The Contrastive Analysis of the Structure Inside the Noun Phrase
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Abstract. The article deals with some principles that regulate the order of the elements inside the noun phrase that refers to the grammatical subject. The position of the words inside the noun phrase is variable by their grammatical and semantic functions in Lithuanian and fixed in English. The English and Lithuanian languages differ as to whether their syntactic organisation in the noun phrase reflects grammatical relations of a head noun with an article, with a noun, with an adjective, with a numeral, with a clause, etc. in a head-marked structure, or the noun phrase comprises terms or phraseological units bearing figurative sense. In the English noun phrase, the position of the dependent elements is before the head noun they modify or they are expressed by means of postposition.

In Lithuanian the grammatical means of indicating grammatical relations in the noun phrase are endings and inflexional suffixes. Generally the flexibility of the word order within the noun phrase in Lithuanian is presented on the basis of morphological case marking. The dependent-marked structure of the determiners inside the noun phrase in English and Lithuanian sentences is a complex of interrelations between its elements. Thus, the semantic meaning of the sentence of the same content in the both languages can be expressed by the different order of its constituents although the order of the elements in the noun phrase can be different too.

Generally this study is concerned with the noun phrase, i.e., the grammatical subject that occurs only before the main verb in a clause in English, though the position of the corresponding noun phrase translated into Lithuanian can appear before or after the main verb, or the clause may correspond to the word order with the retained object.

The contrastive analysis of the noun phrase structure is based on the restrictive effects of grammatical and semantic meaning in reference to the syntactic interpretation.

Key words: noun phrase, element, grammatical relations, head noun, head-marked structure, dependent-marked structure.

Introduction
In traditional analysis a nominal clause is considered a finite or non-finite clause comprising the noun phrase which performs its functions as the subject of a sentence. The noun phrase is comprised of more than one word and/ or even a clause, whereas the relations between the words inside the noun phrase are highlighted by the function of a head and its dependents. In the noun phrase, dependent determiners are defined as a lexical category; they include the articles and words traditionally classified as adjectives and pronouns Whereas some adjectives and most nouns used are covered under the term attributive referring to the grammatical level of a clause analysis (McArthur, (ed.), 1998, pp.51–52).

Furthermore, a grammatical term phrase used in the 19th century denoted at first any combination of two or more words, including that of a noun and a verb. However, when the clause came to be defined as a syntactic unit combining a subject and a predicate, the term phrase was used to designate any word-group (Iofik, et al. (eds.), 1981, pp.106–107).

Thus, the noun phrase which is a particularly significant constituent of a clause structure and content (in reference to the verb phrase) (Comrie, Keenan, 1979) has been explored a lot using the traditional meaning of the content of notions like subject and (in)direct object. In modern grammar, the noun phrase as the grammatical subject or object is maintained as the external complement syntactically which is located outside the verb phrase; the semantic role relevant to the noun phrase in complement function can depend on the meaning of the verb (Matthews, 1993, p.108; Huddleston, Pullum, 2002, p.53). Recent investigations on the English noun phrase (Siewierska, 1997) (Keizer, 2007) are maintained to be noteworthy in linguistics since the research on the English noun phrase has concentrated on specific aspects of their internal structure in reference to theoretical, typological and descriptive analysis. Though, at present similar researches on the Lithuanian noun and nominal constructions (Holvoet, Mikulskas, 2006; Plungian, 2010) demonstrate a variety of valuable approaches too.

The contrastive analysis provides the investigation of the noun phrase (hereinafter the NP) in the English and Lithuanian languages as these languages differ typologically. Comparing both languages, an analytic language as English uses specific grammatical words or particles rather than inflexion, to express syntactic relations within the NP (Encyclopaedia Britannica) whereas a synthetic language as Lithuanian in which syntactic relations within the NP are expressed by inflexions that make the changes in the form of a word to indicate distinctions of gender, number, and case. Differences existing in linguistic and national aspects are essential and have to be taken into account in the translation of scientific texts (Brekke, 2004, p.620). Different approaches to analysis of the flexible Lithuanian and fixed English order have divergent views in the
The problem is based on the relations between heads and their dependents in the NP. When making the contrastive analysis of the structure inside the NP, in English these relations are emphasised by the strict order of the elements inside the NP that are usually supplemented by the specific grammatical words. In Lithuanian the relations between heads and their dependents within the nominal construction are expressed by endings that are indicated on every word of the construction highlighting the distinctions of a form.

