Syntactic-Semantic Analysis of Term Compounds in Mechanics

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Abstract

This paper focuses on the syntactic-semantic analysis of Lithuanian and English compounds in mechanical terminology. The aim of the study is to reveal the components of semantic-syntactic relations of compounds in both languages. According to the theory and methodology of Olsen, LarssoN, and Keinys, the following syntactic-semantic relations of compounds were identified: determinative, possessive, copulative, and verbal governing. These types are dominant in English and Lithuanian. It was found that the essential feature of determinative compounds is the presence of both noun components. Possessive compounds usually have a single adjectival component and are metaphorical in meaning. Copulative compounds are both equivalent nouns that do not describe each other, and in English copulative compound components can be swapped, and the meaning would not change. The distinguishing feature of verbal governing compounds is that one component is a verb or verb-noun, which is usually the second component of a compound. The semantic-syntactic analysis showed that most of the compounds identified were determinative. The analysis of the determinative compounds by semantic class revealed that the most productive is the semantic class of purpose. This tendency was observed among the Lithuanian and English equivalents.

Although while discussing the existing patterns of compound derivation, the most frequent pattern was N + N in Lithuanian and English, the present research identified other types as well. The following models dominated among Lithuanian compounds: Adj. + N, Adv. + N, and Num.+N, while the following dominated in English: Pr. + N, V + N, and N + Adj. Such results show that in the terminology of mechanics, the pattern of formation of both noun component compounds is the most productive among Lithuanian compounds and their English equivalents.

Keywords: Terms of Mechanics, Determinative, Possessive, Copulative, Verbal Governing Compounds

Introduction

Compounds are also known as one of the most problematic ways of forming words and has attracted researchers of linguistic phenomena for many years. The work of Murmulaitytė (2019), which analyses new words and self-occlusive compound nouns, should be mentioned. The main objective of this study is to analyse the compatibility of new compounds found with the grammatical rules of the language norms and to identify the prevailing patterns and types of compounds. In his doctoral dissertation 'The Compounding of German Compounds in Manuscript Bilingual Baltic Dictionaries of the 15th-18th Centuries', Jarmalavičius (2014) has extensively analysed the compound nouns of the period. This study is important for further analysis of compound nouns. Inčiuraitė-Noreikienė (2015) has researched the structure of neoclassical compounds with neoclassical components and their integration into the Lithuanian word-formation system and has discussed the morphological status of neoclassical components. Compound nouns in Old Latvian have been studied by Bukelskytė-Čepelė (2020). Although the author has analysed the compounds in Old Latvian dictionaries, this is quite important in order to study Lithuanian compound nouns. More interest is shown in the analysis of compounds in English as many phrases consisting of several words are combined to form compounds (Myking, 2020).

In linguistics, compounds have been studied more structurally in terms of their syntactic relations, their importance for the common language, etc. Schäfer (2018) has carried out a semantic analysis of complex compounds. Rutkienė also has studied terminology compounds extensively. The author analysed the formation and development of reconstruction terminology compounds (2021), hybrid construction terminology compounds with classical prepositional sieve stems (2019), and the syntactic-semantic component relations among compounds (2017). According to Drukteinis (2013), research of orthographic component joint variants in nautical terms should be mentioned. Even though this study is different, it is an important step while examining compounds in terminology from different fields. Belda (2002) has further analysed computing terminology compounds with a neoclassical root. This is quite a relevant topic in technology terminology, as many new terms with the international roots micro-, mini-, mono-, and uni- are emerging with the development and creation of new technologies. Gavrilovska (2018) has carried out a morphological analysis of noun compounds of English legal terms according to the word class to which the compound constituents belong.

The aim of this study was to carry out a syntactic-semantic analysis of mechanical terminology compounds in Lithuanian and English to reveal the component semantic-syntactic relations of compounds in mechanical terminology in both languages. Thus, this research is new in several respects. For the first time, a study analyses mechanical compounds from a semantic-syntactic point of view and makes a cross-linguistic comparative study.

Theoretical Background

Based on their structure, compounds can be classified according to the meaning of the component, its belonging to a certain part of speech, and the 'role' the component plays in the compound so as to perform a syntactic-semantic analysis. As Rutkienė claims, 'the essence of the syntactic-semantic approach is the recognition that a compound is a syntactic-semantic construct whose components are connected by certain relations' (2017; p.165). According to Larsson (2002) and Olsen (2000), compounds are divided into four types: determinative, possessive, copulative, and verbal governing. Smetonienė also points out that 'the meaning and form of a compound depends on the parts of speech from which the compound is made' (Smetonienė, 2021; p.134). Keinys (1999) divides the compounds into determinative, copulative, possessive, and verbal governing. A more detailed analysis of compounds studies the semantic relations of compound nouns. The most important works that have laid the foundations for such an analysis of compounds and provided possible relations between the components are those of Scalise and Bisetto. Here, dualisation is further subdivided into subordinative, attributive, and coordinative covenants, and components have endocentric or exocentric relations.

