

ŠIAULIAI UNIVERSITY
FACULTY OF HUMANITIES
DEPARTMENT OF FOREIGN LANGUAGES STUDIES

**IMPLICIT AND EXPLICIT NOMINALIZATIONS AS
COHESIVE DEVICES IN SCIENCE POPULAR TEXTS**

BACHELOR THESIS

Supervisor: Assoc. Prof. Dr. Solveiga Sušinskienė

Student: Laura Bačkytė

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INTRODUCTION

Language is a vital phenomenon which is used every day. It can be expressed either in spoken or in written form. The main difference between those forms is that the spoken language is more spontaneous, whereas the units of written language are not spontaneous, rather carefully written. According to Brown and Yule (1983), the speaker can use his voice to make a desirable effect, while the writer has to render everything through the written words. On the other hand, the writer has more time to overthink what he is writing and he can even change his mind about what he wants to say, “whereas the speaker is under considerable pressure to keep on talking during the period allotted to him, the writer is characteristically under no such pressure” (Brown & Yule, 1983:5). Nonetheless, in this research the written language will be given more attention. The main unit of the written language is a text, and the text is combined of sentences. Those sentences are usually required to form a unified text and here the phenomenon of cohesion comes into view.

In order to make the text seem like a unified whole, the cohesive devices are needed. One of them is the nominalization, which is of great importance, as it economizes the text. This phenomenon is essential in science popular texts, because it converts the long verbal sentences into short noun phrases, provides the text with cohesion, which ties the sentences together and makes the text a unified whole, and makes the text easier to understand for people with less scientific knowledge.

The relevance of the work.

Cohesion of the text has been a very prominent term in discourse studies. Hence, this term is popular in applied linguistics and language teaching. Therefore, it has been analysed by various linguists, such as Halliday (1976), Brown and Yule (1983), Dijk (1992), Salkie (1995) to mention the most prominent ones. Similarly, the phenomenon of science popular text has been an interest of many linguists: Koskela (1997), Fuller (1998), Skorczynska (2001), Schäffner & Wieseemann (2011) and others. Moreover, one of the cohesive devices, the nominalization as well as its functions in various types of texts have been discussed in greater detail by many scholars: Chomsky (1970), Heyvaert (2003), Halliday (2004), Sušinskienė (2009; 2012), Biber & Gray (2013) and others. Thus, a lot of works have been written on the cohesion and nominalization, but relatively little attention has been paid to the textual and cohesive functions of nominalizations in the science popularizing texts. Due to this reason, the problem which is analysed in this research, becomes the issue of great relevance.

The novelty of the work.

There are various types of discourses in the system of language: poetic, didactic, scientific, literary, etc. The focus of this paper is only on science popular texts and the textual functions of one of the most important cohesive devices of the text – nominalization.

The **subject** of this research paper is the usage of verb-based nominalizations in the *World War II* magazine.

The **aim** of the present study is to reveal the textual functions of nominalizations in science popular texts related to World War II. To achieve this aim the following **objectives** have been set:

1. To discuss the concept of science popular text.
2. To discuss the concept of nominalization and its textual functions.
3. To reveal the cohesive functions of nominalization and to classify the selected examples according to their cohesive functions in the text.
4. To indicate the frequency of nominalizations in the cover articles of *World War II* magazine.

To achieve the best results, the following **methods** have been used in the present research:

1. Descriptive theoretical literary analysis provided a possibility to overview the theoretical data concerning the case of nominalization and the phenomenon of science popular texts.
2. Meta-analysis was used in order to combine and compare the theoretical data of nominalization and science popular texts.
3. Descriptive analytical method was useful in analysing the usage of verb-based nominalizations in science popular texts.
4. Transformational method was employed in order to reveal the relationship between the underlying proposition and the respective nominalization.
5. Descriptive statistic method was used to indicate the frequency of certain features of nominalizations revealed by the analysis.

The scope of the research and research material.

For the purpose of investigation 422 examples of verb-based nominalizations have been drawn from *World War II* magazines. To be more specific, the analysis comprises of six articles.

The structure of the work consists of an introduction, the theoretical part, methodological considerations, the empirical part, conclusions and a list of references and sources. The introduction gives a brief overview of the phenomena of cohesion, nominalization, as well as phenomenon of science popular texts. Furthermore, the relevance, the novelty, the subject, the aim, the objectives, the scope and the material of the research, the structure of the investigation and the practical value of the work are defined in the introductory part. The theoretical part of the research paper consists of three sections: in the first section the phenomenon of science popular text is explained in greater detail, in the second section the concept of nominalization is defined, and in the third section the nominalization is presented as cohesive device in science popular texts. The section of methodological considerations describes the methods which have been applied in this paper and explains how they helped to conduct the research. In the empirical part some of the examples collected from *World War II* magazine cover articles are presented and analysed. Moreover, the conclusions are drawn in a separate chapter.

Practical value of the present work will be most relevant and useful for students conducting researches concerning the phenomena of cohesion in the science popular texts and the nominalization as their cohesive device.

1. THEORETICAL BACKGROUND

1.1 The Phenomenon of Science Popular Texts

There are two types of language: spoken and written. Spoken language can be described as an oral and spontaneous mix of words, which sometimes tends to be chaotic. Moreover, sometimes spoken language is thoughtless, because there is not much time to think about what to say. Written language is the opposite of the spoken language. It tends to be carefully written and considered. Text is considered to be a production of language of any passage: written or spoken and of whatever length. There are different types of texts, such as poetic, didactic, scientific, literary, etc. However, in this thesis only science popular texts will be described in more detail.

Scientific discourse is different from any other type of text. As well as all types of discourse, scientific discourse has its own features. One of them is the complexity of the text. There are many aspects that make the scientific text difficult to read and to understand. According to Halliday (1989), some of them would be technical taxonomies, lexical density, grammatical metaphor, syntactic ambiguity, etc. These characteristics tend to make a text more dense, ambiguous and understandable only for a certain audience. Though, scientific discourse can be divided into two subgroups. These two subgroups are presented in the figure below:

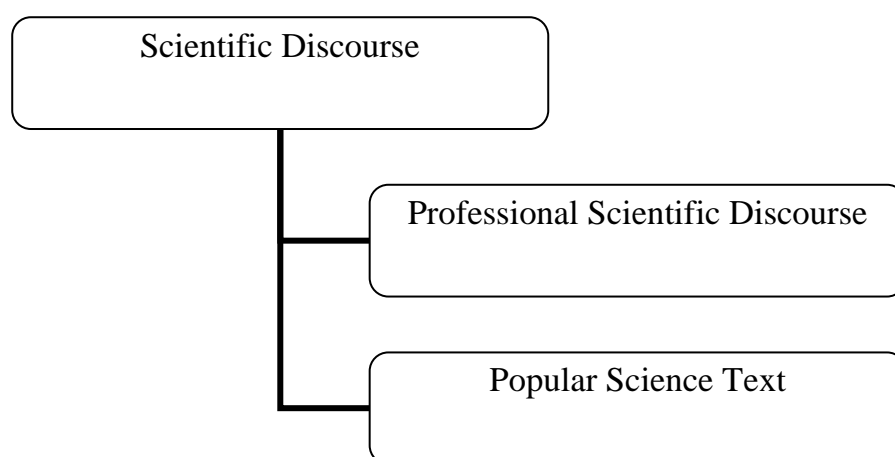


Fig. 1. The Classification of Scientific Discourse. (According to Koskela (1997)).

From the Figure 1 above it can be seen that scientific discourse can be divided into professional and popular science texts. Skorczynska (2001:46) objected that scientific discourse may be divided into three types:

- 1) Primary scientific discourse;

- 2) Discourse written for didactic purposes, and
- 3) Discourse written for non-formal scientific-educational purposes.

The first one is the professional scientific discourse, the second one is scientific discourse written for schools or universities (e.g. textbooks, course books), and the last one is the science popular text. The similarity between professional and popular science texts is that both are the publications of science, but despite that the differences between them also exist. To quote Koskela (1997:343), “the readers of scientific texts are better able to see implicit textual relations because they have more background knowledge, whereas the readers of popular science need explicitly marked textual relations in order to understand the text as a coherent whole.” It means that the readers of professional science texts have more knowledge and can easily understand implicit textual relations, while the readers of popular science are only able to understand explicit textual relations. Moreover, it is then clear that science popular texts gain coherence by using pronouns, synonyms, as well as other explicit cohesive devices, while in professional scientific texts the lexical repetition and implicit lexical relations are being used (Koskela, 1997:343). To be more specific, the readers of the science popular texts require more clearly connected sentences with explicit references backward or forward to the text, while for the readers of professional scientific discourse such references are not essential.