The paper focuses on the structure inside the NP in English and Lithuanian.

The aim of the paper is to explore the specificity of the relations between heads and their dependents inside the NP.

The following tasks are addressed in the study:
- to determine the characteristics of the noun as the head in both languages;
- to survey the dependent modifiers in adposition indicating the relations;
- to substantiate the contrastive specificity of the relations of the head and its dependents inside the NP.


The following research methods are applied in the study:
- the method of syntactic typology;
- the method of contrastive analysis.

Theoretical Background

1. The Noun in the Head-marked Structure

Generally the head of the noun phrase is the word that defines the syntactic type of that phrase; the other elements inside the phrase modify the head they depend on. The noun standing in the head-marked structure inside the NP can show syntactic relations morphologically that are indicated on the head of the construction (Bynan, 2004, p.1227).

The concept noun is defined as the word class having “no universal status and being a language-specific category” (Lechmann, Moravesik, 2000, p.733). Such concepts as syntactic category and syntactic relations that are mainly based on the descriptive syntax are particularly important in syntactic analysis (Heriniger, 1993, pp.298–345; Primus, 1993, pp.686–705). Contrary to tradition, nouns comprise pronouns as a subclass (Matthews, 1993, p.108; Huddleston, Pullum, 2002, pp.54–55). It is asserted, that a pronoun is not a part of speech and it cannot be the NP. Furthermore, a pronoun being but a feature distinguishes pronominal members of various categories from non-pronominal members. The view that personal pronouns can not be interpreted as pronominal nouns is based on the arguments (McCawley, 1995, p.1320). Though referring to recent investigations, pronouns that have a syntactic status are considered to be similar to NPs (Quinn, 2008).

Traditionally, the differentiation of parts of speech was based on the morphological criterion of inflexional categories; such parts of speech as the adjective, the numeral, and various subgroups of pronouns were maintained as kinds of the noun. In English noun was used in opposition to adjective (Lechmann, Moravesik, 2000, p.732). Later on, both noun and adjective were covered by the term substantive which was not usually found in later 20th century English grammars (McArthur, (ed.), 1998, p.587). At present, the term noun is used instead of substantive referring to the recommendation of the Committee on Grammatical Terminology (1911) (Lechmann, Moravesik, 2000, p.732).

In English the identification of nouns in the head-marked structure can be based on the following criteria: firstly, nouns fill certain characteristic positions in relation to other identified parts of speech in phrases and the most obvious of these is the position just before the verb; secondly, nouns may be identified by various noun-marking derivational suffixes; thirdly, noun-determiners as function words are maintained to be the most common noun-marking signal; and fourthly, nouns have two inflexions, the plural –es and the possessive –s (sometimes called the genitive) (Francis, 1958. In: Iofik, et al. (eds.), 1981, pp.52–53). However, it is argued that whatever possessive is, it is definitely not a marker of genitive case, as this notion is generally understood with respect to the Indo-European languages (Taylor, 2000, p.1).

The specific feature of the English noun is that it can be used in combination with the definite or indefinite article as a modifier. Another point about the noun is that there are a number of grammatical, and semantic subclasses of nouns, e.g. common, proper, (in)animate, abstract or concrete, and (un)countable nouns; countable nouns make distinction between singular and plural in number (McArthur, (ed.), 1998, pp.408–410). In English gender is a category with more restricted morphological marking on nouns that may fall into three gender subclasses (Robins, 1975, p.233), and therefore nouns do not hold specific endings for gender classes of nouns (e.g. only some nouns possess masculine and feminine reference or suffix marking for a masculine/ feminine differentiation).