Compounds are considered subordinating when one component of a compound noun supplements another. In the example *taxi driver*, *taxi* is a component that supplements the main component *driver* (Bisetto & Scalise, 2009). When one of the components is an adjective and the other is a noun (e.g., *yellow lemon*), or when both compounds are nouns but one of them corresponds

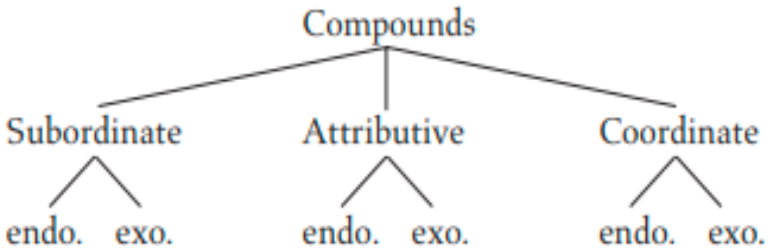

Figure 1. Classification of the Compounds According to Scalise and Bisetto (2005)

to the adjectival properties of the other (e.g., *raincoat*), these compounds are dualised as attributive. Coordinating compounds are ostensibly linked by the conjunction 'and' and are equivalent to each other (e.g., *poet-painter-director*) (Bisetto & Scalise, 2009). Bell and Plag (2012) suggest that compounds can also be analysed according to semantic classes by determining the meaning of the first and second component, i.e., what is described by the defining component (the modifier), which can indicate place, time, material purpose, etc. Thus, it can be argued that subordinating components can also be called determinative, attributive possessive, and coordinating copulative.

The most common are determinative compounds. According to Stundžia, the most common are determinative compounds, especially noun + noun pattern, which 'in different dialects make up from half or a little more to almost two-thirds of all compounds' (Stundžia, 2021, p.238). However, the first

component of a determinative compound can also be a verb, an adjective, a numeral, a pronoun or an adverb. However, these patterns are rare (Bukelskytė-Čepelė, 2020). Determinative compounds are characterised by a binary structure. The first component (determiner) usually defines the second component (determinate), thus making its meaning narrower and forming subordinating relations (Jarmalavičius, 2014). The second noun is usually the main noun, which determines the semantic and morphological properties of the compound. In contrast, the other noun (the determiner) acts as a modifier, thus narrowing the meaning of the compound. A great example of a determinative compound would be a *coffee cup*. This shows that the main word (component) is *cup*, which determines the semantic and morphological properties of the dagger. On the other hand, the modifier (determiner) in this case is *coffee*, which narrows the meaning.

According to Balode, 'possessive compounds are a category of adjectival composites and substantiation is very common. Dictionaries often refer to adjectival (adj.) and noun usages' (2019, p.38). Possessive compound is the second classificatory type of compound, which is one of the most archaic, and dates back to the Indo-European proto language (Larsson, 2002). These compound words, unlike the determinatives mentioned above, are not productive (Neef, 2002). Futhermore, these compounds are usually used to describe plants and animals, and the most prominent feature attributed to this type is figurative meaning (Jarmalavičius, 2014). Possessive compounds differ from determinative compounds because possessive usually refers to 'properties possessed by objects in the living and non-living world' (Balode, 2019, p.38). The *unicorn* (lit. *vienaragis*) is a perfect example (Balode, 2019). In addition, these compounds are more frequently used in colloquial speech, which may account for the lower use of these compounds in written sources (Jarmalavičius, 2020). The first component is usually an adjective or a numeral and less often a noun or a verb. The components of possessive compounds are linked by determinative relations and are classified as subspecies of determinative compounds (Jarmalavičius, 2014). In these compounds, based on the determinative compounds mentioned above, the second component is defined by the first component. Nonetheless, the overall meaning of the compound is expanded and not narrowed in the determinative compounds. In Baltic languages, these compounds are similar to adjectives, thus reflecting their original purpose as adjectives (Larsson, 2002). Trousdale stated that 'in modern English, possessive compounds evolved from possessive phrases' (2008; p. 159).

According to Keinys (1999), the smallest number of compounds are connected or copulative. Inčiuraitė-Noreikienė also points out that this group of compounds is rare (2015). They are also not productive (Vaičiulytė Semėnienė, Vaičienė, 2014). In copulative compounds, both components are independent nouns, and their meaning is formed from the sum of these components (Inčiuraitė-Noreikienė, 2015). Such component relations are called coordinative, which means that even if they are interchanged, the meaning of the copulative compound would not change much (Rutkienė, 2017). This is because the 'lexical and syntactic meaning of copulative compounds is almost the same or only differs in its greater specialisation' (Kizelytė, 2006, p.27). In this case, it would

be possible to swap the components of the compound and the meaning would not change much. However, it would not be possible to do this for determinative or possessive compounds. For example, writing doctor-poet instead of poet-doctor would not change much as the meaning of the compound would remain similar. It is obvious that neither of the components is the main or modifier, which means that neither of them describes the other or narrows the meaning (Olsen, 2001). This group of compounds is much rarer than the determinative and possessive compounds mentioned earlier.

