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ON STYLISTIC DIFFERENTIATION IN UKRAINIAN POETIC SPEECH BASED ON THE SYNTACTIC STRUCTURE OF SENTENCES

Background. The article is devoted to the stylistic differentiation of syntactic structures of Ukrainian-language poetic texts of the Ukrainian language corpus. The goal is to study the idiosyncrasy on models of syntactic structures, graphically presented in the form of dependency trees, with the establishment of parameters for characterizing the author's style. The properties of the linear structure of 7,752 Ukrainian-language sentences in the verse style were studied. An "averaged" dependency graph was built for each author as a generalization of the syntactic parameters of dependency trees.

Methods. Applied methods of structural linguistics included quantitative methods and modeling methods, distributive analysis, direct component method, method of constructing dependency trees (DT) and direct components in linguistic analysis modules: automatic morphological (distributive) and automatic syntactic (direct component and dependency tree method).

Results. As a result of the study, it was established that the architecture of the phrase is important, that is, a scheme in the form of a graph that reflects the real sequence of syntactic elements of the statement. If the author has developed his individual writing style, this will inevitably affect the originality of the graphic drawings for the structures of his typical phrases. It is in syntactic stylistics that dependence graphs as a research method will find an unlimited field of application. Eight graph parameters are proposed, the choice of which is determined by the fact that they have stylistic distinguishing power.

Conclusions. To justify the applied method of statistical analysis, it can be said that in stylistics each analysis gives only what it can give; the overall research picture consists of a comprehensive review of the results of all analyses. Qualitative methods can describe what is perceived from the text through its symbolic character, but only quantitative methods can explain why the text is constructed in the way it is. Qualitative characteristics consist of precisely those quantitative characteristics that cannot be seen by the average reader, and their detection is the task of science.

Keywords: parser, dependency tree, dependency graph, idiosyncrasy, direct component method, dependency graph parameter.

Background

All textologists know that the key to a writer's style lies in syntax. The division of poetic language into syntactic units – sentences (simple and complex, with different types of syntactic dependencies between members of a simple sentence and parts of a complex sentence) – reveals some features of the syntax of individual styles. A sentence is a carrier of style to a much greater extent than a word.

This is explained by the fact that the individual freedom of choosing structural options at the syntactic level reveals the author's manner of unfolding thought; syntax has more structural possibilities for expressing thought than at other levels; in the syntactic structure, such qualitative interpretations as "fusion – discontinuity" of the structural model, "syntheticity – analyticity" of the forms of expression of grammatical categories, "simplicity – complexity" of the sentence, and "subjectivity – familiarity – effectiveness" of the semantic-syntactic organization of the sentence are clearly revealed.

The poetic syntax attracts special attention. This article is devoted to the stylistic differentiation of the syntactic structures of the Ukrainian-language poetic texts of three Ukrainian poets: Lina Kostenko, Mykola Vinogradovskiy, and Ivan Drach. The purpose of the article is to develop a methodology for the analysis and study of idiosyncrasy using models of syntactic structures, graphically presented in the form of dependency trees, with the establishment of parameters for characterizing the author's style, as well as compiling a dictionary of models of multi-component complex sentences for studying the peculiarities of the linear

structure of Ukrainian-language poetic text. Such a goal required the performance of a number of tasks, including the automatic compilation of a database of syntactic structures in the form of trees of hierarchical dependencies with their grammatical, quantitative and qualitative characteristics, and linguistic interpretation.

Related Works. The creativity of Lina Kostenko was the focus of attention for M. V. Holtvenytska (Holtvenytska, 2021), who investigated the peculiarities of the representation of simple sentences in the L. Kostenko's poetic works in the collection "Madonna Perekhrest". O. O. Telezhkina (Telezhkina, 2016) analyzed the artistic and expressive possibilities of various types of complex sentences. The stylistic syntax of Mykola Vinogradovskiy was analyzed by Yu. I. Kalashnyk (Kalashnyk, 2015), I. O. Kukharchuk (Kuharchuk, 2022), A. G. Omelchenko (Omelchenko, 2021). The analysis of recent studies and publications shows that scientists pay more and more attention to the functional and stylistic purpose of the specified syntactic units, sometimes choosing individual works of artists or non-representative samples. Most researchers are indifferent to the architecture of the phrase. However, the syntax of the lyrics of Lina Kostenko, Mykola Vinogradovskiy, and Ivan Drach was not the subject of a complex linguistic-stylistic comparative analysis taking into account the architecture of the phrase, which determined the choice of our research. We tried to develop a methodology for the study of the author's style which would be based on the properties and signs of individual style and carried out on a large body of material.