However, scientific discourse and popular science texts have been an object of interest for more than one author. Schäffner and Wiesemann (2001:91) claimed that lengthy specialist articles are primarily written and translated to the experts in the field, i.e. “an expert writing for other experts in a specific academic field,” while science popular texts are written to a wider public, they are of a less specialist nature and they cover a variety of topics related to science and technology. They also claim, that science popular texts are written by experts, or by journalists who have some expertise in the field and they are intended for laypeople. Similarly, Myers (2003) claimed that scientific discourse and science popular texts are different: the first one within scientific institutions, and the second one outside them. In addition, Fuller (1998:35) described science popular texts as translations from something difficult to understand and uninterpretable into something that everyone can understand. He also names some difficulties which arise to the authors of science popular texts: “Many popular science authors point to the problems of relating the complexity of the ideational (or referential) content of science in texts that should display none of the characteristically forbidding forms of academic science, such as high degrees of nominalisation, embedded causality, technical lexis and mathematical equations (Fuller,

1998:35).” In other words, it is said that popular science texts should be less complex than academic ones, and more understandable to laypeople. Nevertheless, while “translating” academic text into popular science text, it is not possible to remove all the features that are specific to the scientific discourse. In addition, the transformation from the science discourse to the science popular one is characterised by five main features (see Figure 2):

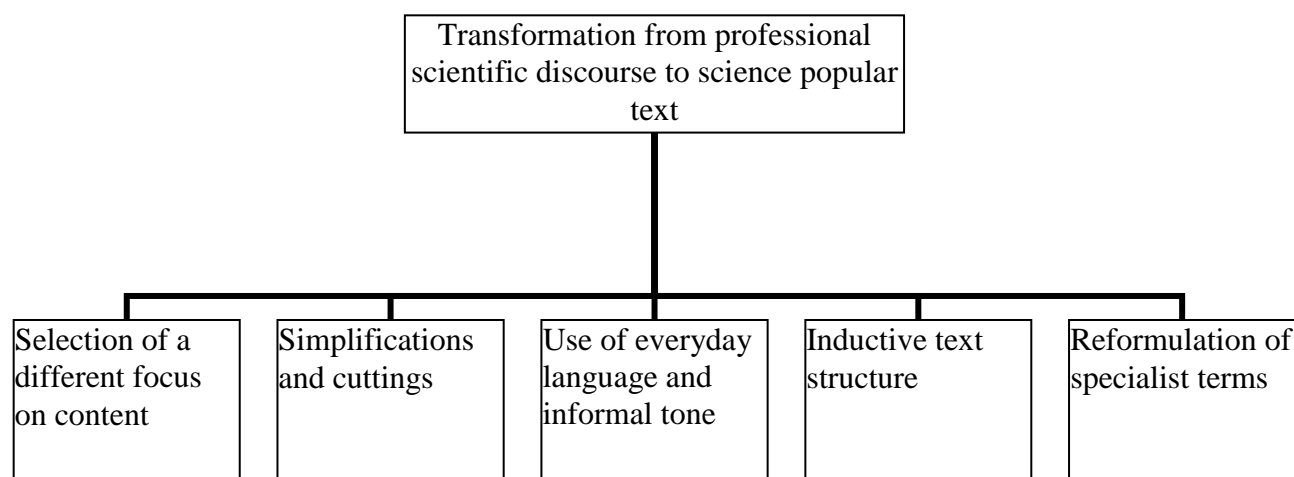


Fig. 2. Transformation of scientific discourse to science popular texts. (According to Skorczynska (2001:46)).

In Figure 2 there are divided five main peculiarities of science popular texts. The first one (*Selection of a different focus on content*) focuses on the content of the text. To be more specific, while transforming the professional scientific discourse into the science popular one, the focus on the content needs to be changed according to the audience. The second feature (*Simplifications and cuttings*) concentrates on words and sentences of the text. In order to make the scientific discourse understandable for laypeople, the scientific terms need to be explained in greater detail or simplified, and some things have to be omitted. Moreover, the writers of science popular texts, or “translators” of scientific discourse to the texts of science popularization, instead of using formal language, tend to use informal, everyday language. As regards the structure of such texts, they tend to begin with specific evidence and go on to general conclusion, and the last feature of the science popular texts (*Reformulation of specialist terms*) is the transformation of the terms into simpler words. In general, Myers (2003) described this transformation as a conveyance of scientific knowledge to a wider audience.

To sum up, the science popular texts are the translations from scientific discourse. Even though they tend to have many differences, as the science popular texts are intended

for a wider audience than scientific discourse, the similarities between them exist. One of them is the device called nominalization – it appears in both types of texts.

1.2 The Concept of Nominalization

Language is an unstable phenomenon which changes all the time. Every day each language adopts new words from other languages or creates new words from the ones, which it already has. This is where the case of nominalization comes into view.

Several researchers have written on the subject of nominalization and its advantages to scientific discourse, as well as science popular texts: Biber and Gray (2013), Sušinskienė (2009; 2012), Heyvaert (2003). Biber and Gray (2013:1) stated that “one of the most distinctive linguistic characteristics of modern academic writing is its reliance on nominalized structures.” It can be said that nominalization is an inherent feature of scientific discourse. Moreover, Sušinskienė (2012:134) claimed that “nominalization is one of the lexico-grammatical structures causing a higher degree of complexity in scientific texts, i.e. these structures serve as complex encodings of processes into nouns and they contribute to the increase of complexity in texts.” It can be noted that nominalization is an important link in science popular texts, which makes it more complex and more academic. Any scientific discourse could dispense with nominal structures. They are very important as cohesive devices in the previously mentioned texts, as Halliday (1988:195) pointed out, “in the scientific discourse, nominalization as a process is used to “create technical taxonomies; it helps the writer to relate one process to another and thus create chains of reasoning.” What is more, nominalizations are also used in science popular texts in order to economise on space, because they tend to shorten long verb expressions into short noun expressions. It can be claimed that nominalization is an integral part of scientific discourse and science popular texts, because without it those texts would be long and their language would lose its scientific nature.

Nominalization is a phenomenon widely used in a variety of texts. However, there is a wide range of different types of nominalizations. According to Sušinskienė (2009), nominalization is a noun derived from verb or adjective, or as the author writes herself, there are nominalizations of “processes” and “qualities”. The nominalizations made from verbs are considered to be nominalizations of “processes”, and nominalizations derived from adjectives are the nominalizations of “qualities.” They can also be classified according to their level. The phenomenon of nominalization can be divided into clause or

word level (Heyvaert, 2003). Moreover, the nominalizations at clause-level can be divided into nominalizations that contain part of a clause or a full clause (e.g. *her signing the contract, that she signed the contract*), while nominalizations at word level are divided into morphologically derived from verbs or adjectives (e.g. *develop* → *development*, *angry* → *anger*) and the ones that have been simply converted to nouns, and thus are called conversions (e.g. *increase* → *increase*, *use* → *use*, *transfer* → *transfer*) (Heyvaert, 2003; Biber and Gray, 2013). The nominalizations at word level can also be divided into two types according to their suffixes: gerundive and derivational. Gerundive nominalizations are made by adding a gerund suffix *-ing* to a verb, while derivational nominalizations have a wider range of suffixes (see Table 1).

Table 1. Suffixes of Derivational Nominalizations

Suffixes of Derivational Nominalizations	Examples
-ment	<i>Engage</i> → <i>engagement</i> , <i>develop</i> → <i>development</i>
-ure	<i>Close</i> → <i>closure</i> , <i>fail</i> → <i>failure</i>
-age	<i>Marry</i> → <i>marriage</i> , <i>break</i> → <i>breakage</i>
-er/-or	<i>Advise</i> → <i>advisor</i> , <i>drive</i> → <i>driver</i>
-ion/-tion/-sion	<i>Decide</i> → <i>decision</i> , <i>fuse</i> → <i>fusion</i>
-ery	<i>Discover</i> → <i>discovery</i> , <i>forg</i> → <i>forgery</i>
-ance/-ence	<i>Patient</i> → <i>patience</i> , <i>resist</i> → <i>resistance</i>
-al	<i>Arrive</i> → <i>arrival</i> , <i>refuse</i> → <i>refusal</i>
-th	<i>Die</i> → <i>death</i> , <i>grow</i> → <i>growth</i>

In addition to different suffixes, nominalizations can also be created by deriving them from a verb (e.g. *choose* → *choice*, *believe* → *belief*) and by using the conversion (the same verb form is used as a noun) (e.g. *search* → *search*, *use* → *use*). The latter case might be called zero-derivation. Hence, two main types of derivational nominalizations exist. The first one requires the derivational suffix to create the noun, and the second one is called zero-derivation, which means that the same verb is used as a noun without any changes. Chomsky (1970:187) assessed the gerundive and derivational nominalizations as of particular importance, however, they have many differences. As the most striking ones he marked those, which deal with “productivity of the process in question, the generality of the relation between nominal and the associated proposition, and the internal structure of

the nominal phrase” (Ibid). To put it in simpler terms, the gerundive nominalizations can be formed by simply adding the suffix *-ing* to the verb and the relation between the nominalization itself and the verb from which that nominalization was made is quite regular, while the derived nominalizations have many different suffixes and the relation between the nominalization and its proposition is varied. Moreover, the gerundive nominalizations do not have the internal structure of a noun, while the derived nominalization has. Consider:

(1) John **has refused** the offer.

(2) John’s **refusing** the offer.

(3) John’s **refusal** of the offer (ibid).

The first example is the simple sentence without any nominal phrases, the second one contains the gerundive nominal *refusing* and the third one presents the derived nominal *refusal*. As it can be seen from the examples above, (2) and (3) examples dispense with grammatical tenses, using nominalizations instead. Still, the (2) example has a form of a verb, while the (3) one is a genuine noun. In general, it can be noted that the nominalization, instead of verb phrases provides the text with noun phrases that shorten and simplify the sentences.

In addition, Halliday (2004) introduced the phenomenon of nominalization with the term of grammatical metaphor. This term is used to present the nominalization, because “nominalization is presented as a major resource for the creation of ‘metaphorical’ rather than ‘typical’ or ‘congruent’ lexicogrammatical realizations of semantic features” (Heyvaert, 2003:65). Banks (2003) stated that grammatical metaphor has many forms, and the nominalization is one of them. To be more specific, Halliday (2004) distinguished two types of grammatical metaphors: the interpersonal metaphor and the ideational metaphor. The nominalization belongs to the latter type. As the author presented himself (by giving two examples: (1) *press* -> *pressure*, (2) *hot* -> *heat*), these nominalizations are examples of ideational metaphors “where processes and qualities are construed as if they were entities” (Halliday, 2004:637). It means that nominalization expresses the adjective or a verb by a noun, and this phenomenon is called grammatical metaphor because different parts of speech, i.e. verb and adjective, are expressed through yet another part of speech – the noun. As Ravelli (2003:48) pointed out, the grammatical metaphor has a very prominent place in the theory of language, and “it is central to an understanding of language, and to an understanding of the relationship between language and context.” To

sum up, the phenomenon of nominalization is a type of grammatical metaphor, which is essential in understanding the language.

