A QUANTITATIVE ANALYSIS OF THE NOVEL
NE SPYTAVŠY BRODU BY IVAN FRANKO

Solomija Buk

Abstract

In modern linguistic studies, the quantitative analysis of the works of many world known writers are made. Ivan Franko is one of the most powerful figures for Ukraine; that is why the multilateral analysis of his heritage is very important. In the article, the history of his novel "Without Asking a Wade" is given. The statistical features of the novel are obtained on the basis of text corpus. A special attention is paid to quantitative relations between parts of speech (the indexes of epithetization, nominalization, and verbal definitions). An analysis of the Menzerath–Altmann law regarding the length of syllables (in phonemes) versus the length of words (in syllables) in the text and vocabulary of the novel is presented.

Keywords: *quantitative analysis, novel, statistical features, text corpus, relations.*

1. Introduction

Statistical and quantitative studies in linguistics are relatively new approaches to text analysis, but they have a long tradition both in the Ukrainian and world science and can be traced back in the history to the times of Antiquity.

The precise quantitative analysis of the many famose writers are made, not only Western European W. Shakespeare[1], J. Joyce[2], but also Slavic: K. Čapek[3], B. Hrabal[4], O. Březina[5], M. Pavić[6], M. Danojlić[7], N. Vaptsarov[8], K. Baczyński[9], F. Dostojevski[10], A. Chekhov[11].

At the Ivan Franko National University of Lviv (Ukraine), the Corpus of Ivan Franko's long prose fiction is currently under development. It is the first stage of a larger project of the I. Franko text corpus. A comprehensive statistical description of Franko's works is planned as one of the project outcomes[12]. From this point of view, the novels *Boryslav smijetsja [Boryslav Laughs]*, *Zakhar Berkut*, *Dlja domašnjoho ohnyšča [For the Hearth]*, *Osnovy suspil'nosty [Pillars of Society]*, *Velykyj šum [The Great Noise]*[13], *Boa Constrictor*[14], as well as *Perekhresni stežky [The Cross-Paths]*[15] are described. The statistical properties of the lexicon of the novel *Ne spytavšy brodu [Without Asking a Wade]* are the object of separate study in this article.

Ivan Franko (1856–1916) was the famous poet, writer, ethnographer, philosopher, economist of the Western Ukraine when it was part of the Austro-Hungarian Empire. He had a great influence on the public opinion and formation of national consciousness of Western Ukrainians in the 19–20th centuries. That is why the modern study of his heritage is an important question of national honor.

The present article has the following structure. In the second Section, the history of work's reconstruction is given; Section 3 contains a brief description of the electronic text corpus compilation and its markup, in particular, the direct and author's speech as well as the morphological characteristics of words. In Section 4 the statistical features of the novel are presented with a special attention paid to quantitative relations between parts of speech (the indexes of epithetization, nominalization, and verbal definitions). Section 5 contains analysis of the Menzerath–Altmann law regarding the length of syllables (in phonemes) versus the length of words (in syllables) in text and vocabulary of the novel. Conclusions and research prospects are in Section 6.

2. The history of text reconstruction of the novel *Without Asking a Wade*

Ne spytavšy brodu [Without Asking a Wade] is an unfinished work by Ivan Franko; it has an interesting history of creation and literary life. Franko worked on the novel during the 1880s and planned to publish it at first in the *Postup* magazine (letters to M. Drahomanov from October 31 and November 20, 1886), and later, after the police confiscated even the magazine prospect, he planned to publish it in an almanac, which also failed to be printed. So, the novel *Without Asking a Wade* remained unpublished, only its seven separate fragments appeared in different editions and started to live an independent life: *Na loni pryrody [On the Bosom of Nature]*, *Hava i Vovkun [Hava and Vovkun]*, *Borys Hrab*, *Genij [Genius]*, *Herschko Goldmacher*, *Hava*, *Driada [Dryad]*. The short story *Hava* was even published as a separate book[16] and translated into Polish[17].

The novel *Ne spytavšy brodu [Without Asking a Wade]* was first published as a whole work in the journal *Červonyj šljakh*[18]. It was reconstructed by M. Voznjak and was accompanied by his article entitled *An attempt to reconstruct the unfinished novel*[19]. The novel was published as a book also in 1966 having been reconstructed by H. Verves[20]. His article *The unfinished novel by Ivan Franko "Without Asking a Wade" (To the problem of the Ukrainian–Polish public relations)*[21] preceded this edition.