Methods

The applied methods of structural linguistics included quantitative and modeling methods, distributive analysis, the method of direct components, the method of building dependency trees (DT) and direct components in linguistic analysis modules: automatic morphological (distributive) and automatic syntactic (method of direct components and dependency trees).

Experiment. The research was carried out on the material of the Ukrainian Language Corpus (mov.a.info), a sub-corpus of poetic speech. The full-text sub-corpus of three Ukrainian poets was analyzed with a total of 67,982 word forms; the total number of sentences is 7,752. The largest number of sentences was found in the sub-corpus of Lina Kostenko (3,358), which is explained, on the one hand, by the larger volume of the subsample and, on the other hand, by the smallest average sentence length (7,7). At the same time, the sub-corpus of Ivan Drach's sentences (1,872) turned out to be the smallest, while the average sentence length is the largest and is slightly more than 11 word forms. The sub-corpus of M. Vingranovsky is 2,522 sentences (the average sentence length 8.1). In order to study the syntax of the Corpus of the Ukrainian language (mov.a.info) within the framework of AGAT computer grammar, the following type of parser was created, which provides various information about the functioning of grammatical syntactic units and their categories, in

particular formal-syntactic ones: predicativeness, subordination, coherency, as well as categories subject, predicate, secondary member of the sentence, etc. Linguistic software was developed. At the first stage, it helped to automatically isolate a word combination from any text of the Corpus, which makes it possible to automatically build alphabetic-frequency dictionaries of the conjunctiveness of all parts of the language. At the second stage, it was applied to carry out a syntactic analysis of the entire sentence in the form of a dependency tree. Fig. 1 contains a table of subordination, which the program builds automatically. Above the working table in Fig. 1, there is a sentence with a morphological annotation about participle and categorial characteristics. The table has three columns: in the first, the main member of the binary compound (master) is the core word; in the second, the subordinate member of the compound (servant) is an adjunct word; and in the third, syntactic information about the type of compound. Note that each type of syntactic connection has an internal code.

In Fig. 2, this table is inverted into a graphical form and corresponds to a dependency tree (DT).

Since the grammar of dependencies is based on the theory of word combinations and syntactic relations, the main concepts of which are control and, therefore, valence.

The next sentence of Lina Kostenko's poetry is depicted in the form of a DT in Fig. 3.

Красива (АЖ) осінь (КИ) вишиває (ГЯ) клени (ІУ) Червоним (АТ) , (,) жовтим (АТ) , (,) срібним (АТ) , (,) золотим (АТ) , (,) Зберегти

осінь	Красива	іменникова безприйменникова сполука
вишиває	осінь	координаційний зв'язок
вишиває	клени	дієслівна безприйменникова сполука
вишиває	Червоним	дієслівна безприйменникова сполука
Червоним	жовтим	однорідна сполука
Червоним	срібним	однорідна сполука
Червоним	золотим	однорідна сполука