In conclusion, it can be stated that nominalizations and science popular texts are deeply related phenomena. Science popular texts require exactness and short sentences, and nominalization provides it. The phenomenon of nominalization is important to those texts, while it compounds several words into one, which helps to avoid surplusage, and it gives complexity to the text, which is also an important feature for the texts related to science. Moreover, the nominalization functions as a cohesive device, which connects the sentences and makes the text a unified whole, which is an important feature for all kinds of texts.

1.3 Nominalization as a Cohesive Device in Science Popular Texts

Cohesion is a very important phenomenon in all sorts of texts. It gives coherence to the text and makes it easier to understand. To put it in other terms, “the concept of cohesion is a semantic one; it refers to relations of meaning that exist within the text, and that define it as a text” (Halliday & Hasan, 1976:31). In order to bring cohesion to the text, the cohesive devices are needed.

The phenomena of cohesion and coherence have been widely discussed by a range of scholars: Halliday & Hasan (1976), Brown and Yule (1983), Dijk (1992), Salkie (1995), Halliday (2004) Sanders & Maat (2006), Sušinskienė (2009; 2012) to mention the most prominent ones. These two terms are strongly related as they both refer to the meaning of the text. On the other hand, their main difference is that the cohesion deals with lexical and grammatical elements, which function as connectives of the text, while coherence is understood as the knowledge of the speaker and the listener. Dijk (1992:93) stated that the phenomenon of coherence is not well-defined and requires an explanation. Hence, he explains it as “a semantic property of discourses, based on the interpretation of each individual sentence relative to the interpretation of other sentences” (ibid). Brown and Yule (1983:224) pointed out that “although there might be no formal linguistic links connecting contiguous linguistic strings, the fact of their contiguity leads us to interpret them as connected.” It means that we fill any missing connections within the sentences with our knowledge. Moreover, Salkie (1995:X) asserted that the discourse which does not hang together is *incoherent*. According to him, the coherent text has certain words and expressions in it that connect the sentences together. Those are called cohesive devices

(ibid). And here the phenomenon of cohesion comes into view. The cohesion can be described as a semantic relation within the text, which links all the sentences together and makes it a unified whole. Bussmann (2006:199) also defined it as a reference “to the various linguistic means (grammatical, lexical, phonological) by which sentences ‘stick together’ and are linked into larger units of paragraphs, or stanzas, or chapters.” It is noted that cohesion has three layers: grammatical, lexical and phonological. Though Halliday & Hasan (1976:6) argued that “cohesion is expressed partly through grammar and partly through vocabulary” and therefore they distinguished only two types of cohesion: grammatical and lexical. Moreover, according to Sanders & Maat (2006), there are two types of cohesion distinguished as well (see Figure 3):

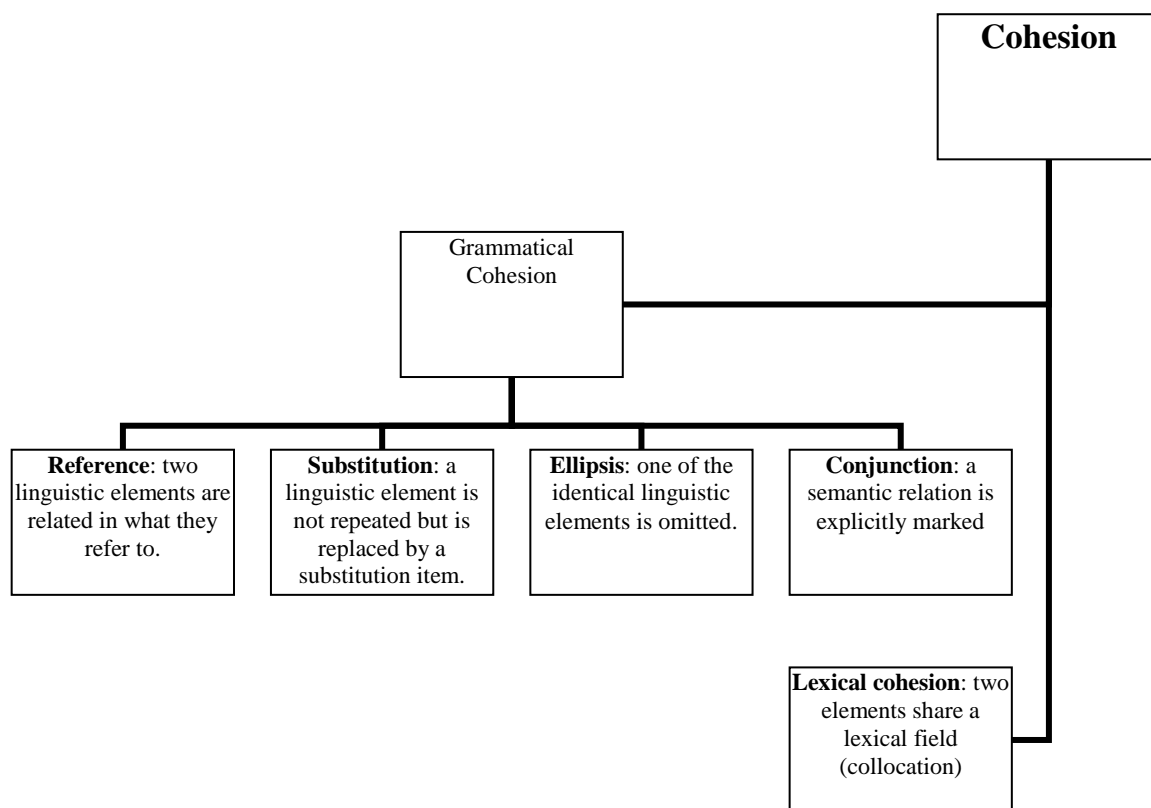


Fig. 3. Types of Cohesion. (According to Sanders & Maat (2006:591)).

In the Figure 3 above, there are two main types of cohesion distinguished. One of them is lexical cohesion, which is used in order to add ideological message to the text, and the second one is grammatical cohesion, which tends to add structure to the text. Moreover, the latter is distinguished into four more types. Sanders & Maat (ibid) provided each of those types with examples, in order to make them easier to understand:

1. Reference: *Jan* lives near the *park*. *He* often goes *there*.

The word *He* refers to *Jan*, and the word *there* refers to the word *park*.

2. Substitution: Daan loves strawberry *ice-cream*. He has *one* every day.

The word *ice-cream* in the first sentence was changed by the word *one* in the second sentence.

3. Ellipsis: All the children had an *ice-cream* today. Eva chose strawberry, Arthur orange and Willem too.

The word *ice-cream* from the first sentence was omitted in the second one. Only the characteristics of ice-cream have been mentioned.

4. Conjunction: Eva walked into town, *because* she wanted an ice-cream.

The word *because* connects two sentences into one. Without conjunction there would be two sentences (e.g. Eva walked into town. She wanted an ice-cream.)

Even though cohesion is a semantic relation, it is still realized through the lexicogrammatical system and at this point the distinction can be drawn that some forms of cohesion are realized through grammar and others through the vocabulary (Halliday & Hasan, 1976). At this point the cohesive devices appear. There are four groups of cohesive devices, and each of them has its own set of devices. The four groups of cohesives are as follows: grammatical cohesives, lexico-grammatical cohesives, lexico-syntactic cohesives and lexical cohesives. Valeika (1985:73-102) classifies them as follows:

- 1) grammatical cohesive devices: substitution, ellipsis and word order;
- 2) lexico-grammatical cohesives: articles, pronouns, conjunctives, conjunctive adjectives, particles, modal words, quantifiers, nominalizations;
- 3) lexico-syntactic cohesives: periphrasis, parenthesis;
- 4) lexical cohesives: lexical repetition, synonyms, antonyms, general nouns, hyponyms, paronyms, converses.

It is noted that nominalization is one of many cohesive devices. As it was previously mentioned, this device provides the text with shorter and more clearly expressed sentences. This kind of sentences usually forms a more academic atmosphere of the text, because the long and hard to understand sentences with long verbal expressions are transformed into the shorter sentences with nominal expressions. The main motive for the occurrence of nominalizations is the economy of the text. But there are also other motives, such as cohesion and coherence of the text. Cohesion provides text with logical and semantic relation within the sentences. To be more specific, those relations are called logico-semantic (Sušinskienė, 2012).

The logico-semantic cohesion defines the connection of the constituent expressing the same meaning in the text, i.e. the word in the preceding sentence means the same as the word in the succeeding sentence. However, it may differ in its form. Moreover, both words appearing in the preceding and succeeding sentences must be compatible semantically. In this case, the nominalization plays a significant role, because it may be made either from the verb or from the adjective and in the succeeding sentence it may appear in the form of a noun. The nominalization of logico-semantic cohesion may be divided into two main groups – explicit and implicit, and explicit nominalizations can be subdivided into explicit anaphoric and explicit cataphoric.

Generally, the explicit and implicit units of the text function as the references within the text. Those references may be inside or outside the discourse. In this case, the explicit units are the references inside the text, i.e. endophoric references, and the implicit units are the references outside the text, i.e. exophoric references (Paltridge, 2006:129). Furthermore, Sušinskienė (2006:141) claimed that when nominalizations are used with their source verb, the logico-semantic ties are marked between them, and when the nominalization occurs without its source verb in the text, “the logico-semantic ties are established between the ‘pre-text’ or the ‘deep-text’ (not an actually occurring text) and the stretch of the actually occurring text.” To put it in simpler terms, the logico-semantic ties of the explicit nominalization can be found within the text, whereas the logico-semantic relation between the implicit nominalization and its source verb requires knowledge outside the text. The explicit reference may be divided into two subgroups: anaphoric reference and cataphoric reference. The first one points backwards in the text, and the second one – forwards. In the case of nominalization, the anaphoric ones point backward to their source verb, and the cataphoric ones refer to their proposition forwards in the text. This provides the discourse with meaning and connectedness. The implicit nominalizations have no source verb in the text, and therefore they are more difficult to understand and to interpret. However, this will be discussed in greater detail in the empirical part of the research.