There are few verbal governing compounds, but more than copulative compounds in Lithuanian. According to Stundžia (2021), such division of compounds is mostly determined by the type of text where the words are used. One might think that compounds with a second verb (verb-noun) component would be more frequent in fiction texts and somewhat less frequent in dictionaries. Verbal governing compounds belong to the group of determinative compounds (Jarmalavičius, 2014). Jarmalavičius has mentioned that 'the syntactic and semantic relations between components are similar to those between the pronoun and the complement in a clause' (2014, p.25). It could be argued that the first component of verbal governing compounds is the object. Thus, the verbal governing compound specifies the predicate action of the second component, e.g., 'brewer (lit. *aludaris*) ('to make beer' (lit. *alų daryti*)' (Smetonienė, 2021, p.136). In Lithuanian linguistics, there are not many verbal governing compounds, but they are just as important as all the other types of compounds mentioned earlier. Kastovsky is confident in the existence and importance of verbal governing compounds and writes about their analysis and examples as verbal governing compounds: '*to sight see = see the sights*'. In this example, the second component *see* (lit. *matyti*) is a verb and the first component *sight* (lit. *matyti*) is a noun (Lamberty & Schmid, 2013, p.593). Lin (2004) compares English verbal compounds with those of Mandarin, which seems to be completely different from English. However, the author writes that the two languages are morphologically similar and gives some examples. In English, a verbal governing compound would include *tree fall* (lit. *medžių kritimas*) (Lin, 2004). Thus, the structure of verbal governing compounds in English linguistics is also likened to the same type of compounds in Lithuanian linguistics.

After discussing the theoretical aspects of the syntactic-semantic analysis of compounds, the following section presents a study of a syntactic-semantic analysis of compounds in Lithuanian and English mechanical terminology, which aims to reveal the semantic-syntactic relations between compound components in both languages.

Methods

The analysis was carried out based on the theory and methodology of Olsen (2000), Larsson (2002), and Keinys (1999). Accordingly, the compounds were divided into determinative, possessive, copulative, and verbal governing. This means that the compounds were categorised into four different groups. The source for compounds analysed in this article is the multilingual 'Mechanical Terms Dictionary' (*Mechanikos terminų žodynas* (2019). The dictionary was

read from the beginning to the end, and the total number of the compounds found and analysed in this article is 208, i.e., 104 Lithuanian compounds and 104 English equivalents. Following their path, this research kept the original methodological roadmap. The object of the study were compounds and their equivalents. However, compounds with a neoclassical (international) root were not included and were not surveyed in this research. This is because there is no unanimous opinion or rigorous theoretical material whereby words with such a root can be considered as compounds. It is important to note that English compounds are referred to by a single term known as compound words. According to Sun and Baayen (2021), they are also divided into several different types of constructions, namely: closed compound words, open compound words, and hyphenated compound words.

The study used analytical research to analyse the existing types of compounds in 'Mechanical Terms Dictionary', qualitative analysis to describe the types and patterns of compounds discovered, quantitative analysis to calculate the number and frequency distribution of the types and patterns of compounds identified, and syntactic-semantic descriptive language analysis to classify the compounds into the appropriate types and patterns.

Since, to the best of our knowledge, a related study has not been carried out in this field so far, it was relevant to analyse the distribution of the types of compounds and the patterns of their formation.

Results and Discussion

In the present investigation, compounds were distinguished into four types according to their semantic-syntactic relations, namely: determinative, possessive, copulative, and verbal governing. Among the 208 compounds analysed, 104 (100%) were Lithuanian and 104 (100%) were their English equivalents. Lithuanian nouns comprised 82 (78.8%) determinative compounds, 20 (19.2%) verbal governing nouns, and 2 (1.9%) possessive compounds. No copulative compounds were discovered in this dictionary. The highest number of the English compounds was identified to be determinative compounds at 72 (69.2%), the lowest number was possessive compound at 1 (0.9%), and 29 (27.9%) were simple words. Although these are not considered to be compounds in English, they are classified as compounds in Lithuanian. Furthermore, 2 (1.9%) were detected as verbal governing compounds and no copulative compounds were present either.

Thus, as expected, most of the compounds were classified as determinative in both Lithuanian and English. The least number of possessive compounds were identified since they are more common in fiction texts and are mostly figurative words. The number of verbal governing compounds was also low, but it was still found. This may be influenced by the area from which the examples were collected. Nevertheless, no copulative compounds were retrieved.

