Application of Linguistic and Statistical (Quantitative) Methods to the Research of the Idiomatic Space of Military Fiction

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The article deals with classification of phraseological units of the idiomatic space of the English fiction on military topics by morphological features and verification of the obtained results by using the methods of mathematical statistics. The article analyses the following issues related to the classification of phraseological units of military fiction by morphological feature, namely substantive (19.34%), verbal (64.31%), adverbials (5.99%), adjectives (8.02%) and interjections (2.34%). In addition, the authors identify the most commonly used structural models among the morphological classes of idioms. The source material of the study was English fiction on military topics, which deal with the wartime and the postwar period of the Second World War. The article presents statistical indicators of phraseological units classes by part-of-speech criterion, as well as quantitative characteristics of phraseological units according to the structure-grammar criterion. Thus, the authors outline the idiomatic space of English military fiction. For a more thorough description of the idiomatic space of military fiction, the article presents the procedure of applying linguistic and statistical methods, namely Pearson's criterion and Student's criterion. The use of these quantitative methods made it possible to state the uniformity of phraseological units distribution in the studied text space, as well as the homogeneity of the frequency of phraseological units use of different classes in the source base texts on the basis of morphological features. Application of linguistic and quantitative methods allowed us to create a more adequate picture of the content and structure of the idiomatic space of English military fiction. The authors argue that the idiomatic space of English military texts on military topics is a complex hierarchical system of discrete phraseological units that have both qualitative (linguistic: morphological, structural and grammatical) and quantitative (statistical) characteristics.

Keywords: *phraseological unit, quantitative methods, part-of-speech criterion, fiction texts, idiomatic space.*

1 Introduction

In periods of dramatic social changes and upheaval characteristic of the late twentieth and early twenty-first centuries (the collapse of a number of states, military conflicts in Europe and Asia, epidemics of Covid-19 etc.), the language system is enriched by responding to the emergence of new concepts, phenomena and realities of human and social life. The lexical and idiomatic spaces of different languages, in particular English are considered to be the most dynamic (Aljabri 2013; Sulikowska 2019; Sridhar 2013; Zyzik 2019; Vasiljevic 2015; Kemertelidze 2021; Giorgadze 2021).

Phraseological units as the most expressive means of each language have been in the focus of attention of many linguists (Strack 2019; Jabbari 2016; Ren 2013; Fadillah 2022; Baker 2018; Buditama 2017; Naciscione 2010; Moon 2008; Gries 2008; Korostenskiene 2015; etc.). This is due to the general attention of linguistic studies on the identification and

analysis of linguistic phenomena related to ethnicity, culture and mentality of individual peoples in close connection with human consciousness, thinking and spiritual and practical activities, as well as a noticeable increase in researchers' interest in the laws of functioning of the language system in general and language units in particular.

One of the important tasks of linguistics is to highlight the general theoretical foundations of phraseology mainly on the material of individual languages and texts (Alabdali 2021), further clarify the concept of phraseological units (Bekhta 2022; Lewicki 2001; Michow 2013), study the specific features of phraseological units in comparison with other units of language (Matvienkiv 2022; Mutiara 2019; Listiani 2019), studying the specifics of the emergence and consolidation of new phraseological units in the language system (Puspita 2018; Creswell 2012), the peculiarities of their use in the language (Mabruroh 2015, studying phraseological synonymy, antonymy, polysemy and homonymy (Van Lam 2023; Bich Diep 2023), developing methods for the study of phraseological units (Larsen-Freeman 1986; Skrbic 2011).

Although phraseological units have not been ignored by researchers, the issue of identifying the linguistic features of phraseological units in English fiction has not been resolved. The studies of phraseological units show that there are still unsolved problems. The reason for this is, on the one hand, the increasingly broad material base on which these studies rely and on the other hand, the fact that the study of phraseological units often remains at the level of observation or material classification, without reaching deeper levels of study of the phraseological sphere.

The issue of finding out the potential of phraseological units of the modern English fiction text space and the selection and correct application of verification tools for the study of the corresponding idiomatic space of English fiction works of various genres in general, and military topics in particular remains relevant. To date, a number of social factors have led to an increase in the volume of works on military topics. These factors include the high level of threats of military actions throughout the world, reform of modern military education and the introduction of new military standards, widespread media coverage of the results and consequences of military missions, and increased attention of politicians to military aid and funding.

Despite the considerable attention of scholars (Tambunan 2023; Briskilal 2021; Jukneviciene 2017) to the issues of identification and classification of phraseological units, there is still no unanimous opinion on their solution, on the interpretation of these issues on the basis of linguistic and statistical methods. It is the absence of a single statistically proven approach to the classification of phraseological units that prompted the study on the basis of the military fiction text space.

Thus, the purpose of the article is to classify the phraseological units of the idiomatic space of the English military fiction according to the part-of-speech and structural-semantic approaches and to verify the results obtained using the methods of mathematical statistics.

In the future, based on previous researches (Philip 2007; Briskilal 2021; Van Lam 2023), the idiomatic space of English language military fiction will be considered a linguistic complex hierarchical system of discrete phraseological units that have both qualitative and quantitative characteristics. At the same time a phraseological unit is interpreted as an established syntagmatic system with minimal productivity of syntactic schemes and inherent transformational destructiveness.