To conclude, the phenomenon of cohesion is very important in all kinds of texts as it provides the text with coherence and connects all the sentences. The nominalization is one of many cohesive devices, which may connect the sentences logico-semantically. This type of connection is important in writing and understanding the science popular texts, as well as all other types of texts.

2. METHODOLOGICAL CONSIDERATIONS

The analysis is based on the verb-based nominalizations collected from *World War II* magazine. This magazine focuses on the actions that have taken place in the World War II period. The articles are vivid, evocative and revealing, concentrating on soldiers, leaders and little-known incidents of the history's greatest modern conflict. The top historians and journalists provide the magazine with every aspect of the World War II, which makes it the authoritative magazine. For the analysis 6 cover articles from 2012 issues of January/February, March/April, May/June, July/August, September/October and November/December have been taken regardless to their topic.

The research focuses on the cohesive functions of nominalizations. First of all, descriptive analytical method was used in order to identify and then to classify the nominalizations according to their role in the text, i.e. explicitness and implicitness. The formation of nominalizations was checked in the dictionary according to their material suffixation with such suffixes: -age (e.g. *break* -> *breakage*), -al (e.g. *arrive* -> *arrival*), -er/or (e.g. *drive* -> *driver*), -ion/sion/tion (e.g. *form* -> *formation*), -ance/ence (e.g. *resemble* -> *resemblance*), -ery (e.g. *discover* -> *discovery*), -ment (e.g. *engage* -> *engagement*), -th (e.g. *breathe* -> *breath*), -ing (e.g. *fight* -> *fighting*), -ure (e.g. *disclose* -> *disclosure*), zero suffixation (e.g. *search* -> *search*) and other cases of derivation (e.g. *defend* -> *defense*). The nominalizations with zero suffixation (as well as with material suffixation) were checked in *Macmillan English Dictionary* (2014). If a verb meaning was given first in the dictionary, it was the main evidence that the word was nominalization and in this case it was included in the corpus under investigation. Otherwise, if the first meaning of the word was a noun, the word was not used, as it was not the verb-based nominalization. The transformational method was employed in order to reveal the relation between the underlying proposition (i.e. the source verb) and the succeeding nominalization. They were grouped into two main types – explicit and implicit, and the explicit ones were subdivided into explicit anaphoric and explicit cataphoric nominalizations. The explicit nominalizations are those, which have the proposition they are made of somewhere in the text, and the implicit nominalizations have no proposition in the text. The explicit anaphoric nominalizations are those with the source verb backwards in the text, and the explicit cataphoric are the ones with the source verb forwards in the text. Lastly, the coding method was used to indicate the frequency of particular features of nominalizations revealed by the investigation.

The descriptive analyses of the data (tables using a spreadsheet program MCEExcel) were rendered within the frequency distribution. The percentage was calculated applying the following mathematical formula: $X=N:Z*100\%$ where X – the percentage of number N; N – the number, which percentage needs to be found; Z – the number, which denotes 100%.

After observing the methodology of the research, the following section will investigate the verb-based nominalizations found in the present research.

3. IMPLICIT AND EXPLICIT NOMINALIZATIONS AS COHESIVE DEVICES IN SCIENCE POPULAR TEXTS

This chapter focuses on the textual functions of verb-based nominalizations. An attempt will be made to analyse the contribution of nominalizations to the cohesion of the science popular text. To substantiate the research some of the collected examples are provided.

3.1.EXPLICIT NOMINALIZATIONS

As it was previously mentioned, nominalizations fulfil many textual functions, and some of them are the cohesive ones. One of the cohesive functions is the explicitness and implicitness in the text. , in this section the explicit nominalizations will be analysed in greater detail.

To begin with, the nominalizations can be subdivided into two main types (see Figure 4):

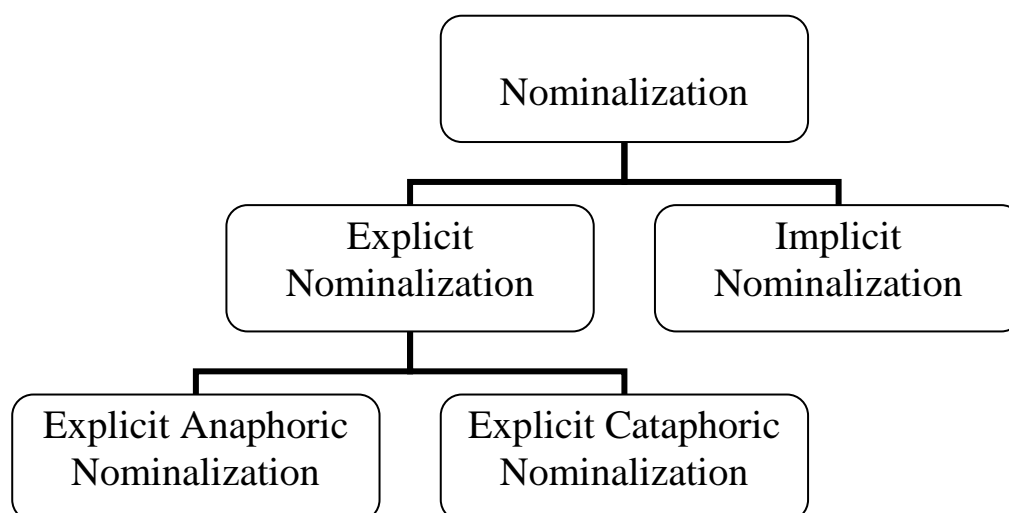


Fig. 4. Types of Nominalizations Found in the Corpus under Investigation.

In the Figure 4 above, it can be seen that the nominalization can be divided into explicit and implicit, and the explicit nominalizations can be subdivided into explicit anaphoric and explicit cataphoric nominalizations. The phenomenon of explicit nominalization can be explained as a reference within the text. To be more precise, the preceding proposition refers to the succeeding nominalization, or vice versa. It depends, whether it is anaphoric or cataphoric nominalization. Dijk (1992:108) compared the explicit units of the text to the completeness of it, because with the explicit references the text has no missing links and everything is put into the text, nothing is omitted.

Additionally, the explicit referencing may also be called endophoric or textual reference, because it is a reference within the text (Halliday & Hasan, 1976). The following examples are presented in order to illustrate the explicit nominalizations. Consider:

- (1) *Twenty-eight days after D-Day, Patton arrived on the shores of France. <...> The first specific report of Patton's **arrival** reached them on July 22, when the 17th SS Panzergrenadier Division reported a rumor from Allied prisoners that Patton and Third Army were in the area; the prisoners described Patton as "the great tank commander," who had met with success in Africa (Yeide, 2012).*
- (2) *For their aircraft to launch, the Hornet and the Enterprise would have to turn into the wind, away from the target, and build up speed to at least 25 knots (nearly 29 mph). <...> It would still be a long flight to the target, but the later **launch** should allow the attack planes sufficient time to get the job done and get back safely (Symonds, 2012).*

The sentences of the above text are tied together and the connection between them is achieved through the meaning. The finite form of the verb *arrive* from the first example refers to the succeeding nominalization *arrival*, and the infinite form of the verb *launch* refers to its respective nominalization with zero suffixation *launch*. Furthermore, the nominalization *arrival*, in the text-opening sentence is expressed by the verb *arrive*, and in the text-developing sentence by the nominalization of the same verb. The same connection of the sentences is used in the second example: the nominalization with zero suffixation *launch* in the first sentence of the text is expressed by the verb *launch* and in the second sentence by the nominalization of the same verb. Hence, this text is a proper example of the explicit nominalization. Consider two more examples:

- (3) *German historian Rainer F. Schmidt, in his 1997 book on the Hess flight, asserts that MI6 agents—operating through Switzerland—made contact with Hess's confidants. <...> In October 1942, the head of Czech military intelligence in London made the same **assertion** in a report to Moscow: British intelligence had tricked Hess into making his trip by posing as Hamilton in correspondence with him (Padfield, 2012).*
- (4) *If he could survive and return with photographs, he would have bagged arguably the greatest picture exclusive of the 20th century: shots of the first GIs landing in France on D-Day. <...> "My beautiful France looked sordid and uninviting [and] a German machine gun, spitting bullets around the barge, fully spoiled my **return**," he recalled (Kershaw, 2012).*

The relation in the examples above is established through the meanings of *assert* and *return*, and the connection between the nominalizations and their preceding propositions. The word *assertion* discloses the nominalization of the verb *assert*, and the nominalization *return* with zero suffixation is created of the verb *return*. It may be stated that such references provide the text with cohesion, because they connect several sentences with two interchangeable words.

In addition, the place of explicit nominalization and its underlying proposition may vary within the sentences. Consider:

- (5) *Goebbels's December 9 entry summarizes **developments** in East Asia and the Pacific, mentions the coming Reichstag session, and repeats his assessment that the United States no longer will be able to aid England and the Soviet Union. "We can be extraordinarily satisfied with the way things have developed," the Nazi propagandist says in conclusion (Weinberg, 2012).*
- (6) *This may help to explain his **flight**. Karl Haushofer seemed to imply it when he said after the war that his friend had flown to Britain because of "his own sense of honor and his desperation at the murders going on in Germany"—likely a reference to routine atrocities against Jews and Poles in German-occupied Poland (Padfield, 2012).*

The examples above again show the mutually connected sentences sharing the same meaning of the processes of *development* and *flight*. Though these examples are similar to the previous ones by having the nominalization and the verb it is made of, it is still different, because the place of nominalization has changed. In the previous examples firstly appeared the verb, and only then the succeeding nominalization. In these cases, the nominalization appears first, and only in the following sentence the proposition of nominalization. Thus, the difference between those examples lies in the position of the nominalization. Accordingly, the explicit anaphoric and the explicit cataphoric nominalization need to be discussed in the following sections.

