ON THE QUESTION OF NEOCLASSICAL COMPOUNDS IN LITHUANIAN

In Lithuanian, word formation processes have been given detailed consideration with regard to their morphological properties. However, neoclassical compounds have received exiguous attention. They are described as formations consisting of Greek and Latin bound stems. This article aims at examining the structure of neoclassical compounds in Lithuanian. It is neither simple nor straightforward to determine the morphological status of the constituent items of neoclassical compounds and to differentiate them from prefixes, initial combining forms, final combining forms, constituents or affixoids. Due to their heterogeneous nature, linguists treat them differently as no strict criteria have been applied for their delimitation. When words with neoclassical elements appear in the Lithuanian language, they usually adapt to this language’s phonological and morphological system. The analysis of neoclassical compounds in Lithuanian shows that not all neoclassical elements have the same positional constraints. Some of them can appear both in initial or final position, some only in initial position, while others only in final position. Furthermore, neoclassical compounds in Lithuanian consist of two or more bound stems which give rise to new neoclassical compounds. As far as the combinability properties of neoclassical elements are concerned, they appear in combinations with one another, with words of English origin as well as with Lithuanian native forms. Neoclassical formations can also contain international or Lithuanian suffixes. Such formations constitute endocentric structures in particular.

KEY WORDS: bound stems, compounding, endocentric compounds, neoclassical compounds, neoclassical elements

Introduction

Discussions of Lithuanian word formation embraces a distinct category of neoclassical compounds to deal with formations such as aerofototopografija ‘aerophototopography’, biologija ‘biology’, kosmonautas ‘cosmonaut’, metafizikas ‘metaphysician’, seismografas ‘seismograph’. Ingo Plag maintains that these formations are of modern origin as they did not exist in classical languages. That is why they are called neoclassical (Plag 2003, p. 74). Many labels are used to refer to the constituents of neoclassical compounds in Lithuanian, namely initial combining forms, final combining forms, constituents, prefixes or affixoids. Due to their ambiguous nature, linguists treat them differently because no
specific criteria have been established for their delimitation.

The behaviour of neoclassical compounds in Lithuanian differs considerably from both affixation and compounding, i.e. neoclassical compounds obey distinct rules and restrictions in contrast to word formation involving Lithuanian native elements. As a result, neoclassical elements in Lithuanian do not occur as independent lexemes, yet they can be used to create new lexemes. When words with neoclassical elements appear in the Lithuanian language, they usually adapt to this language’s phonological and morphological system and receive corresponding inflections, e.g. Lithuanian masculine neoclassical compounds possess inflections -as (e.g. dermografas ‘dermograph’), -is (e.g. velomobilis ‘velomobile’) or -us (e.g. radionavigatorius ‘radionavigator’), whereas feminine ones have inflections -a (e.g. agrofizika ‘agrophysics’) or -ė (e.g. hidronefrozė ‘hydronephrosis’). As Bonifacas Stundžia observes, in Lithuanian, the change of inflection paradigm (IP) is characteristic of the second component of compounds. The linguist provides the following examples: skaĩt-vard-is (IP -is) ‘numeral, lit. number-name’ (cf. vaĩl-as [IP -as] ‘name’), mės-gal-ỹs (IP -ys) ‘a piece of meat’ (cf. mės-ą [IP -a] ‘meat’), jūr-lig-ė (IP -ė) ‘sea-sickness’ (cf. lig-ą [IP -a] ‘illness’) (Stundžia 2013).

The number of neoclassical compounds in Lithuanian is increasing enormously. The same phenomenon emerges in other languages. As Renáta Panocová holds, “neoclassical compounding occurs in many European languages as a productive word formation process in the sense of frequently producing new words, mainly scientific terms” (Panocová 2012, p. 31). In Lithuanian, neoclassical compounds belong to the vocabulary of scientific or technical fields, namely medicine, biology, chemistry, physics, and technology. It is no surprise that many Latin and Greek elements entered the Lithuanian vocabulary as Latin and Greek were the European lingua francas for many centuries. As words with neoclassical elements hold a dominant position in almost all languages, they deserve assiduous attention in Lithuanian, too. Neoclassical word formation has received scant attention with the exception of a few scholars focusing on this phenomenon, namely Vincas Urbutis (2009), Stasys Keinys (1979, 1999), Aldona Paulauskienė (1994), and Vida Rudaitienė (1978, 1988, 2003). However, in Lithuanian, the perennial problem of neoclassical compounding has not been analyzed yet. Even though some publications on neoclassical formations appeared, no systematic investigations have been conducted.