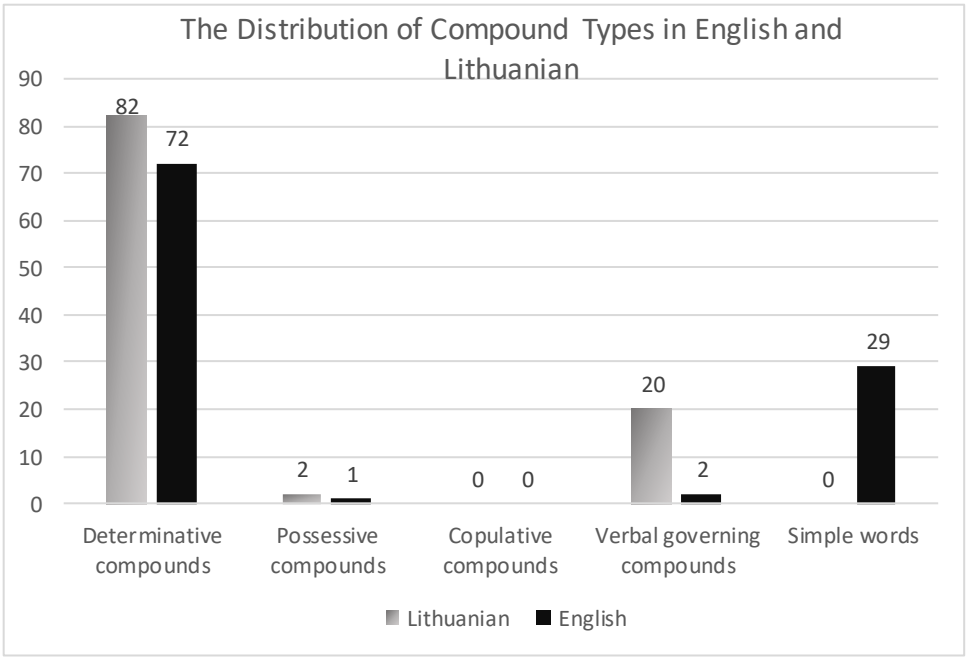

Figure 2. The Distribution of Compound Types in English and Lithuanian

Determinative Compounds

The most common formation pattern for compounds of this type, in terms of semantic-syntactic relations was N + N. However, other patterns of formation could be discovered, such as N + N, Adj. + N, Num. + N, V + N, Adv. + N, Pr. + N, and Pron. + N.

Determinative compounds have a binomial structure. The first component (the determiner) usually defines the second component (the determinate), thus making its meaning narrower. Out of the 104 Lithuanian compounds present in the 'Mechanical Terms Dictionary', 82 determinative compound nouns were the most frequent (78.8%): *aukščiamatis* (en. *alititude meter*), *bendraašiškumas* (en. *coaxiality*), *darbastalis* (en. *workbench*), *daugiakampis* (en. *polygon*), *dažniamatis* (en. *frequency meter*), *formadėžė* (en. *box form*), *garlaivis* (en. *steam vessel*), *greitmatis* (en. *speedometer*), *ilgalaikiškumas* (en. *durability*), *juodvaris* (en. *blister copper*), *kryžgalvė* (en. *crosshead*), *krumpliaratis* (en. *gear wheel*), *laivasraigtis* (en. *propeller*), *lydkrosnė* (en. *blast cupola*), *lygiagretumas* (en. *parallelism*), *mentratis* (en. *bucket wheel*), *naujasidabris* (en. *nickel silver*), *ortakis* (en. *air hole*), *pusašis* (en. *half shaft*), *pusautomatis* (en. *semi-automatic machine*), *ratlankis* (en. *rim*), *smėliasrautė* (en. *sandblast unit*), *statramstis* (en. *strut*), *stormatis* (en. *thickness gauge*), *tarpmazgis* (en. *interstice*), *tarpmatis* (en.*feeler*), *veržliaraktis* (en. *spanner*), *žvaigždėlaivis* (en. *star-probe vehicle*), and others.

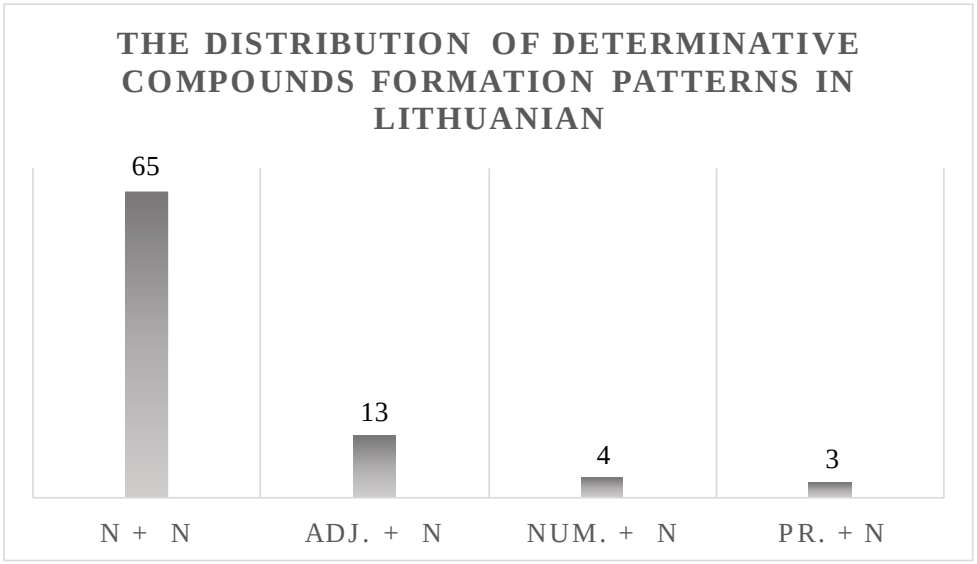

Figure 3. The Distribution of Determinative Compounds Formation Patterns in Lithuanian

The latter were also divided into semantic classes according to what the definite component determines. In this case, the first noun component determined the second.

The definite component indicated purpose (64). Most determinative compounds were made up of both noun components, with the left component refining the right one. Thus, the first (left) component specified the purpose of the second (right) component. Examples would be *aukščiamatis* (en. *alititude meter*) (a measure for measuring height), *kreivėmatis* (en. *curvometer*) (a measure for measuring curve), and *kampamatis* (en. *angle meter*)(a measure for measuring angles).