Fig. 1. The interface of the software for building the DT worksheet

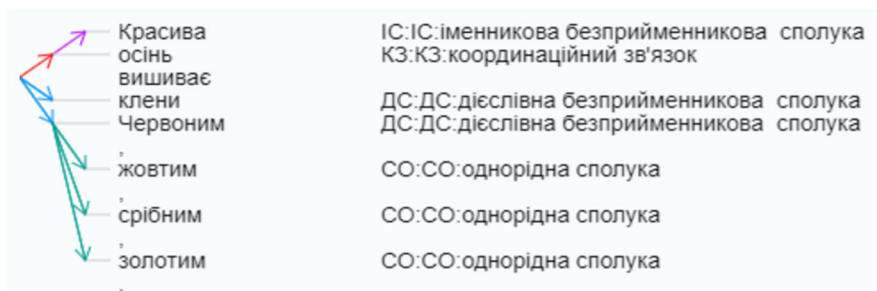


Fig. 2. Software interface with the constructed dependency tree

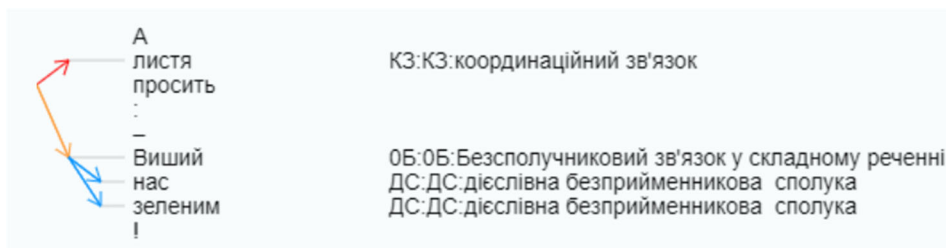


Fig. 3. The interface of a sentence from Lina Kostenko's poetry "Krasyya osin' vyshyvaye kleny..."

This sentence is unconjugated with two predicative parts (the first part: *A lystya prosyt'*; the second: *vyshyy nas zelenym*). All the nodes of the binary pair are connected by

an arc to which the code is assigned: in the first part K3 (coordination connection – *lystya prosyt'*), in the second part, two DCs (verbless prepositional compounds – *vyshyy*

nas and *vyshyy zelenym*). At the same time, the discontinuity between these predicative pairs can be eliminated thanks to the agreement: the predicate of the first predicative part is directed by an arc to the predicate of the second part, and the code 0Б is assigned to the arc, i.e. a non-conjunctive connection in a complex sentence. As can be seen in Fig. 3, the graph is continuous, that is, the connection between the predicative parts of a complex sentence is visualized according to the rules of five models of the representation of the connections of predicative parts in a complex sentence, described in (Darchuk, 2022).

Results

The architecture of the phrase is important, that is, a scheme in the form of a graph that reflects the real sequence of syntactic elements of the statement. If the author has developed his/her own individual writing style, this will inevitably affect the originality of the graph drawings for the structures of his/her typical phrases. It is in syntactic stylistics that dependence graphs as a research method will find an unlimited field of applications. But first of all, it is necessary to determine the diagnosis of graphs, which provide important information for stylistic conclusions since they serve as parametric information. The following parameters of graphs are proposed, the choice of which is motivated by the fact that they have style-distinguishing power (Sevbo, 1981).

Number Of Nodes (length parameter), i.e., how many words there are in a sentence. This parameter will indicate "brevity" in the case of a small number of them or "complexity of thoughts" squeezed into a long sentence, but will by no means characterize the structural complexity of the phrase since a long sentence has more opportunities for stylistic and syntactic variation. The value of the parameter is calculated by the number of word forms in the tree.

Number Of Simple Sentences. In general, this parameter indicates how discretely or non-discretely the author tries to express his/her thoughts, while discreteness can be associated with dividing the observed situation into atomic facts described by one predicative pair. Both a quantitative parameter and a qualitative characteristic of the arrangement of simple sentences in a complex one are important. It is counted by the number of predicative pairs or main members (in impersonal sentences).

The Width Of Branching by Levels (width parameter). This characteristic, represented by the number of nodes per level, is interesting because it shows the complexity of the sentence. It is possible to establish a relationship between the depth – the number of levels of subordination – and the width of the branching tree – the number of elements located at the same level.

Number Of Levels (depth parameter). The value of this parameter is calculated by the number of nodes in the longest path of the tree, which corresponds to a chain of interdependent words.

Maximum Direction Changes. The meaning of this parameter is that the disconnection of the "master-servant" pair is repeated as many times as the direction of the path changes – a zigzag is observed in the figure.

