* 'outline law (lit. law frame)' (nominative), *nómu plésio* (genitive), etc.[7]

Appositive phrasal-compound-like phrases and constructs are products of syntax. They are examined in Ralli (2013, 255–56) and Ralli (2013, 258–61), respectively.

Before we proceed to details about the object of investigation, let us first deal with the author's framework and the main results in EOC's first part.

2. Background research

2.1 The socio-expressive (SE) tier in compounding[8]

To address evaluative operations in morphology, Charitonidis (2012a; 2012b; 2013; 2014; 2015a; 2015b) introduced an extra level of meaning, i.e. the 'socio-expressive (SE) tier', that shows up parallel to the grammatical and/or categorial level, i.e. the

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[6] According to Ralli (2013, 250), the semantics of the phrasal compounds may be non-compositional, but "their structure is derived in syntax, in that, it is not based on morphologically proper units and is not the product of a morphological process". For further properties of phrasal compounds, see Ralli (2013, 246–52).

[7] For further details see Ralli (2013, 254–55).

[8] Sections 2.1 and 2.2 contain various parts from Charitonidis (submitted), with minor changes.

'denotational (DE) tier'. The SE tier emerges according to the interplay of three SE features, i.e. {measure}, {stance}, and {interpersonal}.[9] In this paper, I will focus on {stance} because it is the only SE feature that, through its +/− changing head-operations (+/− HO) sufficiently defines the compounding classes in EN and MG (Charitonidis 2014; 2015a).[10] As regards the meaning of this feature, {+ s} refers to positive {stance}, and {− s} refers to negative {stance} towards a situation or entity.[11] {stance} may also be underspecified, i.e. merely {s}.

In [1] I rephrase the properties of the SE tier in relation to compounding (Charitonidis 2014; 2015a) by narrowing their scope to {stance}.

[1] **The properties of the SE tier in relation to compounding**
   a. Both constituents in the compounds refer to a {stance} value, i.e. {+ s}, {− s}, or {s}.
   b. SE (evaluative) heads can be right-hand (RH) or left-hand (LH).[12] Valued features in the SE (evaluative) heads are also heads.
   c. Underspecified features in the first or second constituent are merged regardless of their head role.
   d. The SE arguments – linked to the single compound referent – are addressed by the features throughout the derivation, i.e. the SE arguments are evaluated anew in every derivational step including output.

In the following, I refer to the properties of the SE tier by giving EN compounds as examples. All {stance} values assigned to the compound constituents are independently confirmed by the valence ratings in Warriner, Kuperman & Brysbaert (2013).

[1a] defines that every compound constituent (a major lexical category) bears an evaluative content that can be positive ({+ s}), negative ({− s}), or underspecified ({s}). For instance, in *brain drain*, *brain* is {+ s}, and *drain* is {− s}. In *automania, auto* is {s}, and *mania* is {− s}. In *shadow factory* both constituents are {s}, etc.

[1b] suggests that compounds such as *brain drain*, etc., have a RH SE (evaluative) head and compounds such as *idiot girl*, etc., have a LH SE (evaluative) head. The position of the SE (evaluative) head emerges most clearly in +/−HO compounds. For instance, in the R{SE} compound *brain drain*, {− s} in *drain* reverts {+ s} in *brain,* and in the L{SE} compound *idiot girl,* {− s} in *idiot* reverts {+ s} in *girl*, etc.[13]

[1c] defines that, when a compound constituent is underspecified, the position of the SE (evaluative) head is irrelevant and the output is computed by means of a simple merging. For instance, in the compound *psychological warfare,* {s} in *psychological* is merged with {− s} in *warfare* yielding {− s} in the output, by disregarding the fact that *psychological* is the SE (evaluative) head of the compound, etc.

The three-fold evaluation of the single compound referent referred to in [1d] calls

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[9] SE features are indicated with curly brackets.

[10] The workings of a +/−HO operation are presented later in this section by means of the examples *brain drain* and *idiot girl*.

[11] In simple terms, {+ s} refers to lexemes with a positive meaning, and {− s} refers to lexemes with a negative meaning.

[12] In this paper, the terms 'socio-expressive (SE) heads' and 'evaluative heads' are used indifferently.

[13] 'R{SE}' and 'L{SE}' are abbreviations for 'RH SE-head' and 'LH SE-head', respectively.

for the application of the SE operations in a syntactic way. For instance, in *brain drain* three evaluations are necessary: the compound referent is first evaluated in the SE (evaluative) nonhead *brain* as {+ s}, in a second step the same referent is evaluated in the SE (evaluative) head *drain* as {− s}, and in a third step the same referent is evaluated in the SE output *brain drain* as {− s}, etc.