The definite component indicated a feature (11). The defining component of compounds belonging to this semantic class was usually an adjective. Examples of such compounds were as follows: *stačiakampis* (en. *rectangle*) (the adjective erect described the noun angle), *juodvaris* (en. *blister copper*) (the adjective black describes the noun copper), and *kietlydinis* (en. *hard alloy*) (the adjective hard described the noun alloy).

The definite article indicated location (3). The first component of the compounds belonging to this semantic class was a preposition, which was the most frequent preposition in the analysis of collected compounds. Also, the first component of compounds belonging to this class was a preposition *tarp*: *tarpmazgis* (en. *interstice*)(tarp + mazgas), *tarpmatis* (en. *feeler*)(tarp + matas), and *tarpvamzdis* (en. *branch pipe*)(tarp + vamzdis).

The definite article indicated the number (4). The first component of this semantic class was a numeral which described the number of the second component. Among the mechanics compounds analysed, compounds of this

semantic class were identified: *daugiakampis* (en. *polygon*) (daug + kampas) and *trišakis* (en. *T-joint*) (trys + šaka).

Therefore, among the compounds discovered by syntactic-semantic types, the most frequent were determinatives and the latter were divided into semantic classes. This shows that the most frequent compounds that belong to the semantic class indicated the purpose, the second place indicated the feature, the third place denoted the location, and the last place identified the number.

Also, in Lithuanian linguistics, to determine English determinative compounds, one component described the other, thus narrowing the meaning of the second component and the entire compound. The most common formation pattern was also *noun + noun*. In English, 72 (69.2%) determinative nouns also ranked first in terms of types of compounds. However, these compounds were distinguished into three different groups based on the formation of the terms. Twenty-four (24) (33.3%) were closed compound words: *breakwater*, *barograph*, *barogram*, *workbench*, *flowmeter*, *phasemeter*, *speedometer*, *durability*, *crosshead*, *aircraft*, *profilograph*, *mudguard*, *flywheel*, and *studdriver*. Open compound words accounted for 37 (51.4%): *altitude meter*, *barometer*, *frequency meter*, *box form*, *depth meter*, *hard alloy*, *gear wheel*, *rack bar*, *nickel silver*, *air hole*, *half shaft*, *semifinished piece*, *dump truck*, *sandblast unit*, *thickness gauge*, *heat medium*, *branch pipe*, *single rail*, and *nail claw*. Hyphenated compound words had 11 (15.3%): *gas-tank truck*, *semi-automatic machine*, *half-mould*, *half-coupling*, *half-period*, *self-diagnosis*, *thread-cutting die*, *shot-blast unit*, *strain-gauge indicator*, *off-road vehicle*, and *star-probe vehicle*.

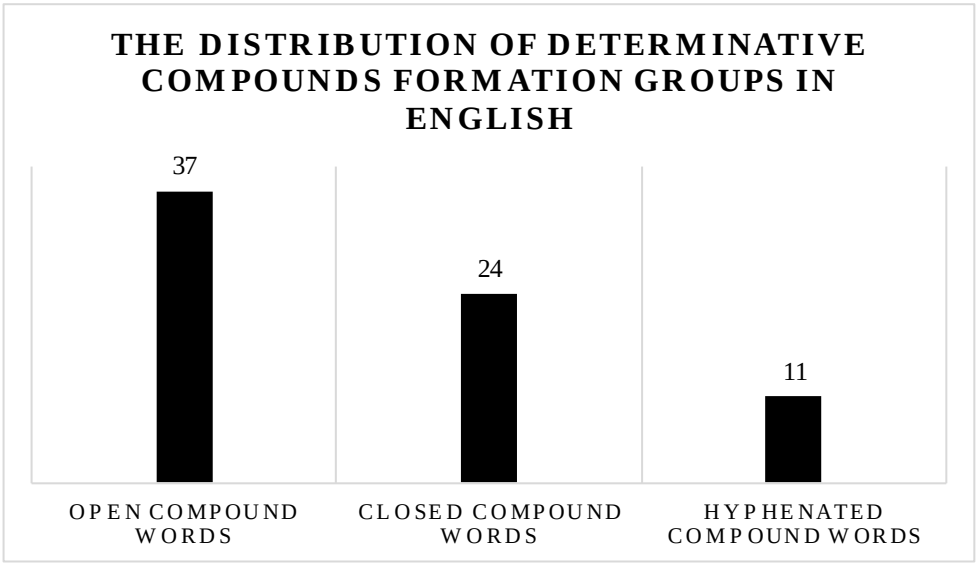

Figure 4. The Distribution of Determinative Compounds Formation Groups in English

Equivalents in English were also divided into syntactic classes. Since the semantic classes of determinative compounds were analysed, the most

frequent second component was a noun defined by a noun or another part of speech.

The Definite Article Defined the Purpose (64)

The first noun component, among English compounds, defined the second noun component by indicating the purpose. Examples of this semantic class were *phasemeter* (meter, the second noun component of the compound was specified by the defining first component phase) and *profilograph* (profile, the first noun component of the compound specified the second noun component graph).