2 Method

The study of the linguistic features of the idiomatic space of English military fiction involved the formation of a sample corpus of phraseological units in compliance with all the necessary requirements, analysis of their linguistic characteristics and establishment of patterns of their use based on the results of quantitative (statistical) methods.

The source material for the study included English fictional texts on military topics, which, for example, deal with the wartime and postwar period of World War II, totaling 3376 pages: 'Nimitz Class' (Patrick Robinson 1997), 'Best Kept Secret' (Jeffrey Archer 2013), 'Enigma' (Robert Harris 1995), '2034: A Novel of the Next World War' (Elliot Ackerman, 2021), 'The Guardian' (Joshua Hood 2023), 'Red Storm Rising' (Tom Clancy 1986), 'The Book Thief' (Marcus Zusak 2007).

It is worth noting that the selection of works and authors was random, with the only requirement (for ease of analysis) being that the literary texts describe the same historical period. In addition, the selection of literary sources was based on the length of the text. This is due to the fact that by means of mathematical statistics (Perebyinis 2013). It was clarified that in order to obtain reliable results (to ensure the reliability of the results of 95% and to achieve a statistical error of 5%), the volume of the processed fiction should be at least 735256 word uses. The selected corpus of 7 English military fiction had a total volume of 913950 word uses, which ensured 97.8% reliability. In compliance with all the necessary and sufficient conditions for the formation of the sample material (representativeness, cross-sectional selection, exclusion of repetitions), 1670 phraseological units were selected from the mentioned fiction works on military topics. The application of quantitative methods (Pearson's χ^2 criterion) showed that the statistical error for this sample size is 3.2%, which is quite acceptable for achieving statistically significant reliability of the results of linguistic research (in linguistics, an error of 5% is allowed).

Interacting with other lexical units in speech, all phraseological units are subject to the general rules of the language. Traditionally in linguistics a phraseological unit in a sentence is a structural integrity, including words that are in various morphological and syntactic relations with each other. The review of various approaches to the part-of-speech distribution of lexical units allows us to work out more thoroughly the issue of the appropriate classification of phraseological units used in English military fiction.

An important issue for the description of the idiomatic space of English fiction on military topics is the study of lexical and grammatical features of phraseological units used in the relevant text space, as well as the clarifying of their morphological structure and syntactic functions. According to L. Smith (1971: 36) that pointed out that the belonging of the basic element (nuclear component) to a certain part of speech can serve as a criterion for classifying phraseological units. This approach is called the approach according to which, taking into account the existing grammatical categories, the selected phraseological units can be conditionally divided into substantive, verbal, adjectival, adverbial and exclamatory. In a sentence, they perform different syntactic functions – subject, predicate, definition or circumstance. At the same time, a separate class of phraseological units is exclamatory, which includes phraseological units that have the semantics of exclamations and are characterized by a complete or partial lack of motivation (proverbs, sayings, etc.). If we are to classify all the phraseological units of the idiomatic space of English military fiction, this class cannot be forgotten, since exclamatory phraseology exists, albeit in small numbers, and cannot be attributed to any of the other classes mentioned. It is worth noting that when assigning a

phraseological unit to a particular class, it is important to take into account its lexical and semantic load, which helps to clarify the syntactic role of the phraseological unit in the sentence and to make the correct classification. Taking into account the semantic and syntactic criteria contributed to the decision to assign a phraseological unit to a particular class in case of detecting phraseological units in the sample that do not contain a determining part of speech but belong to the corresponding class (for example, a phraseological unit contains only nouns or adverb but is adverbial).

The application of the part-of-speech and lexical-semantic approach to the analysis of these texts allowed not only to adapt the described classification of phraseological units by morphological and semantic features, but also to determine their quantitative characteristics by the method of cross-cutting demonstrated in Table 1.

Table 1: Classification of phraseological units in English military fiction

Classes of phraseological units according to the part-of-speech criterion	Quantity	Percentage share
Verbal phraseological units	1074	64,31%
Adverbial phraseological units	100	5,99%
Substantive phraseological units	323	19,34%
Adjectival phraseological units	134	8,02%
Interjections	39	2,34%
Total	1670	100%

It is more convenient to evaluate the distribution of phraseological units of the sample population by these classes using a diagram demonstrated according to Figure 1.
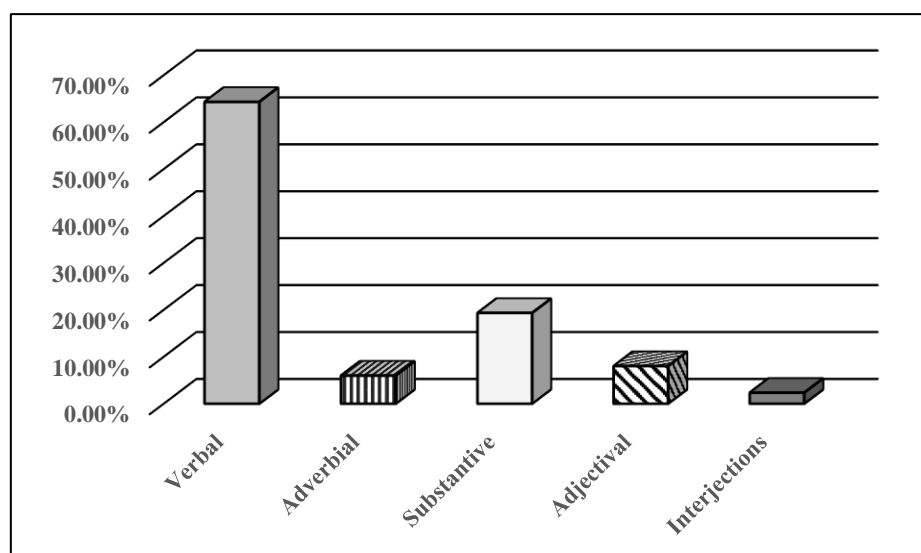