2.2 The head-linking patterns of attitudinal compounds in English (EN)

In visual recognition tasks (Warriner, Kuperman & Brysbaert 2013; Kuperman 2013, etc.), *valence* is a semantic variable gauging the amount of pleasantness or discomfort that a person feels when reading a word. The participants are asked to give a rating for presented words by referring to a scale from '1' ('happy') to '9' ('sad, unhappy'). For technical reasons, reported in Warriner, Kuperman & Brysbaert (2013), the reverted ratings enter the analysis, whereby '1' refers to the most negative and '9' to the most positive value.

In Charitonidis (submitted), a set of 103 EN attitudinal compounds are examined by using the valence ratings in Warriner, Kuperman & Brysbaert (2013).[14] In particular, the following mappings between valence and {stance} are defined:[15]

[2]   Valence   {Stance}
       1 − 4.4   {− s}
       4.5 − 5.4   {s}
       5.5 − 9   {+ s}

It is shown that the linking of DE (grammatical and/or categorial) and SE (evaluative) heads yields two main classes of attitudinal compounds, i.e. the classes A_{EN} and B_{EN}. These classes correspond to the classes of subordinate endocentric compounds (SUB compounds) and attributive/appositive compounds (ATAP compounds) in Scalise & Bisetto's (2009) classification, respectively.

In both the A_{EN} and B_{EN} classes, the RH constituent is the DE head. In A_{EN} compounds, such as *brain drain, computer virus,* etc., the RH constituent is also the SE (evaluative) head. In B_{EN} compounds, such as *idiot girl, trash television,* etc., the SE (evaluative) head is the LH constituent. The head-linking patterns of classes A_{EN} and B_{EN} are exemplified in [3] and [4], respectively. DE heads are indicated with '[HEAD]' and SE (evaluative) heads are indicated with bold face.

[3] A_{EN} [NONHEAD]   [HEAD]   [OUTPUT]
                   brain   +   *drain*   →   *brain drain*
                   {+ s}   {− s}   {− s}

[4] B_{EN} [NONHEAD]   [HEAD]   [OUTPUT]
                   idiot   +   *girl*   →   *idiot girl*
                   {− s}   {+ s}   {− s}

[14] All compounds are neologisms of the 20th century, taken from Algeo (1991).
[15] The mappings in [2] consider the valence rating '5' as directly corresponding to {s} while rounding the proximate ratings.

By being unexceptionally subject to the properties of the SE tier in [1], 77.67% of the compounds examined in Charitonidis (submitted) are assigned to these two classes alone. The remaining 22.33% of the compounds do not address the properties of the SE tier in [1] by showing a non-compositional negative meaning. For the most part, these non-compositional patterns can be explained with reference to negative standard-deviation (SD) shifts in the SE (evaluative) heads. For instance, in A_{EN} compounds such as *brain wash, couch potato,* etc., both constituents are {+ s}. The subtraction of the SD value from the valence mean in the SE (evaluative) head (second constituent), referred to as '– SD2 shift', results in {– s} and, accordingly, in the negative interpretation of these compounds. In [5] these operations are shown in detail.

[5] brain wash   wash: 6 (valence mean) – 2.07 (SD) = 3.93 ({– s})
  couch potato potato: 6.4 (valence mean) – 2.21 (SD) = 4.19 ({– s})

Let us now proceed to the object of investigation concerning MG compounding.

3. Object of investigation

As mentioned in the Introduction, this study aims at the empirical validation of the six linking patterns of DE and SE (evaluative) heads in MG compounding, proposed in Charitonidis (2014; 2015a). To accomplish this goal, 30 online interviews with native speakers of MG were conducted by means of which were elicited a large set of attribute lists and 5-point-scale evaluations for six ±HO compounds and their constituents. The one-word compounds were *kosmoxalasm(ós)* 'uproar of people', *elafrómial(os)* 'light-minded', and *pikróghlik(os)* 'bitter-sweet', and the two-word compounds were *mávr(i) aghor(á)* 'black market', *ík(os) anox(ís)* 'brothel', and *eterí(a) maimú* 'dummy corporation, bogus company'.

 Charitonidis (2014; 2015a) proposed that in MG the linking of DE and SE (evaluative) heads yields five main classes of attitudinal compounds (classes A_{MG}-E_{MG}). Table [3] contains the full set of these classes, with the compounds used in the on-line interviews as examples.[16] Again, DE heads are indicated with '[HEAD]' and SE (evaluative) heads are indicated with bold face.[17]

A_{MG}	[NONHEAD]		[HEAD]			[OUTPUT]	
	kósm(os)	'people'	+	**xalasm(ós)**	'uproar'	→	**kosmoxalasm(ós)** 'uproar of people'
	{+ s}			{– s}			{– s}
B_{MG}	[NONHEAD]		[HEAD]			[OUTPUT]	
	elafr(ó)	'light'	+	mial(ó)	'mind'	→	**elafrómial(os)** 'light-minded'
	{– s}			{+ s}			{– s}

 [16] In designing the interviews, *kósm(os)* 'people' (class A_{MG}) was assumed to be a positive concept and not an underspecified one as in Charitonidis (2014; 2015a). As we will see in Section 5, the evaluations of the participants verified this assumption.