Maximum Extent Of Link. If the previous parameter determines how many broken "controller-controlled" pairs are successively wedged into each other, this parameter indicates the size of the gap, that is, the number of words that separate the "master" from the "servant".

The Number of Homogeneous / Similar Groups in the Tree. This parameter is related to a stylistic feature: the author's manner of discretely or non-discretely expressing his/her thoughts, since any

homogeneous or similar group is to some degree an independent fragment of the tree, the more widespread it is, the more independent it is, and vice versa. This diagnostic parameter does not say anything about the structure of each homogeneous group or about the way they are arranged in the DT. However, coherency, subordination, and homogeneity are not split due to the impossibility of doing this automatically at this stage. Perhaps, with the accumulation of linguistic facts, it will be possible to automate the process of analyzing these structures and analyze them separately.

Asymmetric – the ratio of the number of nodes to the right and to the left of the perpendicular lowered from the root of the tree to the abscissa axis. The expression of a classical composition is a symmetrical drawing: its left part, in relation to the root, is a mirror image. A strict laconic simple sentence corresponds to a DT with the same number of nodes on the right and on the left, which indicates an even distribution of dependent words and, therefore, a smooth narrative. These are only from 11 % (V. Vingranovskiy) to 17 % (I. Drach). However, in half of the samples, the sentences are complex, and this determines the asymmetric pattern (from 71 % (Drach) to 79 % (Vingranovskiy, Kostenko), a significant number of branches occur to the right of the root.

On an intuitive level, it is clear that it is easier to perceive a sentence with consecutive connections, and when control words are located with their controlled ones. Then you don't have to keep in memory a group of words wedged between the control-controlled pair. Mostly trees are directed to the right (this is both a sequence of paths and right-hand coverings), trees with a left direction are less common. These are basically sentences with inverted word order and stylistic coloring. It is accompanied by a significant number of changes in the path – zigzags.

As for complex sentences and the arrangement of simple sentences in them – subtrees – these are also interesting connections. These are interweavings of sentences that reflect the sophisticated course of the author's thought, combining cause and effect, the circumstances of the event, etc. An example can be a sentence from the poem "Do dzherel..." by I. Drach (Fig. 4).

Fig. 4 shows the interface of the graph and sentence parameter calculations. For this sentence, a computer draws up the following protocol by automatically determining the value of each parameter: 1) the tree is unbroken, i.e., all nodes are connected; 2) projective, because no arc intersects with the projection of the perpendicular to the node; 3) 25 word forms in a sentence; 4) three simple sentences in a complex one; 5) the graph has ten levels, which is measured by the number of nodes in the longest path of the tree, which corresponds to a chain of words that are sequentially dependent on each other; 6) the width of the branching at the root is three; this is the number of words subordinate to the top, two dependent actants: *dozrivaye tysha* (the subject in the tree is reduced to the position of the actant), *dozrivaye tut*; unconjugated connection through predicates of predicative parts: *dozrivaye i vodyt'*; 7) the maximum number of changes in the path is 2; 8) the maximum length of the branch is seven, which means the number of words that separate the subordinate from the subordinating; in this case, according to the rules of grammar, the direction from the left (controlling) to the right (controlled) is preserved between the predicates of the unconjunct clause; 9) there is an asymmetry of the graph (1/23), since the number of members on the left-hand side from the root of the graph is less than the number of right-hand members 10) the number of contiguous groups is one (it flies and disappears) (*poletyt' i shchezne*).



Fig. 4. The interface of a sentence from the poetry of Ivan Drach "Do dzherel..."

Each of these parameters gives an idea of the composition of a simple and lengthy sentence, characterizing an individual style of writing, allows us to see structural indicators that are hidden until we learn to "read" a graph. All the listed diagnostic parameters are diverse in their content. The "phrase length" parameter describes not a structural but an external feature. The parameters "number of levels in the tree" and "number of simple sentences in the complex" are directly related to the structure of the phrase, indicating how many relatively independent fragments the phrase is composed of.

The rest of the diagnostic parameters conditionally describe the graph pattern, although they are related to linguistics. In fact, we are not dealing with a picture but with a set of seven numbers. Thus, the verbal description of the graph is replaced by a statistical survey of seven diagnostic parameters.