3.1.1. Anaphoric Nominalizations

There may be various types of nominalizations distinguished, but one type, which is very significant in providing the text with cohesion, is anaphoric nominalizations. Anaphora is a very often used term in a variety of spheres, e.g. in linguistics, in psychology, in philosophy, etc. Yet, in this research only the linguistic anaphora will be given more attention.

To quote Botley & McEnery (2000:2), “anaphora allows a speaker/writer to recall to the consciousness of a hearer/reader entities or concepts that have already been introduced into a discourse.” Similarly, Halliday & Matthiessen (2004:552) noted that anaphoric reference “points ‘backwards’ to the history of the unfolding text, that is, to a referent that has already been introduced and is thus part of text’s system of meanings.” In general, the anaphoric reference gives cohesion to the text, while it connects several words into one meaning. Furthermore, Botley & McEnery (2000:3) distinguished two main functions of the phenomenon of anaphora in linguistics:

- 1) It tells the hearer/reader “about how discourse is constructed and maintained – how linguistic patterning above and beyond the sentence is arranged.”
- 2) “Anaphoric features function to bind structural elements together, and therefore can play an important role in the syntactic description of languages.”

To be more specific, the main functions of the anaphora are the construction of the discourse and the connection within the text.

The case of anaphoric nominalization is similar as that of anaphora. In this case, the words connected in meaning are the verb, and the nominalization made from that verb. In order to illustrate the anaphoric nominalizations, the following examples are given. Consider:

- (7) *This was the state of things when Nimitz learned that the Japanese were sending their so-far-undefeated—indeed not yet seriously challenged—Kido Butai, the Imperial Navy’s mobile strike force, to attack Midway Atoll, an American-held territory 1,100 miles northwest of Hawaii. He knew about the impending **attack** thanks to the work of a dedicated group of code breakers that had predicted it would come toward the end of May or early June, with four or possibly five carriers* (Symonds, 2012).
- (8) *On a good day, the Marines only lost 10 percent of their men. On a bad day, **losses** went up to 15 or 20 percent* (Campbell, 2012).

From the examples above it can be seen that both sentences are related by the words *to attack* and *attack*, and *lost* and *losses*. In the first sentence of the first example appears the infinite verb *to attack*, and in the second sentence its nominalization *attack* with zero suffixation. In the second example, the sentences are connected by the verb *lost* in the first sentence and its nominalization *losses* in the second sentence. Hence, the nominalization from the second sentence refers to the verb from the first sentence, and this is a proper example to substantiate the anaphoric reference. Consider two more examples:

- (9) *Released by Spruance, McClusky's group of 32 dive-bombers flew southwest toward the coordinates McClusky had calculated that morning. It was a long **flight**, and the wait over the task force and the climb to altitude had burned up a large amount of fuel* (Symonds, 2012).
- (10) *The surprise for Hitler was not that Japan attacked the United States, but how and when. <...> Neither had ever notified Tokyo in advance of intended **attacks**, either* (Weinberg, 2012).

The examples above point out another case of anaphoric nominalization. The sentences of the above examples are tied together and the connection is created through the nominalizations *flight* and *attacks* in the second sentences and their antecedent verbs *flew* and *attacked* in the first sentences. The relation is established through the meanings of *flight* and *attacks* and their reference backwards to their propositions *flew* and *attacked*. Thus, anaphoric nominalizations provide the text not only with cohesion and connectedness, but also with meaning, as several words are being used interchanging their forms.

Furthermore, anaphoric nominalizations may vary according to their distance within the text (see Figure 5):

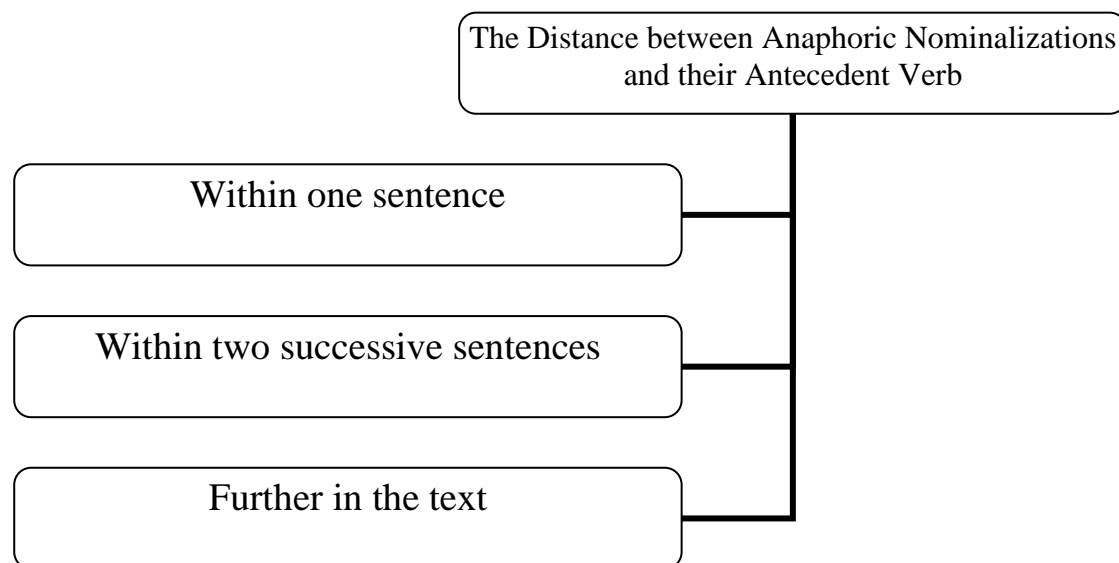


Fig. 5. The Distance between Anaphoric Nominalizations and their Antecedent Verb within the Text.

In the Figure 5 above it is noted, that nominalizations, according to their distance in the discourse, may be divided into three groups: the nominalizations that are in the same sentence with their proposition, the verbs that come in two successive sentences with their nominalizations and the nominalizations that are moved further away from their

propositions in the text. Accordingly, all three types of distances of nominalizations and their propositions will be provided with corresponding instances.

1. The nominalization and its proposition within one sentence:

- (11) *If Hess was carrying a peace proposal draft that offered Britain a way out of its dicey military situation, and, if the terms included a German **offer** to evacuate certain occupied countries, Churchill almost certainly would have had to conceal it to hold his government together* (Padfield, 2012).

The example above points out the relation of the verb *offered* and its nominalization *offer*. Even though the nominalization *offer* appears further in the text, it is still in the same sentence, and it refers back to its antecedent verb.

2. The nominalization and its proposition within two successive sentences:

- (12) *Despite the Allies' best efforts, the Germans did not decide until mid-May—months after they concluded that the Allied invasion would land at Pas de Calais or in Belgium—that Patton had indeed taken command of FUSAG. However, his leadership of the supposed landings at Pas de Calais appears to have been incidental to the strategic **conclusions** the Germans reached regarding the Allied invasion* (Yeide, 2012).
- (13) *The führer was convinced that Germany would win the war, but he had never wanted to fight Britain. For his part, Hess said, he wished to stop the unnecessary slaughter that would occur if the **fighting** continued, and he asked Hamilton to gather leading members of his party to discuss peace proposals* (Padfield, 2012).

The relation is created between the verbs *concluded*, *to fight* and their respective nominalizations *conclusions* and *fighting*. As it may be seen from the above examples, the nominalizations and their antecedent verbs are located in two sentences that go immediately one after another. Correspondingly, the two sentences are connected with each other by relation created through the meanings of *conclusion* and *fighting*.

3. The nominalization located further from its proposition in the text:

- (14) *As the German armies withdrew east from the invading Allies, these commanders patched together a semblance of the flexible defense they had used against the Soviets, using mobile reserves and trading space for time and survival. Patton, for his part, fully intended to make an unrelenting push to the Rhine after Normandy. He succeeded for a short time, brazenly gambling that the speed of his advance and Allied air superiority would keep the Germans too*

*off balance to attack his unprotected flank. But Third Army's advance was soon slowed by gasoline and ammunition shortages as Third Army reached the bank of the Moselle River, giving the Germans time to organize their defenses. Patton finally began receiving adequate supplies on September 4, after a week's excruciating pause, and Third Army established a bridgehead across the Moselle on September 29—before halting again to wait for supplies. The fortress city of Metz did not fall until December 13, holding up Third Army long enough for the Germans to make an organized **withdrawal** behind the Saar River, setting the stage for the Battle of the Bulge (Yeide, 2012).*

- (15) *Hess steered west but, despite a full moon, failed to find Dungavel, and flew on and out over the Firth of Clyde coastal waters before turning back inland. By then his fuel tanks were dry; he had to bail out. He floated down on a moonlit Scottish field barely 12 miles from the duke's estate, overcome, he later wrote, with "an indescribable sense of elation and triumph." His plane crashed a short distance away and burst into flames. Hess's **flight** was a feat of courage, skill, and endurance (Padfield, 2012).*

The instances given above signify the third case of anaphoric nominalization, which appears further away in the text from its antecedent verb. Even though the distance is longer, the relation between the two words is still created. The nominalization *withdrawal* refers back to its precedent verb *withdrew* and accordingly connects the sentences providing the text with cohesion. Similarly, in the second sentence the nominalization *flight* refers backwards to its congruent form *flew*. The frequency of the different types of distances between the nominalization and its source verb are illustrated in the Figure below:

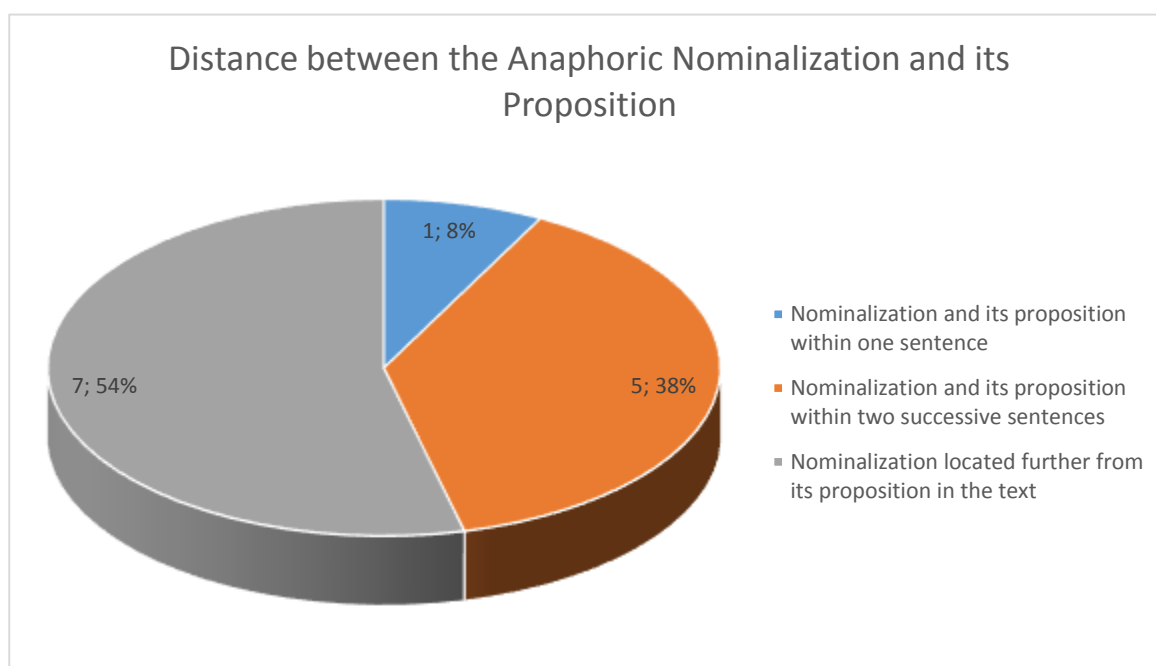


Fig. 6. Distance between the Anaphoric Nominalization and its Proposition.

The frequency of different types of distances between anaphoric nominalizations and their antecedent verbs are shown in the Figure 6. The most frequent type of distance is when the nominalization is located somewhere further in the text from its proposition, it makes 54% (7 tokens). Less frequent type is the one, when nominalization and its proposition are in two successive sentences, this type makes 38% (5 tokens), and the rarest type of distance between the nominalization and its source verb in the corpus under investigation is when the nominalization and its proposition are in the same sentence. It makes only 8% (1 token).

To sum up, the anaphoric nominalization tends to point back to its precedent verb thus connecting both or one sentence where the verb and its nominalization are. In general, there is no difference whether the nominalization and the antecedent verb lie in the same sentence, or in different sentences, it still provides those sentences with cohesion, and allows the hearer/reader understand them as the whole, meaningful texts.

3.1.2. Cataphoric Nominalizations

Thus far the anaphoric nominalizations that point back to their underlying propositions have been discussed and analysed in greater detail. Nevertheless, there may

also be the opposite reference, which points not backward, but forward. This kind of reference is called cataphoric reference.

Cataphora, oppositely to anaphora, may be defined as a reference to the further going text. To cite Halliday & Matthiessen (2004:552), cataphoric reference points “‘forwards’ to the future of the unfolding text, that is, to a referent that is yet to be introduced.” Brown & Yule (1983:192), likewise the previous authors, also develop the term of cataphoric reference as the relations that “look forward in the text for their interpretation.” To put it in simpler terms, the cataphoric reference is the reference inside the text that points to the future of the text and by doing so, creates cohesion of the discourse. However, it is said that anaphoric references are much more common than the cataphoric ones. According to Beaugrande (2004), “cataphora is most common inside the single sentence.” Moreover, cataphora can also fulfil two main functions (ibid):

- 1) Cataphora can announce a large block of content that spans a series of utterances;
- 2) It can be used to create a deficit of knowledge that will be filled later.

To be more precise, these functions are necessary in order to create connection within the text and within the sentences.

Cataphoric nominalization functions as the case of cataphoric reference. This type of nominalization, as well as anaphoric, is connected with its antecedent verb, only their positions differ. In the case of anaphoric nominalization, the verb goes first and it is followed by its nominalization, and in the case of cataphoric reference, the nominalization appears first and is followed by its precedent verb. To instantiate this type of nominalizations, some examples will be provided. Consider:

- (16) *The **photographer** looked stunned by what he had seen, gray-faced and still in shock. After changing his film again, he photographed the first American wounded to be taken off Omaha in LCI 94* (Kershaw, 2012).

The above instance shows the relation within two sentences. In the first sentence appears the nominalization *photographer*, and in the second sentence its source verb *photographed*. To be more precise, these two sentences are connected by the meaning, as they both have the words that express the same meaning – the verb *photographed* and its nominalization *photographer*. Consider one more instance:

- (17) *Yet there is no mention in any other open government file of a German **offer** to evacuate occupied countries. If Hess was carrying a peace proposal draft that offered Britain a way out of its dicey military situation, and, if the terms included a German offer to evacuate certain occupied countries, Churchill*

almost certainly would have had to conceal it to hold his government together (Padfield, 2012).

The example given above points out another case of cataphoric nominalization. These two sentences are connected by the meaning of *offer*, as the first sentence of that text has a nominalization *offer*, which is connected with the verb *offered* from the second sentence of the text. In addition, the cataphoric nominalizations, similarly to the anaphoric ones, may be divided into three sections according to the distance between the nominalization and the source verb. Consider:

1. The nominalization and its proposition within one sentence:

(18) *If the Yorktown became available, then Rear Admiral Frank J. Fletcher, the **commander** of Task Force 17 and Spruance's senior, would command the fleet* (Symonds, 2012).

2. The nominalization and its proposition within two successive sentences:

(19) *For **proof**, Schmidt points to Walter Schellenberg, the German counterintelligence official charged with investigating Hess's flight. After the war, Schellenberg described receiving a secret dossier some time after Hess's flight that proved the de facto chief of Hess's personal intelligence office, Kurt Jahnke, was a top-level British spy* (Padfield, 2012).

(20) *In the meantime, Goebbels reports, Ribbentrop has handed Germany's **declaration** of war to the American chargé d'affaires; the German chargé in Washington presented the document to Secretary of State Hull. Ribbentrop and Hitler had worried that the United States might declare war before Germany was able to do so* (Weinberg, 2012).

3. The proposition located further from its nominalization in the text:

(21) *That night, 1st Battalion took a direct artillery **hit**—from the rear. Thinking they were under friendly fire, the men shot green flares to indicate that short rounds were landing on Americans. But the ground and treetop bursts continued. Shrapnel hit Borta, but most of its energy was spent so it was only like being shot with a BB gun* (Campbell, 2012).

Thus, the examples provided above show that both anaphoric and cataphoric nominalizations provide a text with connection and cohesion and the distance between the source verb and its nominalization in the text is not significant. The frequency of different

types of distances between the nominalization and its source verb is indicated in the Figure 7 below:

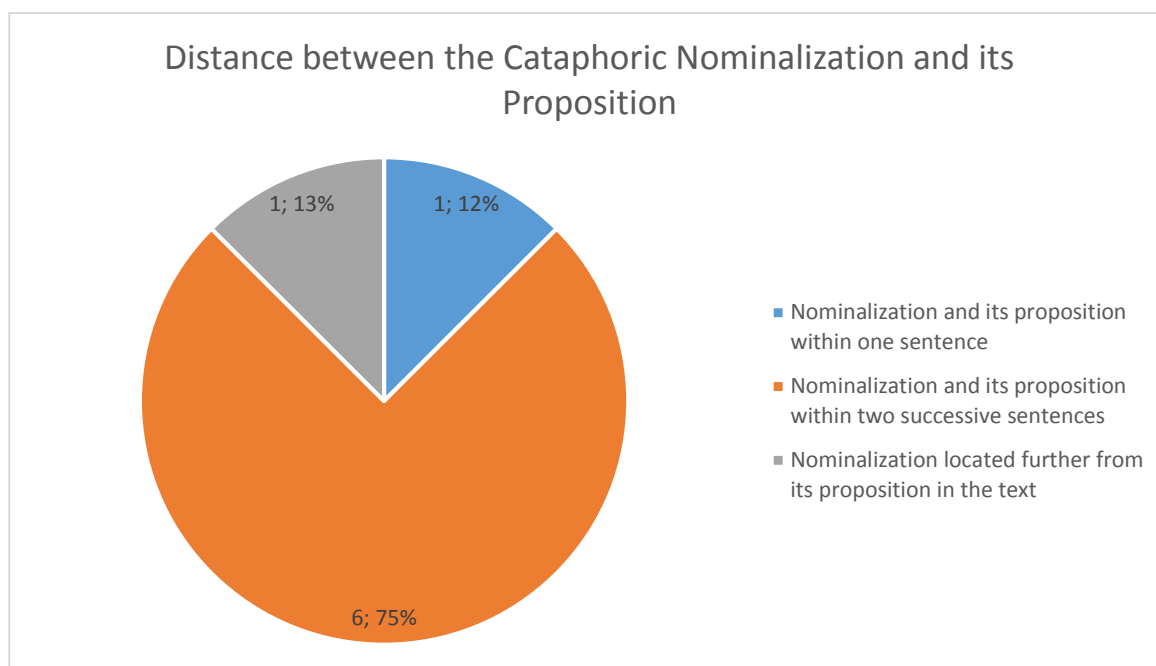


Fig. 7. Distance between the Cataphoric Nominalization and its Proposition.