 [17] 'GEN' stands for 'genitive'.

C_{MG}	[HEAD]			[HEAD]			[OUTPUT]	
	pikr(ós)	'bitter'	+	ghlik(ós)	'sweet'	→	pikróghlik(os)	'bitter-sweet'
	{− s}			{+ s}			{− s}	
$D1_{MG}$	[NONHEAD]			[HEAD]			[OUTPUT]	
	mávr(i)	'black'	+	aghor(á)	'market'	→	mávr(i) aghor(á)	'black market'
	{− s}			{+ s}			{− s}	
$D2_{MG}$	[HEAD]			[NONHEAD]			[OUTPUT]	
	ík(os)	'house'	+	anox(ís) (GEN)	'tolerance'	→	ík(os) anox(ís)	'brothel'
	{+ s}			{− s}			{− s}	
E_{MG}	[HEAD]			[NONHEAD]			[OUTPUT]	
	eterí(a)	'company'	+	maimú	'monkey'	→	eterí(a) maimú	'dummy corporation'
	{+ s}			{− s}			{− s}	

Table 3: Classes of MG attitudinal compounds (*Charitonidis 2014; 2015a*)

The head-linking patterns in Table 3 are summarized in Table 4. 'EXO' stands for 'exocentric compounds' and 'COP' for 'copulative compounds'. In class C_{MG} with two DE heads, the alternating order L{SE} ⊻ R{SE} indicates that the SE (evaluative) head may be in LH or RH position, cf. *pikróghlik(os)* 'bitter-sweet' vs. *ghlikópikr(os)* '(lit. sweet bitter) bitter-sweet', respectively, etc.

Class	Head-linking patterns
A_{MG}	R[DE] ~ R{SE}
B_{MG} (EXO)	R[DE] ~ L{SE}
C_{MG} (COP)	[DE][DE] ~ L{SE} ⊻ R{SE}
$D1_{MG}$	R[DE] ~ L{SE}
$D2_{MG}$	L[DE] ~ R{SE}
E_{MG}	L[DE] ~ R{SE}

R: right-hand, L: left-hand, [DE]: DE head, {SE}: SE head

Table 4: Head-linking patterns of MG attitudinal compounds (*Charitonidis 2014; 2015a*)

4. Interview design

The interviews were designed by using the Open-Source Software LimeSurvey as provided by the University of Cologne (https://www.limesurvey.org). The participants were (mostly postgraduate) students of the University of Thessaloniki. Interview collaborators and/or recruiters were Christiane Bongartz (University of Cologne), Elvira Masoura (University of Thessaloniki), and Eleni Agathopoulou (University of Thessaloniki).

As regards the procedure prior to the interviews, an Information Sheet contain-

ing the survey's terms and conditions was sent by email to the volunteers. The Information Sheet was accompanied by a sample questionnaire containing the evaluation of the concept *paltó* 'coat' (see Appendix 1).

After expressing their agreement with the terms and conditions described in the Information Sheet, the volunteers entered a group of 10 persons. In particular, three groups of ten persons were defined, i.e. G1, G2, and G3. Six 'concepts' (compounds or compound constituents) were presented to each participant in random order. In every group, it was avoided that a participant might have examined a compound together with its constituents.

Table 5 displays which concepts were assigned to each group by considering the (assumed) positivity or negativity of each concept.

	(negative)	(positive)	(negative)
G1	kosmoxalasm(ós) 'uproar of people'	ghlik(ós) 'sweet'	elafr(óς) 'light'
	mávr(i) aghor(á) 'black market'	ík(os) 'house'	maimú 'monkey'
G2	elafrómial(os) 'light-minded'	kósm(os) 'world'	pikr(ós) 'bitter'
	ík(os) anox(ís) 'brothel'	eterí(a) 'company'	mávr(oς) 'black'
G3	pikróghlik(os) 'bitter-sweet'	mial(ó) 'brain'	xalasm(ós) 'uproar'
	eterí(a) maimú 'dummy corporation'	aghor(á) 'market'	anox(í) 'tolerance'

Table 5: Examined concepts in groups G1, G2, and G3

The participants received an invitation email containing a personalized link. After providing some personal information about age, gender, occupation, education, language, and place of origin, they were asked to evaluate the concepts. In particular, the participants were asked (a) to list 6–10 characteristic properties (attributes) for each concept in the form of words or very small phrases (2–4 words) within a time-limit of 90 seconds, (b) to give a definition for each concept by using the characteristic properties they have already listed, (c) to declare whether the concepts have a positive or negative meaning for them, and (d) to make comments about their evaluation.