Figure 1: Distribution of phraseological units in the English military fiction by morphological classes

The analysis of Table 1 and Figure 1 explicitly shows that the following patterns are noticeable among the selected phraseological units:

- verbal phraseological units are the most used (there are 1074 of them among 1670 phraseological units in the sample), and most of them indicate an action in sentences and the verb is the nuclear component among them;

- phraseological units whose nuclear component is a noun belong to the class of substantive phraseological units (323 substantive phraseological units), and they are almost three times less frequently used in English military fiction compared to verbal phraseological units;

- even less frequently in the studied fiction are used adjectival phraseological units, for which the nuclear component is an adjective and which usually serve as a definition in a sentence (among 1670 phraseological units in the sample – 134 adjectival phraseological units) and adverbial phraseological units (their nuclear component is an adverb), which serve as a circumstance (among 1670 phraseological units in the sample – 100 adverbial phraseological units);

- quite rarely in English military fiction phraseological units in the form of interjections are used – only 39 such phraseological units were found in the selected sample.

3 Grouping of phraseological units

Analysis of the peculiarities of each phraseological class allowed us to illustrate their role and purpose with examples.

Verbal – this subgroup includes phraseological units that carry out the function of a verb in a sentence. This subgroup is the most representative of all in the sample under study. The analysis and comparison of the sample material allowed us to conclude that the text most often contains verbal phraseological units with the structure:

(1)   V+N
        to lose face, to tell the truth, to break someone's heart.

Such phraseological units in a sentence usually play the syntactic role of a predicate. In general, the verb that is part of a verbal phrase plays a dominant role in a lexical construction. The flexibility of the verb component allows verbal phraseological units to be modified by moods, tenses, persons, etc., and various morphological verb changes can be regulated by the semantics of certain phraseological units.

Thus, verbal phraseological units are fixed phrases in which the verb is the main component and has a stable expressive form and meaning. They are used to express various actions, states, processes or events. Verbal phraseology adds dynamics and expressiveness to a text, helps to convey certain ideas and thoughts to the reader with more emotion and precision. Phraseological units that are verbs and perform the syntactic function of a predicate in a sentence serve to encourage action, motivate, and help to enhance the semantic and emotional load of the language *(kick the bucket, change the horses in the middle of the stream, boil a stone).*

It is worth emphasizing that verbal phraseological units predominate. Since this literature describes combat actions, military operations, and overcoming the consequences of

war, it is verbal phraseology that gives the text activity, movement, and dynamics. Accordingly, this gives a military fiction a specific 'charisma'.

Substantive phraseological units are those in which the nuclear component is a noun that retains all the semantic and grammatical features characteristic of this part of speech. In fact, like nouns, substantive phraseological units can act as both subjects and complements or nominal parts of compound predicates in a sentence. For example, *in good faith*, which means 'with good intentions'. *All might have progressed in good faith*, where the phraseology characterizes the deeds, actions of a person, and the main semantic load is carried by the noun.

In order to use some substantive phraseological units, it is worth mentioning such a semantic phenomenon as 'enantiosemy', i.e. the use of language units in their opposite meaning. The enantiosemy of phraseological units is due to the fact that in terms of their semantic, functional and structural qualities, phraseological units are more complex lexical units than just words, and for which emotional, evaluative, pragmatic and figurative aspects play an important role. It is these features that make a number of additional adjustments to enantiosemy at the phraseological level.

Substantive phraseological units include phraseological units whose nuclear component is expressed by a noun that retains its semantic and grammatical qualities characteristic of this part of speech, as well as phraseological units formed by incomplete or complete metaphorical reinterpretation. We are talking about the formation of phrases that appeared as a result of similarity to a certain phenomenon or object (*a call of arms*, *comrade in arms*). It is worth paying attention to the substantive phraseological units used to characterize and qualitatively assess a person. For example, the substantive phraseological unit *a hard nut to crack* is used to give a positive or sometimes negative assessment of a person depending on the speaker's position. In this case, we can observe a certain coincidence of the grammatical and semantic core components; *poor devil* is used to refer to someone or something in a way that shows sympathy; *figure of authority* is a substantive phraseological unit which indicates a person who has authority over another person: a person who has the power to give orders or make decisions. These phraseological units may be used in both positive and negative assessments which depend on the speaker's attitude and emotional state.

Substantive phraseological units in speech carry the load of a noun; their lexical and semantic structure can be diverse, but the noun remains the nuclear component. The analysis of the idiomatic space of English military fiction has revealed substantive idioms that describe a phenomenon, object or subject, evaluate a persons' actions and deeds, and characterize his or her qualities (*the best part of*, *in full swing*, *without success)*. Military phraseological units usually have a negative or positive evaluation, which is expressed explicitly, which means the presence of an evaluative word. Phraseological units in English fiction on military topics are used to evaluate and describe not only such qualities as strength, willpower, responsibility, military cunning, courage, but also indecision, cowardice, stupidity, etc.