3. The Text Corpus of *Without Asking a Wade* and its markup

The electronic text corpus of the novel *Without Asking a Wade* is based on the text variant which was published by M. Voznjak[22], republished in the Franko 50-volume collection of works[23] including excerpts from the short story *Na loni pryrody [On the Bosom of Nature]*[24].

External markup contains the following information about the text: bibliographic description, education and origin of the author, time and duration as well as place of writing a work, etc. Structural annotation informs about the text division (sections I–IX in the novel under consideration), about poetic insertions, footnotes (supplemented by the

information if they are written by the author or by an editor), about direct and author's speech and so on[25]. For instance, the novel contains two passages of "руська народна пісня" ["Ruthenian folk song"], which start form the words "Де ж ти, милий, пробуваєш..." ["Where are you residing, darling..."]. No author's comment or footnote is observed. Interestingly, Ivan Franko saw no need in translating Hebrew/Yiddish, German or Polish dialogues of his characters, this can serve as a confirmation that these languages were understandable for the writer's contemporary recipients. All footnotes and comments in the text are made by the editors, e. g. the translation of the Polish book title "Wieczory pod lipą" ["Evenings under a linden"] is translated in the footnote as "Вечори під липою" *(польськ.) – Ред.* Such footnotes are not considered in our analysis because these do not belong to Ivan Franko.

The discrimination between the direct and author's speech in the novel also has a separate scientific interest, as far as the prose fiction is not a homogeneous genre (often being interpreted in such a way by scientists, however) but an integral mixture of the colloquial and narrative genres. The proportions of these two types are given in Table 1:

novel	direct speech		author's speech		total	
Without Asking a Wade	*word occurrences*	*%*	*word occurrences*	*%*	*word occurrences*	*%*
	21 590	**43.9**	27 580	**56.1**	49 170	**100**

Table 1: *The frequencies in the direct and author's speech in the novel "Without Asking a Wade" by Ivan Franko*

From the observed data it is clear that the direct speech is important as it occupies a big part of the work (almost 44 %). It is interesting to compare these figures with other long-prose works of Ivan Franko. Similar proportions between the direct and author's speech are found in the novels about writer's contemporary life: *Boryslav..., Dlja domašnjoho..., Osnovy..., Perekhresni..., Velykyj šum* (42.1–49.1 %). The least amount of the direct speech is contained in *Boa constrictor* (12.4 %), which is caused by narrative features of the work. *Zakhar Berkut* and *Petriji j Dovbuščuky [Petrijs and Dovbuščuks]* are historical works requiring more author's descriptions, that is why they contain fewer dialogues: 34.3 % and 30.7 %, respectively. It is presented graphically in Figure 1:
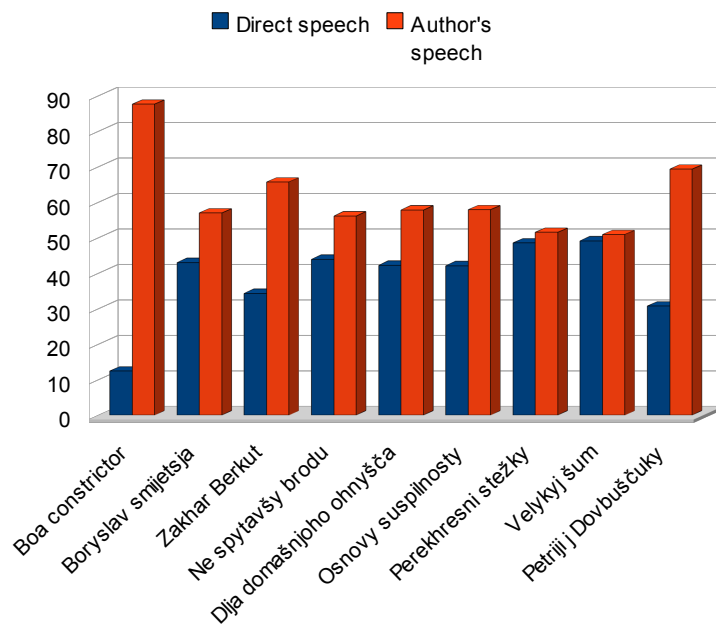
<div style="text-align:center">

Direct speech ■   Author's speech ■

</div>

Figure 1: *The proportion of direct and author's speech in the novels by Ivan Franko*

In general, the average amount of the direct speech in all the long prose works of Ivan Franko is 40.6 %; this indicates a high level of dialogues there.