Each interview took approximately 50 minutes. The participation was completely voluntary; the participants could withdraw at any time without having to give any reason.

After each interview, the application LimeSurvey anonymized the obtained data. No internet footprints were recorded. The full dataset is published on the internet, with only a number attached to each participant; therefore, it is not possible to link

any set of data with any individual. The personal data will be kept by the author for five years after EOC's completion and then will be destroyed.

In the following, I start reporting the survey results by referring to the third part of the interviews. I do this because the obtained data provide numerical values that immediately address the examined head-linking patterns.

5. The mapping of positivity ratings onto {stance}: Results

In the third part of the interviews, the participants were asked to declare whether the presented concepts have a positive or negative meaning for them. The participants had to use a five-point scale in their evaluation, the five points being: 'very positive', 'positive', 'neutral', 'negative', 'very negative'.

In the analysis, 'very negative' was mapped onto '1', 'negative' onto '2', 'neutral' onto '3', 'positive' onto '4', and 'very positive' onto '5'. The exact mappings between positivity ratings and {stance} are shown in [6]. These mappings are defined by considering each scale point as covering 20% of the five-point scale. The middle 20% scale-space corresponds to {s}.

[6]   Positivity ratings   {Stance}
        1 – 2.6   {– s}
        2.7 – 3.3   {s}
        3.4 – 5   {+ s}

Table 6 contains the results from the analysis of one-word compounds, and Table 7 contains the results from the analysis of two-word compounds. In the first row of each table, the examined head-linking patterns are given (cf. Section 3). In the second row, the positivity ratings for the compounds show up (output), together with SD values in parentheses. In the third row, the positivity ratings for each compound constituent are given. '>' indicates that the first compound constituent has a higher mean-value than the second one, and '<' indicates the opposite. In the parentheses, an SD value for each compound constituent is given. In the fourth row shows up the difference rate between the lower and the higher mean-value of the compound constituents. In the same row, 'BL' (balanced) indicates that the difference rate between the mean values is below '1'.[18] In the fifth row, the mean values from the second and third row are displayed as {stance} values. The first {stance} value refers to the whole compound (output). After the colon, the first {stance} value refers to the first compound constituent, and the second {stance} value refers to the second compound constituent. The sixth row contains a general evaluation of the results: 'Valid' indicates that the examined linking pattern is validated, and 'Non-valid' indicates

[18] In Charitonidis (submitted), BL mean-values are involved in the non-compositional (pejorative) A_{EN} compounds, by accompanying SD shifts in the SE (evaluative) heads. For instance, the negative SD shifts in the A_{EN} compounds *brain wash* and *couch potato* in [5], are combined with BL mean values, i.e. 0.22 and 0.12, respectively. Such combined patterns are systematic in A_{EN} compounds but only random in B_{EN} compounds.

the opposite. '– SD1 shift' indicates the subtraction of the SD value from the mean value of the first constituent, and '– SD2 shift' indicates the subtraction of the SD value from the mean value of the second constituent. Both shifts occur in the SE (evaluative) heads of the compounds.

1	R[DE] ~ R{SE} (A$_{MG}$)	R[DE] ~ L{SE} (B$_{MG}$)	[DE][DE] ~ L{SE} ⊻ R{SE} (C$_{MG}$)
2	kosmoxalasm(ós) 'uproar of people' 1.8 (0.63)	elafrómial(os) 'light-minded' 2 (0.47)	pikróghlik(os) 'bitter-sweet' 3.3 (0.82)
3	kósm(os) 'world' & xalasm(ós) 'chaos, uproar' 3.7 (0.67) > 1.3 (0.48)	elafr(ós) 'light' & mial(ó) 'brain' 3.9 (0.57) < 4.4 (0.52)	pikr(ós) 'bitter' & ghlik(ós) 'sweet' 1.9 (0.57) < 4.9 (0.32)
4	2.4	0.5 (BL)	3
5	{– s}: {+ s}{– s}	{– s}: {+ s}{+ s}	{s}: {– s}{+ s}
6	Valid	Non-valid (–SD1 shift not possible)	Non-valid (underspecified output)