In the Figure 7 above the frequency of different types of distances between the cataphoric nominalizations and their source verbs are illustrated. The most frequent type of distance is when the nominalization and its antecedent verb occur in two successive sentences, it makes 75% (6 tokens). The other two types occur equally in the corpus under investigation. Altogether they make 25% (2 tokens), and each of them occur in the text only once.

Furthermore, in the corpus under investigation was found one example, which contains both anaphoric and cataphoric nominalization with one source verb for both. Consider:

- (22) *Yet there is no mention in any other open government file of a German **offer** to evacuate occupied countries. If Hess was carrying a peace proposal draft that offered Britain a way out of its dicey military situation, and, if the terms included a German **offer** to evacuate certain occupied countries, Churchill almost certainly would have had to conceal it to hold his government together (Padfield, 2012).*

As can be seen from the example above, in two sentences going immediately one after another, there is one verb *offered*, which is connected with the words *offer*, which occur

both backwards from the source verb, and forwards. Thus, it is clear that in this case there are both anaphoric and cataphoric nominalizations referring to the same source verb. However, there was only one such example found in the corpus under investigation, which means that such cases are relatively rare.

To conclude, the examples prove that the use of anaphoric and cataphoric nominalizations tie the sentences and link the information together. With the use of nominalization pointing backward or forward to its source verb the cohesion of the text is created, which makes the text easier to understand. To indicate the frequency of explicit nominalization, see the Figure 8 below:

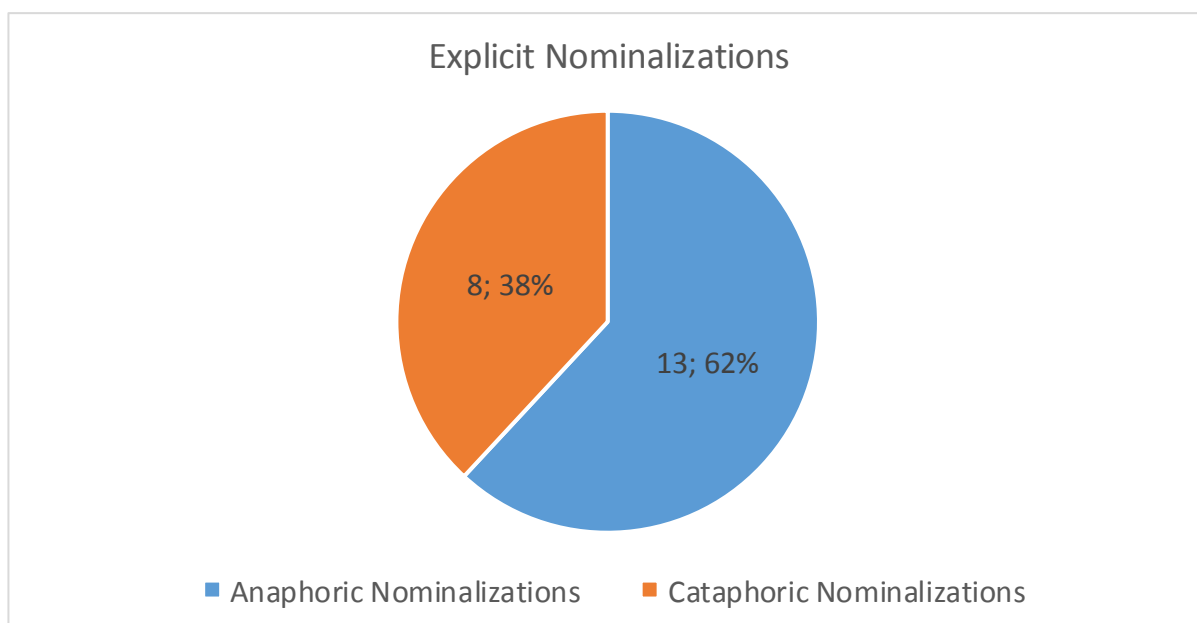


Fig. 8. The Frequency of Anaphoric and Cataphoric Nominalizations in the Corpus under Investigation.

The frequency of anaphoric and cataphoric nominalizations was slightly different. As can be seen from the Figure 8 above, there were more anaphoric nominalizations than cataphoric. The frequency of the anaphoric nominalizations (in the corpus that included 21 explicit nominalization) was 62% (13 tokens), and the cataphoric nominalizations in the corpus under investigation appeared slightly less frequently – 38% (8 tokens).

3.2. IMPLICIT NOMINALIZATIONS

As the nominalizations can point backward or forward to their source verb in the case of explicit nominalization, they can as well have no source verb at all. This kind of nominalizations is called implicit.

Implicit nominalizations are used in order to economise the text, while there is no need to use their congruent forms. Such nominalizations are very popular in science popular texts, as they provide the sentences only with the needed information (i.e. the nominalization itself), which does not need to be repeated as a verb elsewhere. Consider the following examples illustrating the usage of implicit nominalizations:

- (23) *To be sure, chance played a role at Midway, as it has in every military **engagement** throughout history* (Symonds, 2012).
- (24) *While Spruance was a reliable professional, however, he was a specialist in surface warfare, with no **experience** commanding naval aviation forces; Fletcher, too, was a surface officer* (Symonds, 2012).
- (25) *His advance **knowledge** of the Japanese navy's approach, thanks to the code breakers, transferred the invaluable element of surprise from the Japanese to the Americans, and gave Nimitz time to greatly reinforce Midway itself—especially with aircraft* (Symonds, 2012).
- (26) *According to this plan, the United States was to avoid “decisive **action**” against major elements of the Japanese fleet in the Pacific in order to concentrate on the European theatre* (Symonds, 2012).

In the examples above there are only the nominalizations themselves, without their antecedent verbs. Implicit nominalizations can also be called exophoric nominalizations, where “the pro-forms apply directly to entities recoverable in the situation, rather than via co-referent expressions in the same text or discourse” (Beaugrande, 2004). It means that this kind of reference has nothing to refer to and has to be understood from the context. Halliday & Hasan (1976:64) agreed that the exophoric or implicit item is the one, “which does not name anything; it signals that reference must be made to the context of situation.” Consider some examples:

- (27) *That was exactly the kind of man that President Franklin D. Roosevelt wanted in command at Pearl Harbor after the disastrous Japanese **attack** on December 7, 1941* (Symonds, 2012).

- (28) *The 36,000-ton Saratoga had been victimized by a Japanese submarine in January and sent back to Puget Sound, Washington, for a full **refit**; the 37,000-ton Lexington was sunk in the Battle of the Coral Sea in May* (Symonds, 2012).
- (29) *His **decision** to meet the Japanese north of Midway now seems foreordained, but at the time it was a bold stroke, and if someone besides Chester Nimitz had been in command at Pearl Harbor, the battle might not have happened at all* (Symonds, 2012).
- (30) *Rear Admiral Raymond Spruance was a man very much in the same mold as Nimitz: calm in his demeanor and courtly in his manners, reminding one **interviewer** of “a soft-spoken university professor”* (Symonds, 2012).

In these examples, as well as in the previous ones, the reference is made somewhere outside the text, because there are no words, which the nominalizations *attack*, *refit*, *decision* and *interviewer* would refer to.

In addition, there is an exception, when the implicit nominalization may fulfil the function of reference within the text. Halliday & Matthiessen (2004:552) noted that the exophoric reference “does not contribute to the cohesion of the text, except indirectly when references to one and the same referent are repeated, forming a chain.” Consider the following instances:

- (31) *Since it would take most of an hour to launch air groups from two carriers, which would add another 20 miles to the **flight** by the time all planes were up and in their formations, Spruance decided to continue steaming toward the target for another 45 minutes before launching. It would still be a long **flight** to the target, but the later launch should allow the attack planes sufficient time to get the job done and get back safely* (Symonds, 2012).
- (32) *The planes had been lined up on the flight deck for **launch** since well before dawn, but a number of them developed engine problems during the **launch** and had to be manhandled up to the forward elevator and lowered back down to the hangar deck in order to clear the flight deck* (Symonds, 2012).
- (33) *General George C. Marshall wrote to Eisenhower on October 21, 1943: “It seems evident to us that Patton's **movements** are of great importance to German reactions and therefore should be carefully considered. I had thought and spoke to [Eisenhower's chief of staff, Walter Bedell] Smith about Patton being given a trip to Cairo and Cyprus but the Corsican visit appeals to me as carrying much more of a threat [to northern Italy].” Eisenhower replied, “As it*

*is I am quite sure that we must do everything possible to keep [the Germans] confused and the point you have suggested concerning Patton's **movements** appeals to me as having a great deal of merit"* (Yeide, 2012).

- (34) *For all Marshall's apparent certainty, however, he was making an **assumption**, albeit a logical one: besides Patton, the United States had no other seasoned and widely known general other than Eisenhower. But it was an **assumption** nonetheless, made without any evidence of German opinion* (Yeide, 2012).

The instances above show how the relation between two implicit nominalizations may be created. In the first example the nominalizations *flight* are connected by their meaning, in the following instances the nominalizations *launch*, *movements* and *assumption* have the same relation. Moreover, it may be noted from the examples above, that this kind of relation may be construed either within one sentence or within few sentences. Nonetheless, in one sentence there may appear not only few nominalizations of the same meaning, but also the nominalizations of different meanings. For instance:

- (35) *Embedded in these book titles, and in their **conclusions** as well, is the **implication** that the American victory in the Battle of Midway was largely the **product** of fate, or chance, or luck, or some other unworldly force—that it was a miracle after all* (Symonds, 2012).
- (36) *He wrote in an immediate postwar report on Sicily, "The enemy very often conducted his **movements** systematically, and only attacked after a heavy artillery **preparation** when he believed he had broken our **resistance**"* (Yeide, 2012).
- (37) *Capa was even more bitterly resentful when he discovered in Life's June 19 issue a bogus **explanation** for his spoiled pictures: "Immense **excitement** of moment made **Photographer** Capa move his camera and blur picture"* (Kershaw, 2012).
- (38) *"He is filled with joy over the very fortunate **development** of the **negotiations** between the USA and Japan and also over the **outbreak** of war," Goebbels writes* (Weinberg, 2012).