Internal markup includes in particular the *morphological* data. It gives a possibility to automatically obtain rich information about word-forms, lexemes (lemmas), parts of speech, etc. Every word-form in the process of lemmatization was given a unique form. Two lists were then generated using a computer program: frequency list of word-forms and frequency list of lemmas. The example of the frequency dictionary for the novel *Without Asking a Wade* is given in the Appendix. During the preparatory work with the text a typographic inaccuracy was fixed: the word *доклано* was corrected to *докладно*. For the word-form *ригорозум* the lemma "ригорозум або ригороз" was suggested as far as it is difficult to reconstruct a proper Ukrainian singular form of this Latin loan from the context (… то був найстарший син Трацьких, укінчений правник і трохи вже чи не доктор прав (мав ще одно ригорозум робити), Густав… and … вже я вас візьму на такий строгий екзамен, строжший, ніж усі ваші ригорози). The homonymy is resolved in the corpus. The following homonyms were found by means of contextual analysis: *а* (int., conj.), *або* (conj., particle), *батьків* (adj., noun), *біг* (noun, verb), *братів* (adj., noun), *будуще* (noun, adj.), *все* (adv., pron.), *горі* (noun, adv.), *граб/Граб* (common and proper noun), *де* (adv., particle), *діти* (noun, verb), *доктор* (medical doctor and academic degree), *долі* (noun, adv.), *дорога* (noun, adj.), *жаль* (noun, predicative word), *жидків* (noun, adj.), *захід* (action, direction), *зимою* (noun, adv.), *її, його, їх*

(pers. and posess. pron.), *касієрова* (noun, adj.), *коло* (noun, prep.), *корч* (a plant, a spasm), *коса* (a braid, a scythe), *крихітку* (noun, adv.), *круг* (noun, adv.), *лютий* (noun, adj.), *мило* (noun, adv.), *минувше* (noun, adj.), *ніж* (noun, particle), *о* (int., prep.), *образ* (a view, an insult), *палати* (noun, verb), *паничів* (noun, adj.), *перед* (noun, prep.), *передом* (noun, adv.), *поверх* (noun, adv.), *повій* (noun, verb), *поза* (noun, prep.), *попасти* (to get and to shepherd), *професорова* (noun, adj.), *проше* (noun, adj.), *рано* (noun, adv.), *святий* (noun, adj.), *свято* (noun, adv.), *слід* (noun, adv.), *собі* (pron., particle), *справа* (noun, adv.), *столова* (noun, adj.), *та* (conj., particle), *так* (adv., particle), *тепло* (noun, adv.), *це* (particle, pron.), *чи* (particle, conj.), *чому* (adv., pron.), *шкода* (noun, predic. word), *що* (pron., conj., particle), *як* (adv., conj., particle) and others. In the dictionary, the part of speech or the meaning is indicated for homonyms.

In the frequency dictionary, the phonetic variants (being mostly euphonic alternations) are joined with basic forms: *б/би/би-м*; *в/у*; *бачитися/бачитись*; *вбити/убити*; *вважатись/ уважатися*; *весь/ввесь/увесь*; *лякатися/лякатись*, etc.

4. Linguostatistical characteristics of the novel *Without Asking a Wade*

In the process of quantitative processing of long prose fiction by Franko[26] the scheme for the statistical description of the text properties was developed. The following parameters were calculated.

Text size (N) is 49 170 word occurrences, including 27 580 occurrences of author's speech and 21 590 of direct speech. By size *Ne spytavšy...* occupies the sixth place after the novels *Perekhresni...* (93 890), *Boryslav...* (77 455), *Osnovy...* (67 172), *Petriji...* (52 751), *Zakhar...* (50 223), before *Dlja domašnjoho...* (44 841), *Velykyj šum* (37 005), and *Boa constrictor* (25 427). As one can see from these data, the size of the analyzed novel is closest to the size of *Zakhar Berkut*. To make the comparison correct, the obtained statistical characteristics were analyzed alongside the results for *Zakhar...* having approximately the same text length[27].