Table 6: Results from positivity ratings: One-word compounds

1	R[DE] ~ L{SE} (D1$_{MG}$)	L[DE] ~ R{SE} (D2$_{MG}$)	L[DE] ~ R{SE} (E$_{MG}$)
2	mávr(i) aghor(á) 'black market' 1.7 (0.95)	ík(os) anox(ís) 'brothel' 1.8 (0.63)	eterí(a) maimú 'dummy corporation' 1.5 (0.53)
3	mávr(os) 'black' & aghor(á) 'market' 2.8 (0.63) < 3.6 (0.84)	ík(os) 'house' & anox(í) 'tolerance' 4.3 (0.67) > 2.3 (0.95)	eterí(a) 'company' & maimú 'monkey' 3.2 (0.79) = 3.2 (0.79)
4	0.8 (BL)	2	0 (BL)
5	{– s}: {s}{+ s}	{– s}: {+ s}{– s}	{– s}: {s}{s}
6	Valid (–SD1 shift)	Valid	Valid (–SD2 shift)

Table 7: Results from positivity ratings: Two-word compounds

As becomes apparent from the results, the linking patterns R[DE] ~ R{SE} (A$_{MG}$) and L[DE] ~ R{SE} (D2$_{MG}$) are immediately validated without reference to SD shifts in the SE (evaluative) heads. In contrast, patterns R[DE] ~ L{SE} (D1$_{MG}$) and L[DE] ~ R{SE} (E$_{MG}$) are validated only with reference to SD shifts in the SE (evaluative) heads (cf. [5] in Section 2.2).

In the one-word compounds (Table 6), the linking patterns R[DE] ~ L{SE} (B$_{MG}$) and [DE][DE] ~ L{SE} ⊻ R{SE} (C$_{MG}$) are not valid. On the one hand, a negative SD shift in the LH SE (evaluative) head of *elafrómial(os)* 'light-minded' is not capable of yielding the attested negative output (3.9 – 0.57 = 3.33 ({s})). On the other hand, the underspecified output in *pikróghlik(os)* 'bitter-sweet' precludes a ±HO operation between the constituents. Concomitantly, the alternating constituent order

pikróghlik(*os*)/*ghlikópikr*(*os*) cannot be explained according to a negative head operation of *pikr*(*ós*) in LH or RH position (see Section 3). It should be noted that, in accord with these results, Charitonidis (submitted) shows that the corresponding class of EN attitudinal compounds proposed in Charitonidis (2014), i.e. the coordinative (copulative) class C_{EN}, is not valid.[19]

Concluding, the {stance} values for *pikróghlik*(*os*) and its constituents suggest that both constituents contribute equally to the computation of the output by neutralizing each other ({− s} (first constituent) + {+ s} (second constituent) = {s} (output)). This pattern is in accord with the well-established consideration of coordinative compounds as consisting of two constituents that equally contribute to compound meaning (Ralli 2013, 157–58).

In the two-word compounds *mávr*(*i*) *aghor*(*á*) 'black market' and *eterí*(*a*) *maimú* 'dummy corporation' (Table 7), the valid −SD shifts are in accord with the operations in EN attitudinal compounds described in Charitonidis (submitted). As mentioned in Section 2.2, in these compounds, the subtraction of the SD value from the mean value of the SE (evaluative) head results normally in negative interpretations.

Concluding, the small number of compounds examined in this paper does not permit the assessment of extra evaluative strategies associated with specific head-linking patterns, such as the co-occurrence of BL mean-values with negative SD shifts in the SE (evaluative) heads, etc.

6. The triggers of negative interpretations

In the first part of the online survey, the participants were asked to list characteristic properties (attributes) for six concepts (compounds and compound constituents). For this task there was a time-limit of 90 seconds, after which the modification of the attribute lists was not possible. In the second part of the survey, the participants were asked to give a definition for each concept by using as more attributes as possible from those already given. In the analysis, the definitions given in the second part were used to disambiguate the attributes given in the first part.

As regards data processing, all attributes given for a concept in each group of 10 participants were alphabetically ordered. (Near)synonyms were put together. Repeated or synonymous attributes *given by the same participant* were ignored. Ignored, as well, were groups of two attributes and all nonce attributes. In the extraction of percentages, repeated or synonymous attributes given by the same participant did not count as population members.

The elicited attributes were thought of as indirectly representing parts of mental concepts (Ungerer & Schmid 1998; 2006). The focus of the analysis was on the explicitly negative attributes given for *compound constituents*. By considering the positivity ratings for the compounds as a whole (Section 5), the working hypothesis was that explicitly negative attributes cluster most prominently in the SE (evaluative)

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[19] In Charitonidis (2014), class C_{EN} contains the compounds *boy toy* / *toy boy* alone.

heads, and these negative attributes trigger the negative SD shifts in the SE (evaluative) heads.