Thus, substantive phraseological units are fixed expressions in which noun is the main component and have a stable expressive form and meaning. These phraseological units are used to express different concepts or objects, they give the textual speech variability, which allows to express the essence of concepts and phenomena more accurately in different situations of both peace and war.

Adjectival phraseological units are linguistic units in which the adjective is the main component and which have a stable expressive form and meaning. Such phraseological units are used to express various qualitative features, characteristics or states of objects, phenomena or situations. For example, the phraseological unit *in rude health* is an adjectival phraseological

unit, with an adjective as its nuclear component and expresses the feature *to be strong and healthy*. The phraseological unit *high hopes* has the meaning *a strong feeling that something good will happen or be true*. The nuclear component of this idiom is the adjective *high*, which reinforces the sign of *high hopes*.

Usually, the adjective is the basic component of adjectival phraseological units, and in a sentence they play the role of determiner. Such phraseological units help to express various characteristics and features more accurately and add expressiveness and richness to a military fiction. By using adjectival phraseology, the author encourages readers to think, emphasizes the absurdity and tragedy of war. It is these phraseological units that colour the text, allow us to describe the horrors of war, its destructive impact on society, and, therefore, evoke an emotional response. And this is a feature of a military fiction.

Adverbial phraseological units are fixed phrases in which the main component is an adverb or conjunction. Such phraseological units have a stable expression and meaning. For example, the phraseological unit *below the belt* is an adverbial unit and has the meaning "in one's possession" and is used to indicate the place 'where*?'* – 'behind the back*'*; the phraseological unit *take it personally* is interpreted as 'to be offended or upset by what someone said*'*, i.e. to take information 'how*?'* – 'too close to the heart*'*.

This subgroup of phraseological units includes established circumstantial and adverbial phraseological units, i.e. fixed phrases describing the quality or certain conditions under which a process takes place (*without a reason, behind one's back*). Usually, in a sentence, adverbial phraseological units act as a circumstance. The morphology of this subgroup does not imply or allow any changes. For example, *behind one's back* means 'to do something secretly, behind someone's back'. Adverbial phraseological units do not always contain an adverb, but answer the questions How? Where? When*?*

In terms of structure, adverbial phraseological units are heterogeneous and can represent the conversion of different words, so it is quite difficult to present this structure schematically. Most adverbial phraseological units have a noun in their composition, which is the nuclear of the phraseological structure and plays the role of a grammatically and semantically leading component. The adverbial phraseological units of military fiction expand the possibilities of speech, allowing more accurate and expressive expression of the circumstances of events and military operations, interrelationships, actions and interactions of characters in English military fiction.

Another class is exclamatory phraseological units or interjections. This class includes such phraseological units that have the semantics of interjections, as well as phraseological units that are fixed expressions – proverbs or sayings that give an accurate characterization of an action, person or event. The peculiarity of this class is that usually phraseological units belonging to this group do not perform a nominative function but in military fiction they serve to express emotions, attitudes, characteristics or assessment. Exclamatory phraseology is characterized by emotional coloration and is the basis for the emergence of evaluative-emotional enantiosemy. The phraseological unit *That's a good boy* has a spectrum of positive orientation (surprise, delight), and the phraseological unit *God knows* indicates the unknown and ignorance: *there is no one to rely on but God, and no one knows what the future holds* (Archer, 2013).

Usually, the range of emotions and feelings conveyed by this group is very wide (both negative and positive). Structurally, this group of phraseological units is heterogeneous. Such phraseological units are word conversions based, as a rule, on an interjection or a noun that is

the leading supporting component of the group *('Damn it!', 'Good luck!', 'That's a good boy!' 'God knows!').*

It is worth noting that the described classification is based on the structure of the phraseological unit, its supporting component, part-of-speech and semantic and grammatical features of use. In general, the analysis made it possible to characterize more fully not only the semantic qualities of phraseological units used in military fiction and to study their morphological features, but also to assess their quantitative characteristics.

The above is a prerequisite for the structural and semantic analysis and study of the structural model of phraseological units in English military fiction texts. In the course of establishing the structure of the phraseological units of the sample population, it was found that:

1) within each class of phraseological units there are the most commonly used structural models, and in these models the main (nuclear) component is the corresponding part of speech;

2) there are quite a lot of structural models of phraseological units, but some of them occur 1 or 2 times among the 1670 phraseological units in the sample, which is 0.05÷0.1% (for example, phraseological units containing adjectives or adverbs etc.). This is a very small percentage of the total number, so in order to analyze the idiomatic space of English military fiction, we considered only the most common structural models of phraseological units within each class;

3) as a result of generalization and systematization of the sample material, it was found that certain structural models are most common among verbal phraseological units. The most commonly used model of verbal phraseological units is model as in (2). Such structural models account for 41.71% of verbal phraseological units in the sample.

(2)   V+N
       tell the truth, take time, pay attention, settle accounts, take revenge

The next most frequent structural models are as in (3) and (4).