The definite component indicated a feature (8). This semantic class contained an adjectival component describing another component, thus indicating a feature. Examples of such compounds among the English equivalents were *hard alloy* (the first adjectival component hard indicated the alloy feature in the second component) and *blister copper* (the first adjectival component blister referred to the feature of the second noun component copper).

Therefore, among the compounds collected by syntactic-semantic types, the most frequent were determinatives and the latter were divided into semantic classes. This shows that the most frequent compounds belong to the semantic class that indicated the purpose. The second place was given to the semantic class that indicated the feature, the third place denoted location, and the last place identified the number.

Possessive Compounds

This type of compound words, unlike the determinatives mentioned above, is not so productive. These compounds usually described plants and animals, and the most prominent feature attributed to them was figurative meaning. In this dictionary, two compound nouns could theoretically be classified as possessive nouns, since the primary meaning of the word was used to describe certain tools. The total number of possessive compounds was 2 (1.9%): *aklidangtis* (en. *blank cover*) and *sliekratis* (en. *worm gear*). *Aklidangtis* (en. *blank cover*) case is the tool used to cover the holes. However, trying to read the word according to its original component meaning would suggest that it is *aklas dangtis* (en. *blind lid*), which sounds like a figurative word. Therefore, this compound could be classified as possessive. The situation was similar for the compound *sliekratis* (en. worm gear). Knowing these mechanical terms, it is safe to say that it was a tool. However, the primary meaning of the word *sliekas* was not a tool but a worm (DLKŽ). Without knowledge of the terminology in this field, trying to understand *slieko ratas* (en. *worm's gear*) would be confusing. This is why this word was also classified as a possessive compound type.

In both Lithuanian and English, this type of compound was often used figuratively, and its meaning was often expanded than contracted. It was also noted that possessive compounds were used more widely in English and in a non-literal sense. They are also descriptive of the characteristics of objects or people. Among the retrieved examples, 1 (0.9%) was found and could be classified as a possessive compound: *worm gear*. It was the same possessive Lithuanian

compound *sliekratis* (en. *worm gear).* A direct translation of this word from English would result in the translation *slieko ratas* (en. *worm wheel*), which is known as a mechanical term. Therefore, the compound could be described as figurative and classified as an open compound.

Copulative Compounds

The smallest number of compounds are connected or also known as copulative. In copulative compounds, both components are independent nouns and their meaning is formed from the sum of these components. Among the mechanical compounds presented, no copulative compounds were discovered. These compounds are quite rare in texts of any genre. Hence, it is not surprising that they were absent in the 'Mechanical Terms Dictionary'. In English, just like in Lithuanian, copulative compounds are said to have a coordinating relation. This means that the two components of the copulative compound are equivalent. It is obvious that neither of the components is the main or modifier, which means that neither of them describes the other or narrows the meaning. No copulative compounds were present in this dictionary in English as in Lithuanian.

Verbal Governing Compounds

There are few verbal governing compounds that are more than copulative compounds. According to Stundžia (2021), such division of the types of compounds is mostly determined by the type of text where the words are used. It could be argued that the object is the first component of verbal governing compounds, and it specifies the predicate action of the second component. There were 20 (19.2%) verbal governing compounds in Lithuanian: *bangolaužis* (en. *breakwater*), *benzinvežis* (en. *gas-tank truck*), *dulkėgaudis* (en. *duster*), *elektrometalizacija* (en. *electrometallization*), *grioviakasė* (en. *trenching plow*), *orpūtė* (en. *blower pump*), *purvasaugis* (en. *mudgard*), *pusiausvyra* (en. *balance*), *pusmovė* (en. *half-coupling*), *savivartis* (en. *dump truck*), *savityra* (en. *self-diagnosis*), *smeigiasukis* (en. *studdriver*), *sraigtasukis* (en. *screw driver*), *sriegpjovė* (en. *thread -cutting die*), *šilumnešis* (en. *heat medium*), *šilumokaitis* (en. *heat exchanger*), *šratasvaidė* (en. *shot-blast unit*), *veržliasukis* (en. *wrench*), *viniatraukis* (en. *nail claw),* and *visureigis* (en. *off-road vehicle*). Thus, the verbal governing compounds made up almost one-fifth of all the Lithuanian compounds provided. Although it has been argued that compounds of this type are rare, they appeared to be quite important among mechanical terms.

Verbal governing compounds exist in English and are just as important. Among the terms analysed, 2 (1.9%) verbal governing compounds were retrieved in English: *electrometallization* and *magnetostriction*. However, it turns out that the use of these compounds was indeed rare, as only a couple of them were collected in the 'Mechanical Terms Dictionary'. Both compounds were closed compounds. This distribution and frequency of verbal governing compounds in Lithuanian and English suggested that this type of compound was more prominent in the Lithuanian language.

The semantic-syntactic analysis showed that most of the compounds were determinative. The study of the determinative compounds by semantic class

revealed that the most productive is the semantic class of purpose. This tendency was observed among Lithuanian compounds and English equivalents. Only a few possessive compounds were in both languages. Copulative compounds were completely absent from the mechanical terminology of both languages. Almost one-third of the verbal governing compounds were identified in Lithuanian, which is a relatively high proportion, as only two compounds of this type were discovered in English. These results show that the largest share of the mechanics in both languages eas given to the determinatives of the semantic class of purpose, whose definite component indicated the purpose of the main component.