The total number of lemmas (V) in the vocabulary (i. e., the list of different lemmas) of *Without Asking a Wade* is 7 140. The index of variety $V/N = 0.15$ (in *Zakhar...* its value is 0.13), the mean repetition of a word in the text is thus $N/V = 6.9$, i. e. on the average every word in the text is used almost 7 times, which is a bit less than in *Zakhar...* (7.7 times).

The amount of hapax legomena (i.e. the words occurring only once in the text) $V_1=3$ 834. The indicator for the vocabulary variability, i. e. exclusiveness index for text ($V_1/N = 0.078$) and for dictionary ($V_1/V = 0.54$) are calculated from these data. Hapax legomena occupy 7.8 % of the text and 53.7 % of the vocabulary.

The amount of words with frequency higher than 9 in text ($V_{10,T}$) is 35 938 (73,09 %) and in the vocabulary (V_{10}) is 625 (8,75 %). These characteristics

allow for the calculation of concentration indexes for text ($V_{10,T}/N = 0.73$) and vocabulary ($V_{10}/V = 0.09$).

The *proportions of parts of speech* in the text and vocabulary can be considered properties of an individual author's style, as well as a specific feature of a concrete work[28] (Perebyjnis et al. 1985:152). As far as the text corpus has the morphological markup (with the classical classification of parts of speech applied; conjunctions, interjections, particles, and prepositions are considered auxiliaries), the frequency of each part of speech was automatically obtained in the vocabulary and text (see Table 2).

As it is shown in Table 2, the most frequent words in the text are naturally auxiliary (synsemantic) parts of speech: they occupy less than 3 % in the vocabulary, but they function very actively and cover more than a quarter of text (26.63 %). Pronouns have a similarly high activity. They occupy less then 1% in the vocabulary, but almost 16 % of the text. Adverbs and numerals cover approximately the same fraction in the text and in the vocabulary (8.15/8.60 % and 1.08/0.80 %, respectively):

Parts of speech	Words in text		Words in dictionnary	
auxiliary	13092	26, 63 %	211	2, 96 %
nouns	10961	22, 29 %	2383	33, 38 %
verbs	9007	18, 32 %	2447	34, 27 %
pronouns	7680	15, 62 %	64	0, 90 %
adverbs	4008	8, 15 %	614	8, 60 %
adjectives	3890	7, 91 %	1362	19, 08 %
numerals	530	1, 08 %	57	0, 80 %
fragments	2	0,00 %	2	0, 03 %
	49170	**100, 00 %**	**7140**	**100, 00 %**

Table 2: *Parts of speech distribution in the text and vocabulary of Franko's novel "Without Asking a Wade"*

Nouns, verbs and adjectives show the highest variety. For this parts of speech, the relative numbers in the vocabulary exceed the proportions in the text. Nouns occupy about 22 % of the text and 33 % of the vocabulary, relative number of verbs in the text (34 %) is about twice larger than the number in the vocabulary (18 %), the proportion of adjectives is three times higher in the vocabulary than in the text: 19 % versus 8 %. The vocabulary richness of a work depends on these morphological classes. Figures 2 and 3 demonstrate this situation:
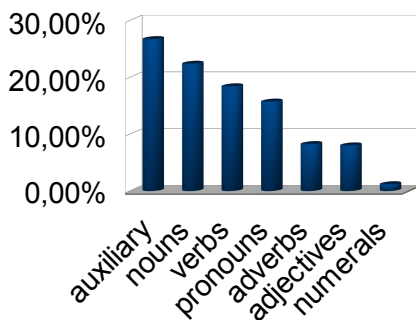
Figure 2: *Percentage of Parts of Speech in the text of the novel "Without Asking a Wade"*
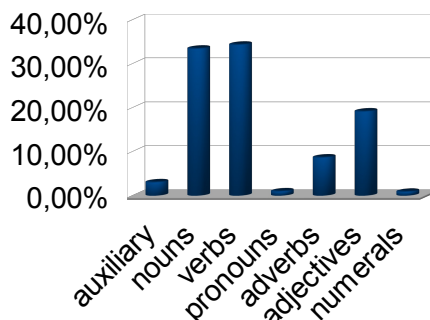