The examples above point out the frequent usage of implicit nominalizations in science popular texts. The reason for that is the economy of the text, as the usage of implicit nominalizations helps the writer/speaker to avoid using few words and instead use the nominalization. Thus, the text with this kind of nominalizations tends to be shorter and

contains more information said in fewer words. However, the text containing explicit nominalizations is usually easier to understand, because those nominalizations have their source verb in the text, while in the case of implicit nominalizations the reader/hearer has to understand the situation without source verbs, only according to the context. Hence, the interpretation of the texts that have many implicit nominalizations is more puzzled than that of the texts with many explicit ones.

The corpus under investigation also contained the sentences with both, explicit and implicit nominalizations. Consider the following examples:

- (39) *If Hess was carrying a peace **proposal** draft that offered Britain a way out of its dicey military situation, and, if the terms included a German **offer** to evacuate certain occupied countries, Churchill almost certainly would have had to conceal it to hold his government together* (Padfield, 2012).
- (40) *Goebbels's December 9 **entry** summarizes developments in East Asia and the Pacific, mentions the coming Reichstag session, and repeats his **assessment** that the United States no longer will be able to aid England and the Soviet Union. "We can be extraordinarily satisfied with the way things have developed," the Nazi propagandist says in **conclusion*** (Weinberg, 2012).
- (41) *Despite the Allies' best efforts, the Germans did not decide until mid-May—months after they concluded that the Allied **invasion** would land at Pas de Calais or in Belgium—that Patton had indeed taken command of FUSAG. However, his leadership of the supposed **landings** at Pas de Calais appears to have been incidental to the strategic conclusions the Germans reached regarding the Allied **invasion*** (Yeide, 2012).
- (42) *For **proof**, Schmidt points to Walter Schellenberg, the German counterintelligence official charged with investigating Hess's **flight**. After the war, Schellenberg described receiving a secret dossier some time after Hess's **flight** that proved the de facto chief of Hess's personal intelligence office, Kurt Jahnke, was a top-level British spy* (Padfield, 2012).

As can be seen from the instances above, some sentences contain both explicit and implicit nominalizations. In these cases, the first example contains one implicit nominalization (i.e. *proposal*) and one explicit anaphoric nominalization *offer*, which points backwards to its antecedent verb *offered*, the second sentence contains three implicit nominalizations (i.e. *entry*, *assessment*, *conclusion*) and one explicit cataphoric nominalization *developments*, which refers forwards to its source verb *developed*. In the case of the third instance, there

are two implicit nominalizations (i.e. *invasion*, *landings*), however one of them is repeated two times in the text, and one explicit anaphoric nominalization *conclusions*, which refers back to its precedent verb *concluded*, and in the fourth case there is one implicit nominalization, which is used in the chain, as there are two *flight* nominalizations, and there is also one explicit cataphoric nominalization *proof*, which is related to its source verb *proved*.

The frequency of explicit and implicit nominalizations is provided in the Figure 9 below:

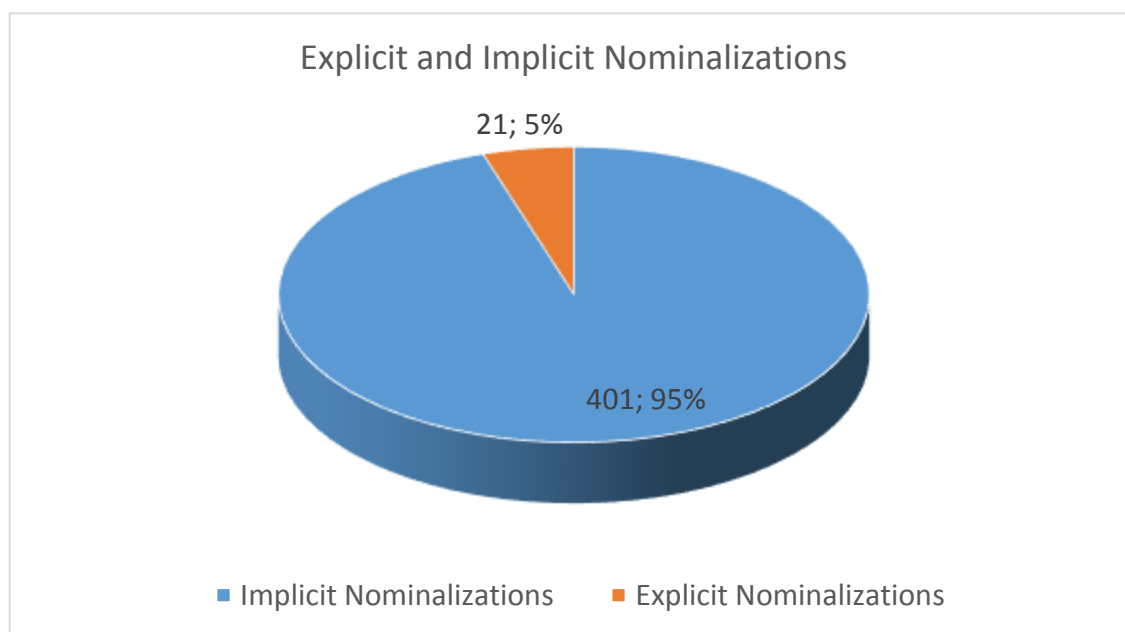


Fig. 9. The Frequency of Explicit and Implicit Nominalizations in the Corpus under Investigation.

From the Figure 9 above it can be seen that there was a big difference between the usage of explicit and implicit nominalizations in the chosen discourse. There were more implicit nominalizations than explicit ones. In the corpus, which included 422 nominalizations, the frequency of explicit ones was 5% (21 tokens), and the frequency of implicit nominalizations was 95% (401 tokens).

In conclusion, the implicit nominalizations, which have no source verb, are used much more frequently than the explicit nominalizations with their congruent forms. The reason for that is the economy and scholarliness of science popular texts.

CONCLUSIONS

The science popular texts need to be written in a clear and accurate way. Hence, they have to be coherent and economical, as well as contain a combination of properly chosen vocabulary and grammar, because usually they are written not for scientists, rather for people with less scientific knowledge. Therefore these texts have to remain short, contain less terms and be understandable for simple people. The phenomenon of nominalization is significant in science popular texts, as it unites two words into one, and therefore provides the text with shorter sentences, which is an important feature of science popular texts.

In the conclusions provided below the objectives given in the introduction (pages 3-4) are confirmed: 1) to discuss the concept of science popular text; 2) to discuss the concept of nominalization and its textual functions; 3) to reveal the cohesive functions of nominalization and to classify the selected examples according to their cohesive functions in the text; and 4) to indicate the frequency of nominalizations in the cover articles of *World War II* magazine.

- 1) The science popular text is a subgroup of scientific discourse, which is divided into professional and popular science texts. The science popular texts, unlike the professional scientific discourse, is intended for laypeople and therefore are simplified, i.e. the complex terms are avoided, the cohesive devices play a more significant role, as well as explicit units. However, science popular texts are similar with scientific discourse, as the sentences in both discourses tend to be short and accurate, the ideas of the text have to be expressed clearly in an economical way.
- 2) The nominalization is a phenomenon very commonly used in linguistics. It tends to change verbal or adjectival phrases or words into the nominal ones and therefore economise on space in the text. It is used to shorten the sentences and make the words more complex, i.e. more scientific. However, the most important textual function of the nominalization is providing the text with cohesion, and the cohesion provides the text with logico-semantic relations. In this case, the nominalization may be the explicit unit of the text, or the implicit one.
- 3) The most significant function of the nominalization is the cohesive one. This phenomenon can function both as explicit and implicit units of the text. In the case of explicitness, the nominalization functions as a reference inside the text,

which can be subdivided into anaphoric (pointing backwards in the text) and cataphoric (pointing forwards in the text). The explicit nominalization tends to point backwards or forwards to its source verb in the text. The implicit nominalizations have no source verb in the text and therefore they are called the references outside the text, as they point to the knowledge of the reader/hearer. The examples of nominalizations collected from the *World War II* magazine were classified according to their explicitness and implicitness in the text.

- 4) Two main types of nominalizations were distinguished in the corpus under investigation: explicit and implicit. Writers more often tended not to use the source verb of the nominalization in order to economise on space and therefore, the implicit nominalizations appeared more frequently in the corpus under investigation, they make 95% of all collected examples (401 token). Explicit nominalization occurred in the text very infrequently, and they make only 5% of all collected examples (21 token). However, the explicit nominalizations are subdivided into explicit anaphoric (the underlying proposition goes before the nominalization) and explicit cataphoric nominalizations (the underlying proposition goes after the nominalization). Explicit anaphoric nominalizations make 62% (13 tokens) of all the explicit nominalizations, whereas cataphoric nominalizations make only 38% (8 tokens).

A conclusion can be drawn that nominalization is a very commonly used cohesive device, which is significant in connecting the sentences and making the text a unified whole. According to the analysis of the examples, the case of nominalization very often occurs in science popular texts, as it shortens the text, as well as makes it more connected and understandable for people with less scientific knowledge.

The research has undertaken the cohesive functions of verb-based nominalizations in science popular texts. Further investigation could involve the comparative analysis of verb-based nominalizations, adjective-based nominalizations and noun-based nominalizations, the research could also be done on the nominalizations in different text genres. Also, the area of research, which is of great interest, is the nominalizations in translation. It would be interesting to find out whether the functions of nominalizations change after translating them from English into Lithuanian, or not.

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