Therefore, the object of the article is neoclassical compounds in Lithuanian. Formations consisting of Greek and Latin elements are taken from the Lithuanian electronic dictionary of international words Interleksis (2008).

The aim of the research is to examine the structure of neoclassical compounds in Lithuanian. This aim could be specified by the following research tasks:

- to introduce the concept of neoclassical compounding;
- to discuss the morphological status of the constituent items of neoclassical compounds;
- to analyze the combinability properties of neoclassical elements.
The concept of neoclassical compounding

In many languages, neoclassical word formation constitutes a subsystem of the lexicon (ten Hacken 2012, p. 78). As Heike Baeskow points out, neoclassical formations in English consist of two or more bound roots of classical origin, e.g. *astronaut*, *fungicide*, *phonoelectrocardioscope* (Baeskow 2004, p. 72). Elisabeth Selkirk (1982) and Sergio Scalise (1986) classify disputable elements that appear in neoclassical word formation as *bound stems*. Laurie Bauer (1983) introduced the terms *initial combining form (ICF)* and *final combining form (FCF)* for Latin and Greek elements that are obligatorily bound. Adrienne Lehrer (2007, p. 124) describes *combining forms* as bound bases that combine with full words or with other combining forms. However, in his later study (1998), Bauer is hesitant about the legitimacy of neoclassical elements. He adopts the view that new words can be created within a three-dimensional space:

- the simplex-derivative-compound dimension;
- the native-foreign dimension;
- the non-abbreviated-abbreviated dimension.

Each of these three dimensions represents a cline which can have some transitional stages. Thus, the scholar comes to a conclusion that “neoclassical compounding acts as some kind of prototype, from which actual formations may diverge in unpredictable ways” (Bauer 1998, p. 409).

In his articles (2005, 2008), Tvrtko Prćić attempts to draw a dividing line not only between prefixes and ICFs, but also betwixt suffixes and FCFs. The scholar establishes an ordered set of distinguishing criteria based on formal, functional, semantic, pragmatic properties of prefixes and ICFs as well as suffixes and FCFs. However, Dieter Kastovsky proposes to abandon the concept of *combining form* as the modern word-formation theory can well manage without it. The linguist upholds the view that the terms *affix, affixoid, blending, clipping, stem and word* are sufficient to deal with the neoclassical formations in question. As he aptly summarizes his viewpoint: “Compounding, affixation, clipping and blending should be regarded as prototypical patterns arranged on a scale of progressively less independent constituents ranging from word via stem, affixoids, affix, curtailed word/stem to splinters as constituents of blends, and finally acronyms” (Kastovsky 2009, p. 12).

Meanwhile, in his paper, Pius ten Hacken uses the term *neoclassical formatives (NCFs)* for the elements that have their origin in Ancient Greek and appear only in neoclassical word formation. He points out that the final element of the formations *anthropomorphic, hydrophobia, mycophagous* is easy to determine as a suffix, whereas the classification of the other two is less straightforward (ten Hacken 2012, p. 78.). As far as the term NCFs is concerned, the scholar might have found it useful, as the above mentioned elements are not easy to classify and they do not belong to words or affixes. Even though they correspond to Ancient Greek stems, they are not considered to be stems in their generally accepted definitions. Therefore, ten Hacken maintains that neoclassical word formation is still a peripheral phenomenon in English and many other languages. Thus, it is worth investigating the morphological status of neoclassical elements in Lithuanian, too.
The morphological status of neoclassical elements in Lithuanian

In Lithuanian, the words are divided broadly into three major groups, namely the simplex, e.g. etiudas ‘étude’, diena ‘day’, the derivatives: oponentas ‘opponent’ (oponentas: oponuoti ‘to be an opponent’), debiutantas ‘debutant’ (debiutantas: debiuotuoti ‘to make one’s debut’) and the compounds, e.g. Žemdirbys ‘farmer’, tėvavardis ‘patronymic’. According to Vincas Urbutis, the derivatives fall into the following three subgroups: prefixal, suffixal, and paradigmatic (inflectional) derivatives (Urbutis 2009, p. 333). Consider the simple word of Greek origin elektra ‘electricity’ which participates in the formation of derived words, e.g. elektrikas ‘electrician’: elektra ‘electricity’, elektrifikacija ‘electrification’: elektrifikuoti ‘electrify’, elektrizacija ‘electrization’: elektrizuoti ‘electrize’, elektrokardiografija ‘electrocardiography’: elektrokardiografas ‘electrocardiograph’, elektrokardioskopija ‘electrocardioscopy’: elektrokardioskopas ‘electrocardioscope’, elektromagnetizmas ‘electromagnetism’: elektromagnetas ‘electromagnet’, elektromekanika ‘electromechanics’: elektromekanikas ‘electromechanic’. The above mentioned derivatives (also known as motivated words) are both formally and semantically motivated. They are also considered to be more complex than their motivating words. Words such as elektrokardiografas, elektromagnetas, elektrifikuoti, elektrizuoti, elektra, elektrikas are considered to be neoclassical compounds.