(3)   V+Prep+Pron+N
       come to someone's mind, sit on one's hands, make up one's mind, stand by someone's back

(4)   V+Pron+N
       beg one's pardon, enter one's head, take someone prisoner

Less frequent among the verbal phraseological units of the sample are the models (5) and (6) which are 8.19% and 6.98%, respectively:

(5)   V+Prep+N
       hang in the air, scare to death, take by surprise

(6)   V+Pron+N+*Prep*
       keep one's hands off, take one's eyes off, turn one's hand to

Only 5.77% of verbal phraseological units are composed as in (7).

(7)   V+N+Prep
        have a word with, set foot in, make light of, keep pace with, make a name for

There are about four dozen structural models, namely (8), (9) and (10).

(8)   V+Pron+Prep
        count someone in, make it up, show someone around (which constitute 4.00% of the total number of verbal phraseological units)

(9)   V+Pron+N+Prep+N+(N)
        keep one's side of the bargain, put one's card on the table, keep someone at arm's length (constitute 4.28%)

(10)   V+Prep+N+Prep
        bend to the will of, go to the rescue of (constitute 3.63% respectively of the total number of verbal phraseological units)

        4) all of the following structural models are quite rare as in (11).

(11)   V+N+N
        call a spade a spade (0.28%)

        V+N+Prep+N
        add fuel to the fire, have fingers in the pie, breathe a sigh of relief (1.40%)

        V+Pron+Prep+Prep
        get someone out of (0.37%)

        V+Pron+Prep+Pron
        get on with sth (0.93%)

        V+Prep+Prep+Pron+N
        get out of someone's sight, jump out of one's skin, turn over in one's mind (1.58%)

        V+V
        dying to know (0.19%)

        V+N+Prep+Prep+Pron/N
        beat the shit out of one, wheel conversation out of the corner (1.77%).

Obviously, the V+N structural model is the most frequent, namely, it makes up the majority of all verbal phraseological units.
        Among the substantive phraseological units (19.34% of the total number of units in the sample), the most common structural models are (12) and (13).

(12)   Prep+N (20.12%)
         in mind, in the meantime, of age, in touch, under pressure, without reason, in danger

(13)   N+Prep+N (22.29%)
         port of call, a matter of time, lady of the house, state of mind, trick of light, figure of authority, change of scene, the way of the world, ball of fire

Among the substantive phraseology used in English military fiction, models of type are relatively common, namely as in (14).

(14)   Prep+Pron+N
         in someone's will, behind one's back, at someone's service, before someone's eyes, by some miracle, under one's breath (9.91%)

         Prep+N+Prep
         in keeping with, in favor of, in the hope of, for the life of, in the name of, in accordance with, in memory of, in the shadow of (13.31%)

         Prep+N+Prep+N
         in the nick of time, from time to time, from dawn till dusk, from start to finish, by force of habit (8.98%)

         N+Prep+Pron+N
         card up one's sleeve, roof over one's head, life of someone's light, time on one's hands (7.12%).

In addition, among substantive phraseological units (from ten to twenty units), the following structural models are found in (15).

(15)   Prep+N+Prep+Pron+N
          on the tip of one's tongue, in the back of one's mind (3.41%)

         Prep+Prep+N
         out of place, out of breath, out of turn, out of business, out of action, out of earshot (4.95%)

         Prep+N+N
         for the heaven's sake (3.72%).

The smallest number of substantive phraseological units (up to ten units) was found to have models as in (16).

(16)   V+N
         link arms, do the honors (1.55%)

         N+V

heaven knows, money to burn (1.86%)

Prep+Pron+Adj+N
over one's dead body (0.62%);

V+Prep+N
be in debt (1.24%)

Pron+Prep+Prop+N
none of someone's business (0.93%).

Thus, in this case, the most commonly used structural model for substantive phraseological units is Prep+N, which accounts for almost a quarter of all substantive phraseological units in the sample.

As noted above, the dominant component of the phraseological units of the adjectival class is an attribute so we selected such units where the nuclear of the phraseological unit is expressed by an adjective, and the context in which they are used confirms that they indicate an attribute. It is worth noting that the largest number of possible structural models was found for phraseological units of this class. Thus, as for the adjectival phraseological units, the most commonly used structural models in this case are Adj+N (*the last straw, good faith, high hopes, bright side, hard time, Chinese whispers*) and Adj+Prep+N (*best of luck, most of the time, quick off the mark, best part of*), the percentage of which is 13.43% and 12.69% respectively of their total number.

In addition, the following models are found among the phraseological units of this class (from ten to fifteen cases among all structural models of the class) as in (17):

(17)   V+Adj+N
make a final sacrifice, make an early start, give a hard time, have a field day, turn a blind eye (9.70%)

V+Adj
make public, go wrong, get busy, be sure, hit hard, go blank, get lucky (11.19%)

Adj+N+V
hard nut to crack (7.46%)

Prep+Adj+N
in good working order, with flying colors, at full power, in the first place, in high places, in every way (10.45%).

All other models of adjectival phraseological units presented below (18) appear rarely (up to five units).