Essentially in English, nouns do not possess peculiar case endings; case is considered to be the special relation between nouns, pronouns and modifiers in the grammatical construction of the NP. The term common case distinguishes the nominative case of nouns (Roberts, 1964. In: Iofik, et al. (eds.), 1981, pp.56–57). The nominative performs the function of subject and direct address whereas nouns and most pronouns play the part of subject becoming subject nominatives through their position (Curme, 1931. In: Iofik, et al. (eds.), 1981, pp.59–60). Other linguists argue that in substantives there are two cases: a common case corresponding to both nominative and objective, and a genitive; the genitive is formed with –s and/ or the preposition of (Jespersen, 1933; Curme, 1931. In: Iofik, et al. (eds.), 1981, pp.59, 62). Though, the nominative and the objective cases with the pronouns can substitute for the prepositions (Whitehall, 1956. In: Iofik, et
highlight grammatical properties of neighbouring elements to between those specific nominal affixes and lexical-noun construction (i.e. the NP).

In modern Lithuanian, the grammatical category of the affixes on nouns, nouns as heads and other dependent elements inside the exploration of semantic relationships keeping between nominal constituent dependents to heads (Blake, al. (eds.), 1981, p.63–65).

In modern Lithuanian, the grammatical category of the noun construction (i.e. the NP) is determined by the semantic content, the way of expression, and its syntactic relation with other parts of the clause. Traditionally, the noun as a grammatical category is definable by morphological criteria having semantic properties (Paulauskiénė, 1994, pp.58–59). In Lithuanian, the noun (Lith. daiktavardis) is a word class which is considered to be a separate part of speech to indicate the names of things, phenomena, actions or properties. Besides, the noun has the independent categories of case, gender, and number; the noun can act as a grammatical subject or an object, a non-concordant attributive or even an adverbial modifier in a clause.

Comparing to the English noun, the Lithuanian noun has seven case distinctions: nominative, genitive, dative, accusative, instrumental, locative, and vocative. The grammatical meaning of the nominative case is determined by the syntagmatic relationship between the subject and the verb and by its paradigmatic relationship with other cases. Moreover, the category of case can cover some levels of language structure; the system of case form analysed on the level of morphology is not meaningless; the paradigmatic relationship is always based on the meaning of case form in syntagm (Paulauskiénė, 1994, pp.98–99). Another point is that cases possess various degrees of grammaticality. Cases that occur high in the paradigmatic marking of relations for case and number can differences in these language systems. In English the grammatical marking of relations is indicated not only on the head noun. In Lithuanian the grammatical marking of relations is indicated not only on the head noun.

The order of the elements inside the NP is dependent on the head to indicate the relations. Furthermore, the interrelationship between morphology and syntax refers to the marker of the dependent relations that are situated in adposition in regard to the head noun inside the NP; the NP structure can comprise dependent elements as modifiers (Huddleston, Pullum, 2002, pp.54–55). Modifiers coming before the head noun can include an article, a pronoun, an adjective, a degree word; other modifiers coming after the head noun can contain a prepositional phrase, an adjective clause, a participle phrase, etc. The term adjective is interpreted in a semantic sense as a word denoting a descriptive property; it does not include non-descriptive words that commonly modify nouns, such as demonstratives or numerals (Dryer, 2005(c)). In English, the degree word precedes the adjective; degree words (e.g. very, most, or a little, etc.) modify the adjective to indicate the degree to which the property denoted by the adjective is obtained (Dryer, 2005(c)). A modifying adjective as a dependent is maintained as affixed to the head, i.e., a possessed noun. Based on recent investigations in most Indo-European languages the structure of the NP is basically dependent-marking (Bynan, 2004, p.1227; Nichols, 1986, pp.56–119). According to a determiner-dependent position in the NP, determiners can be differentiated into central (articles, demonstratives, possessives, some quantifiers); post-determiners used after central determiners (include numbers); pre-determiners used before central determiners (refers to quantity); clauses may also be modifiers in the structure of the NP, usually post-modifiers of head nouns, such as the relative clause. When the head word is inside the relative clause, it can be called internally headed relative clause (McArthur, 1998, pp.51–52, 163, 384; Dryer, 2005(b).