In Lithuanian, neoclassical elements combine productively with each other. From the structural point of view, they can be divided into two wide groups (cf. Table 1).

Neoclassical formations in Table 1 are grouped according to the presence or absence of a suffix as well as the number of neoclassical elements. These formations are called scientific terms as they have parallels in many languages and are often referred to as internationalisms. It is widely believed that these neoclassical formations could be analyzed as borrowings as they have the same meaning and form in other languages. However, sometimes it is almost impossible to determine in which language the word appeared first. In ten Hacken’s opinion, it is not important for the speaker whether the formation anthropomorphic is a borrowing from French or a formation in English because it does not change its place in the mental lexicon. “What is important is that it can be analyzed on the basis of rules that are part of the English speaker’s mental lexicon” (ten Hacken 2012, p. 78). Ten Hacken’s claim implies that Lithuanian speakers who have knowledge of Latin or Greek would readily recognize constituents of neoclassical compounds not only in Lithuanian, but also in some other languages as the components of neoclassical compounds in almost all languages are the same. For instance, some Lithuanian speakers can be familiar with the meanings of some neoclassical elements, such as hydro- ‘water’, bio- ‘life’, geo- ‘earth’, agro- ‘farming’. In order to check this hypothesis, an experiment with Lithuanian native speakers will be carried out in the future.

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1 The italicized colon shows that the words are derivatives. The noun oponentas ‘opponent’ is derived from the verb oponuoti ‘to be an opponent’. The derivative oponentas is both semantically and formally motivated. If there is no semantic and formal motivation between the derived and the underlying word, the word is considered to be a simple one (Urbutis 2009, p. 81–82).
Table 1. Combinability properties of neoclassical elements

| c) NE+IW+FL⁴ | mikro+film-as ‘microfilm’, stereo+film-as ‘stereofilm’, video+film-as ‘videofilm’, aero+klub-as ‘aeroclub’ |
| d) NE+NE+NE+FL⁵ | astro+spektro+graf-as ‘astrospectrograph’, foto+helio+graf-as ‘photoheliograph’, radiome+meteoro+graf-as ‘radiometeorograph’, fono+kardio+graf-as ‘phonocardiograph’, spektro+helio+graf-as ‘spectroheliograph’ |
| e) NE+NE+LW+FL⁶ | aero+foto+nuotrauk-a ‘aerophotograph’, aero+foto+vaizd-as ‘aerophotoview’ |

The formations in the above table are both structurally and semantically transparent. The examples in (1a) clearly illustrate that the words consist of two neoclassical elements and an inflection. Neoclassical elements resemble affixes because they are bound. Nevertheless, these items differ from affixes in two respects. Firstly, if these neoclassical elements were affixes, it would lead to words formed by affixes only. It is 

² Neoclassical element + neoclassical element + inflection.
³ Neoclassical element + Lithuanian word + inflection.
⁴ Neoclassical element + international word + inflection.
⁵ Neoclassical element + neoclassical element + neoclassical element + inflection.
⁶ Neoclassical element + neoclassical element + Lithuanian word + inflection.
⁷ Neoclassical element + neoclassical element + international suffix + inflection.
⁸ Neoclassical element + neoclassical element + Lithuanian suffix + inflection.
⁹ Neoclassical element + neoclassical element + neoclassical element + international suffix + inflection.
significant to accentuate the fact that an affix cannot combine with another affix to form a new word. This would go against the basic assumptions about the general structure of word formation in Lithuanian and other languages. However, in Lithuanian spoken language, the word superinis ‘superb’ is frequently used. In this word, the Latin prefix super- is conjoined with the Lithuanian suffix -inis. Secondly, the same neoclassical element cannot be a prefix in words such as grafospazmas ‘graphospasm’, grafologas ‘graphologist’, grafomanas ‘graphoman’, and a suffix in others, e.g. anemografas ‘anemograph’, heliografas ‘heliograph’, hidrografas ‘hydrograph’. In both cases, the element graf- occurs both in the initial and final position and it also contributes to the same meaning in roughly the same way. Furthermore, the element graf- can also be a base for suffixation, for instance, graf-in-is ‘graphic’ and graf-iškas ‘graphical’. Despite the words look strikingly similar, they carry quite distinct meanings. The former refers to ‘drawings and design’, whereas the latter is more connected with ‘art or computer graphics’. It is also significant to notice that the suffixes -iškas and -inis are regularly used to make Lithuanian adjectives: vaikiškas ‘childish’, vyriškas ‘masculine’, beviltiškas ‘hopeless’, abėcėlinis ‘alphabetical’, akmeninis ‘stony’, aliejinis ‘oily’.