Tables 8 and 9 contain the percentages of explicitly negative attributes in the constituents of one-word and two-word compounds, respectively. The mean values obtained in the third part of this study (Section 5) are repeated under the compounds and their constituents. The corresponding SD values and the translation of mean values into {stance} values stand in parentheses. In both tables, the highest percentage of negative attributes in one of the two compound constituents is indicated with bold face. The reader can find the full set of negative attributes in Appendix 2.

Linking pattern	Compound	First constituent	Second constituent
R[DE] ~ R{SE} (A_{MG})	kosmoxalasm(ós) 'uproar of people'	kósm(os) 'world'	xalasm(ós) 'chaos, uproar'
	1.8 (0.63) ({− s})	3.7 (0.67) ({+ s})	1.3 (0.48) ({− s})
	Negative attributes:	∅/52 [0%]	29/37 [**78.38%**]
R[DE] ~ L{SE} (B_{MG})	elafrómial(os) 'light-minded'	elafr(ós) 'light'	mial(ó) 'brain'
	2 (0.47) ({− s})	3.9 (0.57) ({+ s})	4.4 (0.52) ({+ s})
	Negative attributes:	4/53 [**7.55%**]	2/55 [3.64%]
[DE][DE] ~ L{SE} ⊻ R{SE} (C_{MG})	pikróghlik(os) 'bitter-sweet'	pikr(ós) 'bitter'	ghlik(ós) 'sweet'
	3.3 (0.82) ({s}, edge of {+ s})	1.9 (0.57) ({− s})	4.9 (0.32) ({+ s})
	Negative attributes:	12/43 [**27.91%**]	2/46 [4.26%]

Table 8: Negative attributes in the constituents of one-word compounds

Linking pattern	Compounds	First constituent	Second constituent
R[DE] ~ L{SE} ($D1_{MG}$)	mávr(i) aghor(á)	mávr(os)	aghor(á)
	'black market'	'black'	'market'
	1.7 (0.95) ({− s})	2.8 (0.63) ({s})	3.6 (0.84) ({+ s})
	Negative attributes:	11/46 [**23.91%**]	5/50 [10%]
L[DE] ~ R{SE} ($D2_{MG}$)	ík(os) anox(ís)	ík(os)	anox(í)
	'brothel'	'house'	'tolerance'
	1.8 (0.63) ({− s})	4.3 (0.67) ({+ s})	2.3 (0.95) ({− s})
	Negative attributes:	1/64 [1.56%]	6/34 [**17.65%**]
L[DE] ~ R{SE} (E_{MG})	eterí(a) maimú	eterí(a)	maimú
	'dummy corporation'	'company'	'monkey'
	1.5 (0.53) ({− s})	3.2 (0.79) ({s})	3.2 (0.79) ({s})
	Negative attributes:	1/49 [2.04%]	7/71 [**9.86%**]

Table 9: Negative attributes in the constituents of two-word compounds

The testing of the working hypothesis can only refer to the patterns of *mávr(i)*

aghor(*á*) 'black market' (R[DE] ~ L{SE}) and *eterí*(*a*) *maimú* 'dummy corporation' (L[DE] ~ R{SE}) in Table 9, because these compounds are the only instances of valid −SD1 and −SD2 shifts, respectively (cf. Table 7 in Section 5). The percentages of negative attributes in the constituents of these compounds confirm the working hypothesis. In each case, the SE (evaluative) head contains a higher number of negative attributes as compared to the SE (evaluative) non-head, see *mávr*(*os*) 'black' [**23.91%**] vs. *aghorá* 'market' [10%] in *mávr*(*i*) *aghor*(*á*) 'black market', and *maimú* 'monkey' [**9.86%**] vs. *eterí*(*a*) 'company' [2.04%] in *eterí*(*a*) *maimú* 'dummy corporation', respectively.

In Tables 8 and 9, there is another significant pattern that cannot be ignored. With the exception of *elafrómial*(*os*) 'light-minded' and *pikróghlik*(*os*) 'bitter-sweet' in Table 8, a higher number of negative attributes in one of the two constituents introduces a negative SE (evaluative) head in the compounds.

In *elafrómial*(*os*) 'light-minded', the difference rate of negative attributes between the constituents is very low, i.e. 3.91 (*elafr*(*ós*) 'light' [**7.55%**] vs. *mial*(*ó*) 'brain' [3.64%]). This low difference-rate suggests that no ±HO operation is at work between the compound constituents. The positive mean-values for both compound constituents, i.e. *elafr*(*ós*) 'light' [3.9 ({+ s})] and *mial*(*ó*) 'brain' [4.4 ({+ s})] suggest the absence of a ±HO operation, as well.