Another important aspect that was considered when assessing mechanical compounds is the formation patterns of the compounds. Among the analysed Lithuanian compounds of the 'Mechanical Terms Dictionary', the *noun + noun* model (63.5%) stood out the most. This was followed by other patterns with a noun as the second component: *adjective + noun* (13.5%), *numeral + noun* (3.8%), and *preposition + noun* (2.9%). Some of the compounds also had a verb in the second component according to the formation pattern: *noun + verb* (12.5 %), *adverb + verb* (1.9 %), and *pronoun + verb* (1.9 %).

When the patterns of derivation were distinguished according to the types of semantic-syntactic analysis, it was observed that the most frequent pattern of derivation among the determinatives was *noun + noun* (65): *aukščiamatis* (en. *alititude meter*), *darbastalis* (en. *workbench*), *garlaivis* (en. *steam vessel*), *greitmatis* (en. *speedometer*), *kampamatis* (en. *angle meter*), *kryžgalvė* (en. *crosshead*), *krumpliaratis* (en. *gear wheel*), *laivagalis* (en. *stern*), *lydkrosnė* (en. *blast cupola*), *luitadėžė* (en. *lingot*), *orlaivis* (en. *aircraft*), *ratlankis* (en. *rim*), *smagratis* (en. *flywheel*), *smėliasrautė* (en. *sandblast unit*), and *žvaigždėlaivis* (en. *star-probe vehicle*). Among the patterns of determinative compounds, *adjective + noun* (13) was also found: *bendraašiškumas* (en. *coaxiality*), *ilgalaikiškumas* (en. *durability*), *juodvaris* (en. *blister copper*), *kietlydinis* (en. *hard alloy*), *kietmatis* (en. *durometer*), *klampomatis* (en. *viscometer*), *kreivėmatis* (en. *curvometer*), *lygiagretumas* (en. *parallelism*), *naujasidabris* (en. *nickel silver*), *smulkiagrūdiškumas* (en. *grain fineness*), *stačiakampis* (en. *rectangle*), *statramstis* (en. *strut*), and *stormatis* (en. *thickness gauge*). *Numeral + noun* (4): *daugiakampis* (en. *polygon*), *trišakis* (en. *T-joint*), *vienalytiškumas* (en. *homogeneity*), and *vienbėgis* (en. *single rail*). *Preposition + noun* (3): *tarpmazgis* (en. *interstice*), *tarpmatis* (en. *feeler*), and *tarpvamzdis* (en. *branch pipe*).

Two patterns of the possessive compounds were also retrieved*: noun + noun - sliekratis* (en. *worm gear*) and *adjective + noun - aklidangtis* (en. *blank cover*). The first component of the compound *aklidangtis* (en. *blank cover*) was the adjective *aklas* (en. *blind*) and the second component was the noun *dangtis* (en. lid). The first component of the compound *sliekratis* (en. *worm gear*) was the noun *sliekas* (en. *worm*) and the second component was also the noun *ratas* (en. *gear*).

When examining the verbal governing compounds (20), three formation patterns were identified: *noun + verb* (16), *adverb + verb* (2), and

pronoun + verb (2). Subsequently, the second component of verbal governing compounds in the three formation modules was the verb, while the first component was the noun, the adverb, and the pronoun. *Noun + verb* (16) were the following verbal governing compounds assigned to this module: *bangolaužis* (en. *breakwater*), *benzinvežis* (en. *gas-tank truck*), *dulkėgaudis* (en. *duster*), *elektrometalizacija* (en. *electrometallization*), *grioviakasė* (en. *trenching plow*), *orpūtė* (en. *blower pump*), *purvasaugis* (en. *mudgard*), *pusmovė* (en. *half - coupling*), *smeigiasukis* (en. *studdriver*), *sraigtasukis* (en. *screw driver*), *sriegpjovė* (en. *thread-cutting die*), *šilumnešis* (en. *heat medium*), *šilumokaitis* (en. *heat exchanger*), *šratasvaidė* (en. *shot-blast unit*), *veržliasukis* (en. *wrench*), and *viniatraukis* (en. *nail claw*). *Adverb + verb* (2) compounds belong to this module: *pusiausvyra* (en. *balance*) and *visureigis* (en. *off-road vehicle*). Pronoun + *verb* (2) compounds belonged to this module: *savivartis* (en. *dump truck*) and *savityra* (en. *self-diagnosis*).

When analysing the formation patterns among English determinative compounds, the *noun + noun* formation pattern was the most prominent in terms of number with 54 compounds. The latter were also classified as 28 (51.9%) open compound words: *alititude meter*, *frequency meter*, *flaw detector*, *flaw inspection*, *box form*, *steam vessel*, *depth meter*, *angle meter*, *gear wheel*, *rack bar,* and others.

Nineteen (19) (35.2%) closed compound words were presented: *barograph*, *barometer*, *barometry*, *workbench*, *flowmeter*, *dynamometer*, *electrocorundum*, *electrolysis*, *electromechanics*, *electrometallurgy*, *electromobile,* and others.