(18)   Prep+Pron+Adj+N
in someone's infinite wisdom, in one's old age (3.73%)

V+Pron+Adj
drive someone crazy, do one's best (2.99%)

Prep+Adj+N+Prep
in stark contrast to (0.75%)

Adj+Adj+(N)
same old story, exact same (2.24%)

V+Pron+Adj+N
do one's dirty work (2.24%)

Prep+Adj
for long, on the contrary (2.99%)

V+N+Adj
make matters worse (1.49%)

V+Adj+Prep
get smart with (2.24%)

Adj+Art+Adj
home and dry, thick and fast (2.24%)

V+Prep+Adj+Prep+N
as silent as a grave (2.99%)

Adj+N+Prep
a great deal of (2.99%)

Adj+N+Prep+N
safe pair of hands, every step of the way (3.73%)

Adj+Prep
good of, steady on (2.24%)

Prep+Adj+Prep
for the good of (1.49%)

V+Adj+N+Prep+N
have best interests at heart (0.75%).

Thus, among the identified adjectival phraseological units, the most frequently used are the constructional models Adj+N and Prep+Adj+N, each of which occurs in about 15% of the phraseological units of this class.

As for the adverbial phraseological units, there are few of them in the sample material, and among them there are structural models with adverbs. The most frequently used models

include: Conj+Adv+Conj+Adj (*as quickly as possible*) – 23.00% within the class and V+Pron+Adv (*take it personally, set oneself apart*) – 20.00%.

There are somewhat fewer adverbial phraseological units whose structural models look like (19).

(19) Adv+Prep+(Adj)+N
against all odds (11.00%)

Prep+Adv+N
of all time (15.00%).

There are even less common models (20).

(20) Adv+Adv+Adj
all well and good (7.00%)

Adv++Adj+N
against all odds (9.00%)

Adv+Prep+N
out of the blue (9.00%)

Adv+Adv
by and large (6.00%).

Thus, the most commonly used structural models for adverbial phraseological units are Conj+Adv+Conj+Adj and V+Pron+Adv (approximately 20% each of the total number of adverbial phraseological units).

Interjections are the least frequently used in the English military fiction (only 2.34% of the sample), and the structural models of such phraseological units are all different, it is difficult to single out the most representative ones.

The study of the selected texts of fiction involves the use of precise quantitative methods to determine the peculiarities of the use of phraseological units represented by their morphological structure according to the part-of-speech criterion. Taking into account the fact that the part-of-speech and structural-semantic criteria for classifying phraseological units in English military fiction covered verbal, substantive, adjectival, adverbial and interjections, it is of interest to study their distribution in the studied textual space, namely in the works of the source base. The results of this study are presented in Table 2.

Table 2: Phraseological units in fiction of the source base: part-of-speech criterion

Source base	Classes of phraseological units by morphological feature					Total amount
	Verbal	Substantive	Adjectival	Adverbial	Interjections	
'Nimitz Class' Patrick Robinson	160	42	20	14	5	241
	66,39%	17,43%	8,30%	5,81%	2,07%	100,00%
'Best Kept Secret' Jeffrey Archer	154	53	23	16	4	250
	61,60%	21,20%	9,20%	6,40%	1,60%	100,00%
'Enigma' Robert Harris	148	42	17	18	3	228
	64,91%	18,42%	7,46%	7,89%	1,32%	100,00%
'The Guardian' Joshua Hood	151	46	19	13	8	237
	63,71%	19,41%	8,02%	5,49%	3,38%	100,00%
'Red Storm Rising' Tom Clancy	143	43	16	11	8	221
	64,71%	19,46%	7,24%	4,98%	3,62%	100,00%
'2034: A Novel of the Next World War' Elliot Ackerman	161	52	20	10	9	252
	63,89%	20,63%	7,94%	3,97%	3,57%	100,00%
'The Book Thief' Marcus Zusak	157	45	19	18	2	241
	65,15%	18,67%	7,88%	7,47%	0,83%	100,00%
Total	1074	323	134	100	39	1670

The analysis of the content of Table 2 makes it possible to understand that in all seven literary sources the distribution of phraseological units by classes is almost equable, and there is no reason to assert that in any of the works there are more phraseological units of one class compared to other texts. Using Pearson's criterion, the uniformity of the distribution of phraseological units in the textual material was checked at a sufficient level of statistical significance and the uniformity of the distribution of phraseological units in the texts was established and the homogeneity of the idiomatic space was proved. The results of the calculations can be found in Table 3.

Table 3: Uniformity of distribution of phraseological units in military fiction

No.	Author and title of the work	Empirical value of the criterion	Results of comparing criterion values	Conclusion
1	'Nimitz Class' Patrick Robinson	χ^2_{emp}=6,667	$\chi^2_{emp} < \chi^2_{cr}$ Accepted H_0, $\rho \leq 0{,}05$	The distribution is uniform
2	Jeffrey Archer 'Best Kept Secret'	χ^2_{emp}=9,799	$\chi^2_{emp} < \chi^2_{cr}$ Accepted H_0, $\rho \leq 0{,}05$	The distribution is uniform
3	'Best Kept Secret' Jeffrey Archer	χ^2_{emp}=7,555	$\chi^2_{emp} < \chi^2_{cr}$ Accepted H_0, $\rho \leq 0{,}05$	The distribution is uniform
4	Joshua Hood 'The Guardian'	χ^2_{emp}=6,865	$\chi^2_{emp} < \chi^2_{cr}$ Accepted H_0, $\rho \leq 0{,}05$	The distribution is uniform
5	'Enigma' Robert Harris	χ^2_{emp}=6,563	$\chi^2_{emp} < \chi^2_{cr}$ Accepted H_0, $\rho \leq 0{,}05$	The distribution is uniform
6	Tom Clancy 'Red Storm Rising'	χ^2_{emp}=5,453	$\chi^2_{emp} < \chi^2_{cr}$ Accepted H_0, $\rho \leq 0{,}05$	The distribution is uniform
7	'The Guardian' Joshua Hood	χ^2_{emp}=11,137	$\chi^2_{emp} < \chi^2_{cr}$ Accepted H_0, $\rho \leq 0{,}05$	The distribution is uniform

In addition, in order to correctly define the studied idiomatic space, attention should be paid to the frequency of use of phraseological units of different morphological classes in the texts of the source base. This thesis can also be tested using the methods of mathematical statistics. To do this, it is necessary to use the Student's criterion.