Examples in (1d) consist of three neoclassical elements and an inflection, cf. astro+spektro+graf-as ‘astrospectrograph’, foto+helio+graf-as ‘photoheliograph’, fono+kardio+graf-as ‘phonocardiograph’. These constituents of Greek and Latin origin bear a lexical meaning which characterizes lexemes, e.g. astro- is connected with ‘stars or outer space’, foto- means ‘light’, graf- refers to ‘an instrument for writing, drawing, or recording something’ (OALD 2013). Even though neoclassical elements resemble morphologically complex words, they sometimes appear in Lithuanian as simplex nouns due to the fact that they do not have any derivational affixes, e.g. kosmosas ‘cosmos’, choras ‘chorus’. These words consist of a root kosmos- and chor- to which an inflection -as is attached.

Neoclassical elements show idiosyncratic behaviour as they tend to appear not only in combinations with one another as in (1a) and (1d), but also with Lithuanian words. Cf. the following examples in (1b): foto+nuotrauk-a ‘photograph’, bio+srov-ė ‘biocurrent’, hidro+įrengin-ys ‘hydroequipment’. In (1e), a sequence of neoclassical elements can also combine with Lithuanian words, cf. aero+foto+nuotrauk-a ‘aerophotograph’, aero+foto+vaizd-as ‘aerophotoview’. In (1b) and (1e), the first members of compounds are indeclinable, whereas the second ones are declinable, since they are Lithuanian nouns which change with the case. Likewise, formations in (1a) and (1d) consist only of Greek and Latin elements, whereas the ones in (1b) and (1e) are considered to be hybrid words formed from a bound stem of classical origin and a Lithuanian word.

Words in (1c) clearly demonstrate that neoclassical elements micro-, stereo-, video-, aero- can combine with words of English origin: mikro+film-as ‘microfilm’, stereo+film-as ‘stereofilm’, video+film-as ‘videofilm’.

Bound elements of Greek and Latin origin give rise to further word formation since they accept the Lithuanian derivational suffixes -inis and -iškas which are
used for the formation of adjectives, cf.
examples in (2b): e.g. seismo+graf-in-is
‘seismographic’, mikro+skop-išk-as ‘micro-
scopic’. In addition, words in (2a) contain
easily recognizable foreign suffixes -ija, -ika
and -izmas: e.g. bio+graf-ij-a ‘biography’,
aero+naut-ik-a ‘aeronautics’, teleo+log-izm-
as ‘teleologism’. Even though the words in
(2c) have the same suffix -ija, the number
of neoclassical elements is different, cf.
gloto+chrono+log-ij-a ‘glottochronology’,
mikro+socio+log-ij-a ‘microsociology’,
para+psycho+log-ij-a ‘parapsychology’.
Such formations in English would be called
neoclassical compound derivatives. To quote
Baeskow: “If bound bases such as biolog-,
anthropomorph-, astrolog-, astronom-, or
reptilivor- are selected by suffixes, we ob-
tain well-formed sequences like biolog-y,
anthropomorph-ic, geograp-er, astrolog-er,
astronom-er or reptilivor-ous” (Baeskow
2004, p. 73).

Particular relationships exist between
compound constituents. A large number of
neoclassical compounds in Lithuanian are
endocentric, that is, one of the elements,
namely the right-hand element, is the head
of the complex word. For example, foto-
bakterijos ‘photobacteria’, mikobakterijos
‘mycobacteria’, miksofiskerijos ‘myxobacte-
ria’, nitrofiskerijos ‘nitrobacteria’ are endo-
centric compounds. The second element of
neoclassical compounds functions as a head,
meanwhile the first one acts as a modifier.
Moreover, headedness is shown most clearly
by hyponymy, i.e. the compound as a whole
is a hyponym of its head, e.g. fotobakterijos
‘photobacteria’ is a hyponym of bakterijos
‘bacteria’, but not a hyponym of foto ‘photo’
as well as hidrochemija ‘hydrochemistry’ is
a hyponym of chemija ‘chemistry’, but not
a hyponym of hidro ‘hydro’.