There were 7 hyphenated compound words (13%): *gas-tank truck*, *half-mould*, *half-period*, *thread-cutting die*, *shot-blast unit*, *off-road vehicle,* and *star-probe vehicle*.

The other predominant pattern among English determinative compounds was *adjective + noun* and 12 compounds were discovered. The latter were separated into open compound words and 8 (66.6%) included: *blankcover*, *blistercopper*, *hardalloy*, *blowerpump*, *prototypemodel*, *semifinishedpeace*, *insidegauge*, and *singlerail*.

There were 2 (16.7%) closed compound words: *durability* and *crosshead*, and 2 hyphenated compound words (16.7%): *semi-automaticmachine and strain-gaugeindicator*.

Only a small proportion of compound nouns had other patterns of formation when it comes to English determinative compounds. The *noun + adjective* pattern included a single compound and *heat medium,* which was an open compound word. The *verb + noun* pattern contained the following determinative compounds: *breakwater* and *flywheel*, which were closed compound words, and *trenchingplow* and *tinningmetal*, which were open compound words. The *pronoun + noun* pattern included a single compound: self-diagnosis, which was assigned to the hyphenated compound word.

As far as possessive compounds are concerned, only one *noun + noun* pattern was found. Thus, the compound assigned to it was *worm gear*, which was

an open compound word. The first noun in this possessive compound was *worm* and the second noun was *gear*.

The analysis of the formation patterns of the English verbal governing compounds also revealed only one formation pattern: *noun + verb*. This module of verbal governing compounds included two compounds, *electrometallization* and *magnetostriction*, which were formed by closed compound words.

Unfortunately, more than a fifth of the examples presented in the 'Mechanical Terms Dictionary' were translated into English as simple words, i.e., not compounds. This is mainly because most ordinary English words were formed by adding a prefix, which in English cannot be treated as the root of a compound. However, in Lithuanian, it is obvious that a compound is made up of two components, not a prefix and a root.

In the semantic-syntactic analysis of the compounds collected in the 'Mechanical Terms Dictionary', determinative compounds were the most numerous in the Lithuanian language. The most common pattern among this type of compound was also *noun + noun*. Other patterns were discovered in sufficient numbers, where the second component was also a noun. According to the theory of semantic-syntactic analysis of compounds, determinative compounds seem to be the most common compounds in various scientific fields. Although only two possessive compounds were identified, this type of compound was rare. Therefore, the primary meaning of the first component of the two possessive compounds was different from the meaning of the compound. This implies that the compounds could be classified as possessive compounds. As for the formation patterns of the latter, one of them was formed by the *noun + noun* formation pattern and the other by the *adjective + noun* formation pattern. No copulative compound nouns were found, which was expected because of the rarity of this type of compound. The second highest number of compounds among Lithuanian terms was for verbal governing compounds. Although it is mentioned that this way of derivation is not productive in Lithuanian, the results of the syntactic-semantic analysis of the compounds in the 'Mechanical Terms Dictionary' were different. Among the Lithuanian examples analysed, the verbal governing compounds were quite productive. This may be influenced by the scientific field that deals with the various mechanisms and how they work. The most common formation pattern among verbal governing compounds was *noun + verb*.

The English equivalents are also dominated by determinative compounds, and the most common in terms of the way they are formed are open compound words. In English, unlike in Lithuanian, it is common to use two-word compounds consisting of two separate words, with one modifying the other. As for the pattern of formation that is common among English determinative compounds, the most common was the *noun + noun* pattern of formation. As far as possessive compounds in English are concerned, only one was identified, which was open compound word with a pattern of *noun + noun*. No copulative compounds were present in English either. Accordingly, matches were retrieved that were attributed to simple words rather than to compounds. Also, there were not many verbal governing compounds in English. Nonetheless, two compounds

of this type were found, which were closed compound words with a formation pattern of *noun + verb*.

Thus, this analysis showed that determinative compounds are most common in both English and Lithuanian, and the most frequent pattern among them was *noun + noun*.

Conclusion

After discussing the syntactic-semantic relations, the following types of compounds were identified: determinative, possessive, copulative, and verbal governing. These types were dominant in English and Lithuanian. The syntactic-semantic analysis of Lithuanian and English mechanical term compounds showed that most of the compounds collected were determinative. The analysis of the determinative compounds by semantic class revealed that the most productive is the semantic class of purpose. This tendency was observed among Lithuanian compounds and English equivalents. Few possessive compounds were present. Almost a third of the verbal governing compounds were discovered in Lithuanian language, which can be said to be a high proportion. Only two compounds of this type were found in English. These results show that the largest proportion of terms of mechanics in both languages was occupied by the determinative compounds of the semantic class of purpose, whose definite component indicated the purpose of the main component.

Having analysed the models of term compounds derivation, the obtained results indicate that the pattern of two noun compounds derivation was the most frequent in mechanical terminology in Lithuanian and English equivalents.

The research of syntactic-semantic analysis of mechanical term compounds revealed the semantic-syntactic relations of compounds in different languages, which determined the differences and similarities of compound derivation patterns of both languages. Subsequently, this will help further research in the formation of compounds.

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