In *pikróghlik*(*os*) 'bitter-sweet', the high percentage of negative attributes in the LH constituent (*pikr*(*ós*) 'bitter' [**27.91%**] vs. *ghlik*(*ós*) 'sweet' [4.26%]) should call for a negative interpretation of the output, in accord with the analysis in Charitonidis (2014; 2015a) − see Section 3. In the interviews, however, this output shows up with an underspecified mean-value, i.e. 3.3 ({s}).

I have no ready-made account of the exceptional cases of *elafrómial*(*os*) and *pikróghlik*(*os*). Both compounds open questions for future research.

7. Conclusions

The present study suggests that the head-linking patterns of DE (grammatical and/ or categorial) and SE (evaluative) heads, presented in Charitonidis (2014; 2015a), largely hold. Only the head-linking patterns R[DE] ~ L{SE} (exocentric compounds, class B$_{MG}$) and [DE][DE] ~ L{SE} ⊻ R{SE} (coordinative compounds, class C$_{MG}$) could not be validated. For convenience, the validated head-linking patterns are shown in Table 10.[20]

Classes	Head-linking patterns	Compounds			
A$_{MG}$	R[DE] ~ R{SE}	kosmoxalasm(ós) 'uproar of people'	<	kósm(os) 'people'	xalasm(ós) 'uproar'

[20] After '<', the compound constituents *mávr*(*i*) and *anox*(*ís*) appear in their grammatical form within compounds and not as presented in the interviews (cf. Table 5).

Classes	Head-linking patterns	Compounds			
D1$_{MG}$	R[DE] ~ L{SE}	mávr(i) aghor(á) 'black market'	<	mávr(i) 'black'	aghor(á) 'market'
D2$_{MG}$	L[DE] ~ R{SE}	ík(os) anox(ís) 'brothel'	<	ík(os) 'house'	anox(ís) 'tolerance'
E$_{MG}$	L[DE] ~ R{SE}	eterí(a) maimú 'dummy corporation'	<	eterí(a) 'company'	maimú 'monkey'

R: right-hand, L: left-hand, [DE]: DE head, {SE}: SE head

Table 10: Validated head-linking patterns of MG attitudinal compounds

The head-linking patterns in Table 10 were validated either directly, according to positivity ratings, or indirectly, by means of negative SD shifts in the SE (evaluative) heads.

In particular, the negative SD shifts are triggered by a higher number of negative attributes in the SE (evaluative) heads as compared to the number of negative attributes in the SE (evaluative) non-heads (see *mávr(i) aghor(á)* 'black market' and *eterí(a) maimú* 'dummy corporation' in Section 6).

On top of this, again with the exception of classes B$_{MG}$ and C$_{MG}$, a higher number of negative attributes in one of the two constituents introduces a negative SE (evaluative) head in the compounds.

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Appendix 1: Sample evaluation of the concept *paltó* ʿcoatʾ

(English version. LimeSurvey Interface)

Question 1

Question 2

Question 3

Question 4

Appendix 2: Negative attributes in compound constituents

Please note that the attributes are given together with participant numbers in parentheses.

kosmoxalasm(ós) 'uproar of people'	MEAN-VALUE: 1.8 ({– s})
kósm(os) 'world'	NEGATIVE ATTRIBUTES: 0 out of 52 (0%)
xalasm(ós) 'chaos, uproar'	NEGATIVE ATTRIBUTES: 29 out of 37 (78.38%) ↻
καταστροφές 'damage' (22), καταστροφή 'disaster' (23), (24), (25), (28), (29), (30), καταστροφικές συνέπειες 'devastating effects' (27), καταιγίδα 'storm' (28), κατακλυσμός 'flood' (29), σπάσιμο 'destruction' (21), συντρίμμια 'rubble' (26), (28), (24), καταρρέω 'collapse' (30), δράμα 'tragedy' (26), απόγνωση 'despair' (30), πανικός 'panic' (22), (25), δυσκολία 'difficulty' (25), δυσμενείς συνθήκες 'adverse circumstances' (27), ανατροπή σχεδίων 'foiling of plans' (21), ματαίωση 'foiling' (23), αρνητική 'negative' (23), αρνητικό φαινόμενο 'negative phenomenon' (29), αρνητικό 'negative' (21), αναμπουμπούλα 'mess' (28), μαρασμός 'decline' (21), μη λειτουργικό 'not functional' (21)	