It is used to determine the significance of differences or non-significance of differences in the frequency of occurrence of phraseological units of a certain class in the studied literary sources. The calculation formula of the criterion is as follows (21).

(21) $\qquad t = \dfrac{|\overline{x}-\overline{y}|}{\sqrt{S_x^2+S_y^2}}$

where $\overline{x}, \overline{y}$ – the average frequency of the unit under study in each sample separately, S_x^2 and S_y^2 are calculated by the formula as in (22) and (23).

(22) $\quad S_x^2 = \dfrac{\sum(x_i-\overline{x})^2 \cdot n_i}{n \cdot (n-1)},$

(23) $\quad S_y^2 = \dfrac{\sum(y_i-\overline{y})^2 \cdot m_i}{m \cdot (m-1)},$

where $\overline{x}, \overline{y}$ – the average frequency of the unit under study in each sample separately, n, m – the volumes of the samples of phraseological units in each book separately, x_i, y_i – the number of phraseological units in the subsamples into which the sources were divided, n_i, m_i – frequency of subsamples with the corresponding number of phraseological units.

The presented formulas were used to calculate the empirical values of the Student's criterion. It is worth noting that such calculations were made to compare all books with each other for each class of phraseological units. Direct calculations of the empirical values of the Student's criterion in this case are quite voluminous, so we used the capabilities of EXCEL spreadsheets to perform them. Table 4 presents only the final results of the calculations carried out to clarify the frequency of use of verbal phraseological units in the studied English military fiction.

Table 4: Empirical values of the Student's t-test for detecting differences in the frequency of occurrence of verbal phraseological units

Source base	'Nimitz Class'	'Best Kept Secret'	'Enigma'	'The Guardian'	'2034: A Novel of the Next World War'	'Red Storm Rising'	'The Book Thief'
'Nimitz Class'	-	0,56	1,75	0,45	1,21	0,99	1,01
'Best Kept Secret'	0,56	-	1,32	0,87	1,16	0,87	0,93
'Enigma'	1,75	1,32	-	1,18	1,26	1,65	1,35
'The Guardian'	0,45	0,87	1,18	-	1,34	0,54	0,76
'2034: A Novel of the Next World War'	1,21	1,16	1,26	1,34	-	1,63	1, 67
'Red Storm Rising'	0,99	0,87	1,65	0,54	1,63	-	0,97
'The Book Thief'	1,01	0,93	1,35	0,76	1,67	0,97	-

According to the decision rule for this statistical criterion, each calculated empirical value was compared with the critical value taken from the corresponding table:

(24)

$$t_{cr} = \begin{cases} 1,98 & p \le 0,05 \\ 2,62 & p \le 0,01 \end{cases}$$

If the empirical value is less than the critical value, then there is no reason to assume that verbal phraseological units are significantly more frequent in one source base than in others. Table 4 shows that all the calculated values are less than the critical values. This means that our hypothesis is correct and all seven fiction texts have the same distribution of verbal phraseological units.

Similar calculations were carried out for substantive, adverbial, adjectival phraseological units and interjections, and similar results were obtained. It is worth noting that the results of applying the Student's criterion showed that in all the English military fiction selected for the study, the frequency and density of the use of phraseological units belonging to the above classes is approximately the same. In other words, in all seven sources, phraseological units of different morphological classes are used approximately equally often.

4 Conclusions

Thus, the analysis and application of mathematical statistics methods made it possible to outline the idiomatic space of the English military fiction text and to classify and analyze its content. Summarizing all of the above, we can state the following:
 - the idiomatic space of English military fiction is a linguistic complex hierarchical system of discrete phraseological units that have both qualitative (linguistic: morphological, structural and grammatical) and quantitative (statistical) characteristics;
 - morphological features are manifested in the possibility of classifying the phraseological units of the studied text space according to the part-of-speech criterion. According to this criterion, the phraseological units of military fiction are conditionally divided into verbal (64.31%), substantive (19.34%), adverbial (5.99%), adjectival (8.02%) and interjections (2.34%);
 - based on the results of the classification of phraseological units according to the structural and grammatical criterion, the structural models of each class of phraseological units are distinguished and the most used ones are identified. Among verbal phraseological units, the most used structural model is V+N (41.71%), which accounts for almost half of the total volume of verbal phraseological units. For substantive phraseological units, the most used constructions are Prep+N (20.12%) and N+Prep+N (22.29%). The most characteristic constructions for adverbial phraseological units are Conj+Adv+Conj+Adj (23.00%) and V+Pron+Adv (20.00%), and for adjectival ones – Adj+N (13.43%) and Prep+Adj+N (12.69%). It is worth noting that in each structural model identified, there is always a dominant component - the corresponding part of speech that acts as the main (nuclear) component and, in the context, determines the syntactic role in the sentence, namely, in verbal models it is a verb, in substantive models it is a noun, in adverbial models it is an adverb, and in adjectival models it is an adjective;
 - the use of quantitative methods to analyze the idiomatic space of English fiction on military topics allowed us to determine the specifics and patterns of phraseological units usage:
 1) using Pearson's criterion, the uniformity of the distribution of phraseological units in the textual material was checked at a sufficient level of statistical significance and it was

proved that the distribution of phraseological units in English literary texts on military topics is uniform and the corresponding idiomatic space is homogeneous;