The graph is represented by a set of 7 numbers, that is, it becomes a seven-dimensional vector that changes

depending on a specific sentence, namely: $X = (x_1, x_2 \dots x_7)$, which characterizes the regularities of the structure of the graph of the poetic text. For the analyzed sentence, the vector is equal to: 1) nodal parameter is 25; 2) the number of levels in the tree is 10; 3) width parameter is 3; 4) the maximum number of changes in the direction of the path in the tree is 2; 5) the maximum length of an arc in a tree is 7; 6) the number of homogeneous or equal groups in the tree is 1; 7) the number of simple sentences in the complex one is 3, i.e. (25, 10, 3, 2, 7, 1, 3). If the corpus of Ivan Drach's poems consisted of 1,872 sentences, and a vector was constructed for each one, the lower limit of the confidence interval will be the value of the vector that coincides with the lower confidence vector. The vector whose value coincides with the upper limit of the confidence interval will be the upper confidence vector. Then the average graph of the poet will be a vector that will fit into the corresponding confidence intervals (table 1).

Table 1

Name	DRACH		KOSTENKO		VINGRANOVSKY	
	Average amount	Mean square deviation	Average amount	Mean square deviation	Average amount	Mean square deviation
Nodes	10,00	8,60	7,00	4,82	10,00	7,27
Levels	4,00	2,36	4,00	1,74	4,00	2,24
Width parameter	1,00		1,00		1,00	
Simple sentences	2,00	0,65	2,00	0,61	2,00	0,69
Par. of the number of direction changes	1,00		0,00		1,00	
Arc length parameter in the tree	3,00		2,00		3,00	
Branching width at the root	2,00	1,29	2,00	1,14	2,00	1,33
Lower confidence vector	{1; 2; 1; 1; 1; 3; 1}		{2; 3; 1; 1; 0; 2; 1}		{3; 2; 1; 1; 1; 3; 1}	
Upper confidence vector	{19; 6; 1; 3; 1; 3; 3}		{12; 6; 1; 3; 0; 2; 3}		{17; 6; 1; 3; 1; 3; 3}	

In the Corpus of Ukrainian language texts, averaged syntactic parameters are automatically calculated for each work, or collection, or author (for the studied authors, the data is included in the lower part of table 1). From this, it follows that all vectors are different; this is clear, but it is important to detect, on the contrary, sentences that go beyond the limits of confidence probabilities and to find an explanation for them, as well as to "recognize" the author.

According to the results of the study of the dependence graphs of the sentences of each author, the following characteristic of the idiostyle can be given:

Mykola Vingranovskyi

Smooth rhythmic sound is not characteristic of the author: complex sentences have an asymmetric structure of predicative pairs. In each simple fragment, there is a bundle of dependencies, and the bundle is directed to the inner part, as if framing the sentence. Trees grow only to the right; a sentence begins with a predicate and forms a chain of dependents. Characteristic use of three dots, i.e., broken sentences. And another type of the author's structures is the long right path, where several similar short sentences of approximately the same length are consecutively strung together. The main feature of M. Vingranovsky's syntax is the constant use of consecutive constructions (1,616) and various kinds of homogeneous series (449). In other authors, uniformity is episodic, for this poet, it is dominant and is the key to syntactic style.

Ivan Drach

Sentences are syntactically lengthy. The reasons for the clumsiness are the distant location of the master-servant pair and breaks in syntactically connected words. It manifests itself in the need to keep in memory the initial words of a group of dependencies until the appearance of the remaining dependent and connected pairs of words. At the same time, tree fragments (subtrees) remain simple in structure and are connected by sequential stringing. Arcs are extended due to a long path in the graph and a large bundle of dependencies at one root.

Lina Kostenko

The graphs are highly asymmetric, the arcs extending from left to right with the apex either at the beginning or at the end of the sentence. Characteristic inversions, comparative and adverbial inversions. In trees, in the absence of verbs, prepositions are the roots. Complex sentences are characterized by a sequential stringing of fragments. The tree grows, as a rule, from left to right in both simple and complex sentences. The narrative is fluid, almost every noun has a meaning; members of a homogeneous series consist of a small number of words, which makes the sentence easy.