English linguists of traditional syntax (Robins, 1975, p.228; Hornby, 1976, pp.112–113) and modern syntax (Quirk, et al. 1982, pp.58–107; Jacobs, 1995, pp.20–29; Dryer, 2005(a) treat the position of the dependent elements in the NP (i.e. the grammatical subject) being generally before the head word they modify or it is presented by means of postposition. As the inflexions are few in English, the order of the modifiers inside the NP becomes important (Van Valin, LaPolla, 1997, p.3). The role of prepositions and particles indicating the relations within the dependent-marked structure is essential because the English nouns possess no peculiar case endings (Whitehall, 1956. In: Iofik, et al. (eds.), 1981, p.63). Also H. Sweet’s attitude towards the problem of case (Sweet, 1892. In: Iofik, et al. (eds.), 1981, p.58–59) reflected different ways of approaching the description of English grammatical structure considering the number of cases in the English morphological system. Furthermore, common case distinguished the objective case of nouns (Roberts, 1964. In: Iofik, et al. (eds.), 1981, p.56-57). Though, some linguists accept the four cases in English, i.e. nominative, accusative, dative and genitive; the cases other than the nominative can be maintained as the oblique cases. The accusative can play the role of object; the dative object can indicate that the action or feeling is directed toward a
person or thing (Curme, 1931. In: Iofik, et al. (eds.), 1981, p.59-60). Case is an inflexional system of marking within the NP to show the relationship of dependent modifiers to their heads. The relationship of the dependents to the head inside the NP can be expressed by a variety of indirect cases, i.e. a special case as genitive function (Paulauskiene, 1994, pp.98–99). Moreover, the case form can be expressed by morphological or syntactic means (Paulauskiene, 1994, pp.98–99). Furthermore, consider that the grammatical means of indicating syntactic relations between the elements inside the NP (i.e. subject) are endings and inflexional suffixes, supplemented by structural words. In Lithuanian denoting certain relations to another word in the NP, a case means a form or modification of a decline word that is used to express a certain meaning. Therefore, case is maintained to be the relation between the head and the dependent modifiers in the grammatical construction. In Lithuanian other case forms as dative, accusative, instrumental, and locative can be marked on the dependent modifiers (adjectives, pronouns, participles, and numerals) in the NP specifying the relationship of the head in the head-marked structure. In Lithuanian the grammatical meaning of the different case form can be expressed by morphological or syntactic means (Paulauskiene, 1994, pp.98–99). Moreover, the lower the case position in hierarchy, the usage of case is determined lexically (Holvoet, Semeneiené, 2004, p.28). Finally, exploring the noun and its grammatical forms syntactically, the grammatical functions performed by the dependent elements as word classes in the NP structure are significant.

In English, the morphological marking of the relations on the dependent-modifiers inside the NP is not indicated. However, in Lithuanian the relations are always marked on the dependent-elements to show concord in gender, number, and case. The dependent modifiers can occur in adposition in regard to the head forming a nominal construction to express its grammatical and semantic relation to another constituent (verb) within a clause.

Methodology

The contrastive analysis is based on the content of scientific-technical literature (Bubulis, 2002) as viewed from the grammatical and semantic perspectives. English has a particular word order as the dominant order of subject-verb-object (SVO), and the subject position is always before the verb. In Lithuanian, being an inflectional type of a language, the word order is not as strict as in English: the use of the impersonal constructions, particularly the passive, is seen. The word order of the investigated sentences is stylistically neutral; however, the structure within the NP is very diverse. General aspects of grammatical relations inside the NP are presented; the noun as the head and the dependent modifiers have been analysed. In the analysis, the classification of the examples (from simple to complex) has been made regarding to the structure inside the NP. When describing the structure of the NP, it corresponds to determine the speech parts and their categories and then to present the grammatical relations between those parts being in preposition or postposition.

The analysed examples have been compared typologically to determine how the equivalents of the NP are implemented in the translation of scientific-technical texts from English into Lithuanian. The translated data are investigated on the level of contrasting language systems. The results of the translation analysis have a practical application in comparative syntax and typological linguistics.

Analysis

In English, the NP can contain only the head noun with the definite article or demonstrative pronoun as the pre-determiner in preposition. The first example (1a) in English presents the NP with the definite article preceding the head noun which is in the subject position before the verb. There is no special inflexion on the head noun reconstruction indicating common case which corresponds to nominative in English in regard to the verb being in the passive (1a), e.g.:

1(a) The reconstruction (Nom) will be finished within the summer of 2003.