As far as a type of copulative (or dvand-
va), also known as coordinative, compounds
is concerned, none was found in the Lithu-
anian electronic dictionary of international
words Interleksis (2008). Neoclassical
compounds with bound stems have only a de-
pendency relation. As a result, “items which
follow from a derivational process do not
usually appear in coordinative compounds”
(Ralli 2013, p. 215).

Neoclassical compounds differ enor-
mously from Lithuanian ones due to the
fact that the stems are bound. For com-
parison, compounds in Lithuanian result
from the combination of two stems which
often coincide with roots. Moreover, if the
second word of the Lithuanian compound
is a noun, its inflection usually changes,
e.g. the compound geležinkelės ‘railway’ is
made of an adjective geležinis ‘iron’ and a
noun kelias ‘way’. To quote Stundžia:
“Neoclassical formations are to be treated
separately because of the preservation of
original inflection paradigms and different
accentual behaviour, cf. kilo-mètr-as ‘kilo-
metre’ (← kilo- ‘kilo-’ mètr-as ‘metre’), but
kìet-mètr-is ‘solid cubic metre’ (← kìetas, à
‘solid’, mètr-as ‘metre’), makro-program-à
‘macroprogramme’ (← makro- ‘macro-’,
program-à ‘programme’), but pà-program-è
’subprogramme’ (← pa- ‘sub-’, program-à
‘programme’)” (Stundžia 2013).

Conclusions

The lexicon of Lithuanian contains forma-
tions consisting of Greek and Latin bound
stems. A preliminary analysis of neoclassical
compounds in Lithuanian led to the follow-
ing conclusions:

1. Not all neoclassical elements have the
same positional constraints: some of
them can appear both in initial or
final position, some only in initial
position, while others only in final position.
2. Neoclassical compounds in Lithuanian consist of two or more bound stems which give rise to new neoclassical compounds.
3. Neoclassical elements appear in combinations with one another, with words of English origin as well as with Lithuanian native forms. Both international and Lithuanian suffixes are incorporated into neoclassical formations.
4. A large number of neoclassical compounds in Lithuanian are endocentric.

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References
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ON THE QUESTION OF NEOCLASSICAL COMPOUNDS IN LITHUANIAN

Summary
The object of the paper is neoclassical compounds in Lithuanian. These compounds consist of two or more bound stems of classical origin, namely Ancient Greek or Latin. Bound stems are also known commonly as neoclassical elements as combinations of such elements are of modern origin which did not exist in classical languages. The aim of the paper is to examine the structure of neoclassical compounds in Lithuanian. In order to achieve the aim, the paper introduces the concept of neoclassical compounding, discusses the morphological status of the constituent items of neoclassical compounds and analyzes the combinability properties of neoclassical elements. Many labels are used to refer to the constituents of neoclassical compounds in Lithuanian, namely initial combining forms, final combining forms, constituents, prefixes or affixoids. Due to their heterogeneous nature, linguists treat them differently as no stringent criteria have been established for their delimitation. The behaviour of neoclassi-
nei lietuvių kalbos žodžių daryba. Integruoja-mieji žodžiai su neoklasikiniais elementais yra pritaikomi prie lietuvių kalbos fonologinės ir morfologinės sistemos.

Tyrimas atskleidė, kad žodžiai su neoklasikiniais elementais yra poziciškai apriboti. Kai kurie neoklasikiniai elementai galimi tik prepozicijoje, kiti – tik postpozicijoje, o treti – tiek prepozicijoje, tiek postpozicijoje. Žodžiai su neoklasikiniais elementais susideda iš sietinių kamienų, leidžiančių sudaryti naujus žodžius su neoklasikiniais elementais. Tyrimas parodė, kad neoklasikiniai elementai gali jungtis ne tik su elementais, kilusiais iš graikų ar lotynų kalbų, bet ir su žodžiais, kilusiais iš anglų kalbos. Lietuvių kalboje taip pat galima rasti ir žodžių hibridų, kuriuose yra ir savų, ir iš klasikinių kalbų pasiskolintų elementų. Tarptautinių ir lietuvių kalbos žodžių priesagos yra jungiamos prie graikų ir lotynų kalbų sietinių kamienų. Žodžiai su neoklasikiniais elementais daugiausiai sudaro endocentrinius dūrinius.

REIKŠMINIAI ŽODŽIAI: sietiniai kamienai, dūryba, endocentriniai dūriniai, neoklasikiniai dūriniai, neoklasikiniai elementai

KEY WORDS: bound stems, compounding, endocentric compounds, neoclassical compounds, neoclassical elements