Table 1: Negative attributes in the constituents of the compound kosmoxalasm(ós) *'uproar of people'*

elafrómial(os) 'light-minded'	MEAN-VALUE: 2 ({– s})
elafr(ós) 'light'	NEGATIVE ATTRIBUTES: 4 out of 53 (7.55%) ↻
όχι επιβλητικός 'not stately' (9), παρασύρεται εύκολα 'can easily be swept away' (10), χαζός 'silly' (2), χωρίς πολλή σημασία 'of little importance' (2)	
mial(ó) 'brain'	NEGATIVE ATTRIBUTES: 2 out of 55 (3.64%) ↻
Αλτσχάιμερ 'Alzheimer' (26), κουκούτσι 'not a grain of sense' (lit. pit, CC) (28)	

Table 2: Negative attributes in the constituents of the compound elafrómial(os) 'light-minded'

pikróghlik(os) 'bitter-sweet'	MEAN-VALUE: 3.3 ({s})
pikr(ós) 'bitter'	NEGATIVE ATTRIBUTES: 12 out of 43 (27.91%) ↻
δεν πίνεται ευχάριστα 'not pleasant to drink' (15), κακή γεύση 'bad taste' (17), δυσάρεστη γεύση 'unpleasant taste' (13), μεταφορικά πικρός άνθρωπος σημαίνει στενάχωρος ή καταθλιπτικός 'metaphorically, bitterman means ill-at-ease or depressive' (20), πικρή ζωή 'bitter life' (18), μοναξιά 'loneliness' (11), φαρμάκι 'poison' (19), δυσάρεστο 'unpleasant' (neuter, CC) (12), δυσάρεστος 'unpleasant' (masc., CC) (15), δυσφορία 'discomfort' (14), απόρριψη 'rejection' (11), αρνητική έννοια 'negative term' (11)	
ghlik(ós) 'sweet'	NEGATIVE ATTRIBUTES: 2 out of 46 (4.26%) ↻
ανθυγιεινός (9) 'unwholesom', παχυντικός 'fattening' (9)	

Table 3: Negative attributes in the constituents of the compound pikróghlik(os) 'bitter-sweet'

mávr(i) aghor(á) 'black market'	MEAN-VALUE: 1.7 ({– s})
mávr(os) 'black'	NEGATIVE ATTRIBUTES: 11 out of 46 (23.91%) ↻
εκφράζει πένθος 'expresses bereavement' (19), κηδεία 'funeral' (18), θάνατος 'death' (16), απαισιό-δοξος 'pessimistic' (16), καταθλιπτικό 'depressing' (20), διακρίσεις 'discrimination' (11), αφορμή για ρατσισμό από πολλούς 'cause of many people's racism' (19), βρώμικο 'dirty' (12), ζοφερό 'murky' (12), μαύρη ζωή 'miserable life' (18), φόβος 'fear' (19)	
aghor(á) 'market'	NEGATIVE ATTRIBUTES: 5 out of 50 (10%) ↻
κίνηση 'bustle' (27), (28), κόσμος 'crowd' (23), κυκλοφοριακό 'traffic problems' (27), υπερκατανάλωση 'overconsumption' (30)	

Table 4: Negative attributes in the constituents of the compound mávr(i) aghor(á) 'black market'

ík(os) anox(ís) 'brothel'	MEAN-VALUE: 1.8 ({– s})
ík(os) 'house'	NEGATIVE ATTRIBUTES: 1 out of 64 (1.56%) ↻
ανοχής 'tolerance, sufferance' (genitive, CC) (8)	
anox(í) 'tolerance, sufferance'	NEGATIVE ATTRIBUTES: 6 out of 34 (17.65%) ↻

αρνητική κατάσταση 'negative situation' (23), αρνητική 'negative' (fem., CC) (24), αρνητικό 'negative' (neuter, CC) (21), ενοχλητική προσβλητική βλαβερή ενέργεια 'embarrassing, offending, harmful action' (27), δεν το θέλουμε 'undesirable' (29), μειονέκτημα 'drawback' (30)

Table 5: Negative attributes in the constituents of the compound ík(os) anox(ís) *'brothel'*

eterí(a) maimú 'dummy corporation'	MEAN-VALUE: 1.5 (0.53) ({– s})
eterí(a) 'company'	NEGATIVE ATTRIBUTES: 1 out of 49 (2.04%) ↻
χρεωκοπία 'insolvency' (12)	
maimú 'monkey'	NEGATIVE ATTRIBUTES: 7 out of 71 (9.86%) ↻
εκνευριστικό 'irritating' (2), κάνει χαζούς ήχους 'makes silly noise' (2), πονηρή 'sly' (fem., CC) (10), πονηρός 'sly' (masc., CC) (8), χαζό 'silly' (2), απομίμηση 'fake' (10), ψεύτικο 'cheap, worthless' (8)	

Table 6: Negative attributes in the constituents of the compound eterí(a) maimú *'dummy corporation'*

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