1(b) Rekonstrukcija (Nom) bus baigtu 2003 metų vasarą.

1(c) Rekonstrukcija (Acc) baigs 2003 metų vasarą.

The Lithuanian example (1b) is supposed to be the clause construction of word-for-word translation. In Lithuanian (1b) the noun Rekonstrukcija is inflected for Nom case, gender, and number. In contrast to English, the Lithuanian example (1c) presents the word order with the retained object (or remaining Acc) Rekonstrukcija preceding the main verb in the active; the case depends on the meaning of the verb. This clause construction is chiefly peculiar to Lithuanian.

In the second example (2a) in English, the NP comprises the head noun law preceded by the pre-determiner the, e.g.:

2(a) However the law (Nom) does not regulate by what means these requirements are met...

2(b) Tačiau įstatymas (Nom) nereglamentuoja, kaip bus laikomasi šiu reikalavimy...

2(c) Įstatyma (Loc) nereglamentuojama...

The Lithuanian example (2b) is word-for-word translation. In contrast to English, the impersonal clause with the main verb in the passive is also possible in the Lithuanian example (2c): the case marking on the noun Įstatymas (Loc) is determined lexically based on semantic interpretation of the clause.

In the third example (3a) in English, the head noun answer is preceded by the pre-determiner the, e.g.:

3(a) The answer is likely to reflect customer’s (Poss) needs, expectations, and competitive activity.

3(b) Atsakyme (Loc) griežčiausiai atspindės kliento (Gen) poreikiai, lūkesčiai ir konkurencine veikla.

In Lithuanian, the translated example (3b) illustrates the NP after the reflexive verb in active and it is considered to be the grammatical nominal construction of the clause. The head noun kliento (Gen) shows the possessive relation to
the dependent post-modifiers *poreikiai*, *lūkesčiai*, *ir konurencinė veikla*.

The following example (4a) in English illustrates the structure inside the NP: the definite article *The* precedes the head noun *Ministry* in prepositional relation expressed by *of* with the dependent modifiers *Environment protection* that are in postposition, e.g.:

4(a) *The Ministry of Environment protection* approved them.

4(b) Jas patvirtino Aplinkos Ministerija.

In the Lithuanian example (4b) the relations between the words are indicated by the word forms; the NP *Aplinkos Ministerija* as the subject having all its inherent grammatical indicators takes the position after the main verb in the syntactic structure of the sentence.

In the example (5a) in English, the NP comprises the head noun *study*; the internal pre-head dependent *ethnographic* is the attributive modifier, which is also preceded by the dependent pre-determiner *an*, e.g.:

5(a) *An ethnographic study* (Nom) is currently being performed...

5(b) Šiuo metu (yra) atliekamas etnografinis tyrimas (Nom).

In the example (5b) in Lithuanian, the NP contains the head noun *tyrimas* in nominative and it has the position after the main verb in the passive: this clause construction is also typical to Lithuanian.

In the English example (6a) the NP comprises the head noun *providers* that is preceded by the internal dependent noun *service* with the adjective *Most* in pre-head position marking the zero relationship; the post-dependent modifier of place in industrialized countries is expressed in prepositional relation, e.g.:

6(a) *Most service providers* (Nom) in industrialized countries used to follow a traditional schedule ... 

6(b) Dauguma paslaugų teikėjų (Gen) pramoninėse šalyse dirbo pagal tradicinį grafiką.

In the Lithuanian example (6b), the NP covers the head noun *teikėjų* (masculine, plural) in genitive with the modifiers of place *pramoninėse šalyse* in post-position; the internal pre-modifier *paslaugų* (feminine, plural) is in concord with the head; however the pre-modifier *Dauguma* does not show concord to the head.

In the example (7a) in English, the structure of the NP is composed of the head noun *firefighters* in Nom with a morphological marker –*s* of plural, followed by the participial construction exposed to products of combustion being in postposition, e.g.:

7(a) *Firefighters* (Nom) exposed to products of combustion should wear self-contained breathing apparatus.