2) using the Student's criterion, the differences in the frequency of occurrence of verbal, substantive, adverbial, and adjectival phraseological units and interjections in each text source were identified and at a sufficient level of statistical significance, it was concluded that there are no differences in the frequency of use of phraseological units of different classes according to the part-of-speech criterion in the works of the source base.

The use of linguistic statistical or quantitative methods has made it possible to provide a substantiated description of the content, structure and linguistic features of the idiomatic space of English military fiction, which will further allow comparing it with the idiomatic spaces of English fiction in various genres, to study and compare the lexical-semantic and functional features of phraseological units of the corresponding text spaces.

References

Alabdali, Tahani. 2021. *Translating Idiomatic Expressions in Literary Texts Saving the Pragmatic Meaning.* اللغات وآدابها مجلة ا 389–418.

Archer, Jeffrey. 2013. B*est Kept Secret*. London: Macmillan.

Ayto, John. 2020. *The Oxford Dictionary of Idioms*. Oxford University Press.

Baker, Mona. 2018. *In other Words: A Coursebook on Translation*. London: Routledge.

Clancy, Tom. 1986. *Red Storm Rising*. G. P.Putnam's Sons.

Fadillah, Ilmi. 2022. Idiomatic Expression Found in Movie Script of The Beauty and The Beast: A Semantics Study. *Ethical Lingua* 9(2). 645–651.

Gries, Stefan. 2008. *Phraseology and linguistic theory: a brief survey. Phraseology: An interdisciplinary perspective*. Amsterdam & Philadelphia: John Benjamins.

Harris, Robert. 1995. *Enigma*. New York: Random House.

Jabbari, Mohammad Jaffar. 2016. Idiomatic Expressions in Translation. *Journal of Advances in Humanities* 4(3). 507–514.

Lakoff, George. 2013. *The contemporary theory of metaphor*. Cambridge University Press.

Li, Xiuzhi. 2010. Conceptual Metaphor Theory and Teaching of English and Chinese Idioms. *Journal of Language Teaching and Research* 1(3). 206–210.

Michow, Elzbieta. 2013.*Studia nad frazeologią somatyczną języka polskiego i bułgarskiego*. Kielce: GlobalTrans-lator.

Moreno, Rosa. 2007. *Creativity and convetion: the pragmatics of everyday figurative speech*. Amsterdam: John Benjamins.

Naciscione, Anita. 2010. *Stylistic use of phraseological units in discourse*. Amsterdam & Philadelphia: John Benjamins.

Owens, Jonathan. 2016. *The lexical nature of idioms*. *Language Sciences* 57. 49–69.

Pakir, Anne. 2009. English as Lingua Franca: Analyzing Research Frameworks in International English, World Englishes and ELF. *World Englishes* 28(2). 224–235.

Perebyinis, Valentyna. 2013. *Statistical methods for linguists*. NK Publishers.

Ren, Chi. 2013. Translation of English *Idioms* from the Perspective of Cultural. *Cross-Cultural Communication* 9(5). 78–81.

Robinson, Patrick. 1997. *Nimitz Class*. HarperCollins, U.S.A.

Rogers, Margaret. 2015. *Specialized translation. Shedding the 'non-literary' tag*. India: Palgrave Macmillan.

Seidl J. & McMordie, W. 1988. *English Idioms and How to Use Them*. Oxford: Oxford University Press.

Skandera, Paul. 2007. *Phraseology and Culture in English*. Berlin: Walter de Gruyter.

Smith, Logan. 1971. *Words and Idioms; studies in the English language*. Gryphin Books.

Strack, Daniel. 2019. *Metaphor from the Ground Up: Understanding Figurative Language in Context*. Lanham, MD: Lexington Books.

Sulikowska, Anna. 2019. *Kognitive Aspekte der Phraseologie: Konstituierung der Bedeutung von Phraseologismen aus der Perspektive der Kognitiven Linguistik*. Berlin: Peter Lang GmbH.

Tambunan, Sunarti D. 2023. Revealing the classification of idioms and the translation strategies from English into Indonesian in "Recruit" series movie. *Jurnal Sosial Humaniora dan Pendidikan* 2(1). 48–54.

Wierzbicka, Anna. 2010. *Experience, Evidence and Sense: The Hidden Cultural Legacy of English*. Melbourne: Oxford University Press.

Wulff, Stefani. 2008. *Rethinking Idiomacity: A Usage-based Approach*. London/New York: Continuum Press.

Zusak, Marcus. 2007. *The Book Thief*. Knopf Books for Young Readers.

Sources
Merriam-Webster Dictionary (https://www.merriam-webster.com/)
The Free Dictionary (https://www.thefreedictionary.com)

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