Discussion and conclusions

We can be reproached for approaching the author's stylistics from the standpoint of one-sided analysis, because neither vocabulary, techniques of expression, functional tonality of speech, or the broad context are taken into account. In justification of such an approach, it can be said that in stylistics, each analysis gives only what it can give; a general picture of the situation is obtained by an integral consideration of the results of all analyses. As Gasparov

noted, qualitative methods can be used to describe how we see a work, but only quantitative methods can be used to explain why it is presented as it is. (Gasparov, 1974). Qualitative characteristics consist of precisely those quantitative characteristics that cannot be felt, and their detection is the task of science.

At the same time, we believe that it is unpromising to go the path of accumulating individual facts. Modern linguistics faces the task of providing a complete description of the language using rigorous scientific methods. Yes, it is important to look for typical "Vingranov" or "Kostenko" phrases, but similar phrases alternate with neutral ones, you need to find a balance between regularity and richness of syntactic structures, and the path of formal modeling is a promising way to solve many linguistic problems.

Authors' contribution: Nataliia Darchuk – conceptualization, methodology, collection of empirical data and their validation, writing; Oxana Zuban – conceptualization, methodology, collection of empirical data and their validation, viewing and editing; Victor Sorokin – software.

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СТИЛІСТИЧНА ДИФЕРЕНЦІАЦІЯ УКРАЇНСЬКОГО ПОЕТИЧНОГО МОВЛЕННЯ НА МАТЕРІАЛІ СИНТАКСИЧНОЇ БУДОВИ РЕЧЕНЬ

Вступ. *Присвячена стилістичній диференціації синтаксичних структур україномовних поетичних текстів Корпусу української мови. Мета – вивчення ідіостилю на моделях синтаксичних структур, представлених графічно у вигляді дерев залежностей, із встановленням параметрів для характеристики авторського стилю. Досліджено властивості лінійної структури 7752 україномовних речень віршованого стилю. Для кожного автора був побудований "усереднений" граф залежностей як узагальнення синтаксичних параметрів дерев залежностей.*

Методи. *Застосовувані методи структурної лінгвістики включали кількісні методи та методи моделювання, дистрибутивний аналіз, метод прямих компонентів, метод побудови дерев залежностей (ДЗ) і прямі компоненти в модулях лінгвістичного аналізу: автоматичний морфологічний (дистрибутивний) та автоматичний синтаксичний (метод безпосередніх складників і дерева залежностей).*

Результати. *Унаслідок дослідження встановлено, що важливою є архітектура фрази, тобто схема у вигляді графа, що відображає реальну послідовність синтаксичних елементів висловлювання. Якщо автор виробив свій індивідуальний стиль письма, це неминуче позначиться на оригінальності графічних малюнків для структур його типових фраз. Саме в синтаксичній стилістиці графи залежностей як метод дослідження знайдуть необмежене поле застосування. Проте насамперед необхідно визначити діагностику графів, які надають важливу інформацію для стилістичних висновків, оскільки вони служать параметричною інформацією. Запропоновано вісім параметрів графів, вибір яких зумовлений тим, що вони мають стилеметричну розрізнявальну силу.*

Висновки. *Для обґрунтування застосованого методу статистичного аналізу важливо зазначити, що у стилістиці кожен аналіз дає лише те, що він може дати; загальна дослідницька картина складається з комплексного розгляду результатів усіх аналізів. Якісними методами можна описати те, що сприймається з тексту через знаковий характер, але лише кількісними методами можна пояснити, чому текст побудований саме так. Якісні характеристики складаються саме з тих кількісних характеристик, які неможливо побачити пересічному читачеві, і їхнє виявлення є завданням науки. Перед сучасною лінгвістикою стоїть завдання повного опису мови за допомогою строгих наукових методів.*

Ключові слова: *парсер, дерево залежностей, граф залежностей, ідіостиль, метод безпосередніх складників, параметр графа залежностей.*

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