7(b) Gaisrininkai (Nom), patekė į aplinką, kurioje yra degimo metu išislyktusių medžiagų, turėtų dėvėti dujokaukes.

In the translated example (7b) in Lithuanian, the head noun *Gaisrininkai* bears the morphological marking of the nominative case, plural, and masculine gender. The head noun is followed by the participial construction with the relative clause *patekė į aplinką, kurioje yra degimo metu išislyktusių medžiagų* that provides some additional information.

In the example (8a) in English, the clause contains the two heads composing the separate NP structures that are joined by the conjunction *and*: the first head noun *Tendencies* with the dependent post-modifiers expressed by the participial construction of developing of transport volumes is in prepositional relation. The second head noun *weight* with its pre-modifier *comparative* expressed by the adjective comparative marks the zero relationship; the post-modifiers of different kinds of transport in the EU show the prepositional relation to the head, e.g.:

8(a) *Tendencies* (Nom) of developing of transport volumes and comparative weight (Nom) of different kinds of transport in the EU are illustrated in the tables.

8(b) Vežimų apimčių augimo tendencijos (Nom) ir atskirų transporto rūšių lyginamasis svoris (Nom) ES šalyse pateikti lentelėse.

In Lithuanian, adjectives and nouns share all their grammatical properties: they inflect for number, gender and case. Difficulties arise when translating such a complicated example (8b) into Lithuanian. The NP comprising the two head nouns *tendencijos* (Nom, plural, feminine) and *svoris* (Nom, singular, masculine) are joined by the conjunction *ir*. The dependent pre-modifiers *Vežimų apimčių, augimo* (Gen) in attributive position is expressed by nouns do not show case concord with the head noun *tendencijos*, though the pre-modifier *apimčių* is in gender concord with the head noun *tendencijos*. The pre-modifiers *atskirų transporto rūšių* (Gen) are not concording with the head noun *svoris* either. The dependent pre-modifier *lyginamasis* expressed by the adjective shows concord in case, gender and number with the head noun *svoris*.

The noun inside or outside the relative clause that denotes the thing also denoted by the clause, is referred to as the head of the relative clause. The relative clause can occur with the head word outside the relative clause; it can be referred to as externally headed relative clause (Dryer, 2005b).

The example (9a) in English presents the NP as the nominal group comprising the head noun *situations* with the modifier expressed by the adjective *prototypical* in pre-position, and the clause joined by the relative pronouns *that* and *who* in post-position, e.g.:

9(a) *Prototypical situations* (Nom) (that are) necessary to consolidate the rich set of interactions between users can also be viewed in terms of case.

9(b) Prototipines situacijas (Acc), reikalingas savykoms tarp vartotojų sąjungų, taip pat galima pavaizduoti panašiu principu.

In Lithuanian, the translated example (9b) presents the impersonal clause without a grammatical subject expressing the NP.

Based on the investigation, in the English examples the nouns as heads possess no distinctive case endings; whereas the word order is very strict and the prepositions are the essential vehicle to mark the relations within the
NP. In Lithuanian the diversity and flexibility of the word order in the clause are observable; the relations within the NP are expressed by the morphological marking that highlights the change in form; concord between the head noun and the dependent modifiers is sensitive to case, number, and gender; the use of the impersonal constructions, particularly the passive, is seen.

Conclusion

In English the arrangement of words in the clause is a vital factor in indicating the NP as the grammatical subject that precedes the main verb. In Lithuanian the order of words is irrelevant to the identification of the meaning of the clause; it is the inflectional form of the phrase which highlights the contrastive differences when making the interpretation of the clause.

Analysing English and Lithuanian clauses, the syntactic structure within the NP is a complex of interrelations between the head and its dependent modifiers.

In contrast to English, in Lithuanian the same content and the semantic meaning of the NP can be expressed by the different variable syntactic structure of the word order. English gives emphasis to the word order in regard to the dependent-marked structure inside the NP; in Lithuanian the grammatical relations are strongly based toward the both, head-marked and dependent-marked structure inside the NP.

References


Sources


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Gretinamoji žodžių tvarkos analizė anglų ir lietuvių kalbos daiktavardžio frazėje

Santrauka


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