Figure 3: *Percentage of Parts of Speech in the vocabulary of the novel "Without Asking a Wade"*

The *quantitative relations between parts of speech* are known as an important element of statistical text characteristics. The parameters are: the index of nominal definitions, i.e. *the index of epithetization* (relation of the total noun occurrences to the total adjective occurrences), *the index of verbal definitions* (relation of the total adverb occurrences to the total adjective occurrences)[29], *the level of nominalization* (relation of the total noun occurrences to the total verb occurrences)[30]. In Table 3, the values of such parameters for the novel *Without Asking a Wade* are compared to those of the novel *Zakhar Berkut* and to average indexes for Franko's long prose as well as for the Ukrainian fiction of the mid-twentieth century:

	Ne spytavšy	*Zakhar Berkut*	**Ivan Franco's long prose**	**Ukrainian prose (mid.-20th cent.)**
index of epithetization	2, 82	2, 69	3, 13	3, 00
Index of verbal definitions	0, 44	0, 46	0, 46	0, 46
level of nominalization	1, 22	1, 56	1, 30	1, 41

Table 3: *Quantitative relations between parts of speech in Franko's works "Without Asking a Wade", "Zakhar Berkut", Franko's long prose, and the Ukrainian mid-twentieth century fiction*

In *Ne spytavšy...* there are more nouns per one adjective/epithet (2.8) than in *Zakhar...* (2.7), but less than in the long prose fiction of Franko (3.1) and the Ukrainian prose in general (3.0). The index of verbal definitions shows the number of adverbs per one verb: in the analyzed text this indicator is smaller (4.4 adverbs per 10 verbs) than in *Zakhar...* and writer's long prose (4.6 adverbs per 10 verbs). The index of nominalization in *Ne spytavšy...* equals 1.22; it means that there are 1.22 nouns per one verb (in *Zakhar...*, it equals 1.56; in Franko's long prose it is 1.3; in the 20th century

Ukrainian long prose, it is 1.4). Although the indexes of epithetization, nominalization, and verbal definitions are only some of the many instruments used for the stylistic analysis of text, they can be considered as a set of parameters to complement the qualitative text analysis.

5. Testing the Menzerath-Altmann Law

One of the important language laws in quantitative linguistics is the Menzerath–Altmann law[31]. In order to check it the dependence of average syllable length L (measured in phonemes) on the word length s (measured in syllables) was analyzed. The following simple model[32] was applied for types:

(1)　$L(s) = L_\infty + Bs^c, \qquad c < 0$

The constant L_∞ denotes a hypothetic asymptotic value of the mean syllable length in a very long (infinite) word, the exponent c is a negative number ensuring the observed decrease of syllable length. It also leads to an infinite syllable length for non-syllabic words ($s = 0$). Such words (particles *б*, *ж*, prepositions *в*, *з*, conjunction *ŭ*) were treated as a separate class with word length equal zero.

Function (1) yields a good fit, see Table 4 and Fig. 4a. The calculations were made using GnuPlot. As the obtained value of the exponent c is close to –1, the fitting was also made with function (1) at fixed $c = -1$ to reduce the number of fitting parameters:

s	$L(s)$	$NL(s)$	$NL(s)$
0	∞	∞	∞
1	3.32	3.324	3.305
2	2.64	2.618	2.645
3	2.40	2.404	2.425
4	2.29	2.304	2.315
5	2.21	2.246	2.249
6	2.18	2.209	2.205
7	2.24	2.183	2.174
8	2.21	2.164	2.150
9	2.11	2.149	2.132
		$L_\infty = 2.05 \pm 0.06$ $B = 1.27 \pm 0.06$ $c = -1.17 \pm 0.15$ $R^2 = 0.992$	$L_\infty = 2.05 \pm 0.06$ $B = 1.27 \pm 0.06$ $c = -1$ (fixed) $R^2 = 0.989$

Table 4: *The fitting of mean syllable length by Eq. (1) for the list of types. The calculated values NL(s) are compared to the observed data L(s)*

Note that for another Franko's novel, *Perekhresni stežky* (*The Cross-Paths*), the following values were obtained: $L_\infty = 1.98$, $B = 1.46$, $c = -1.12$.
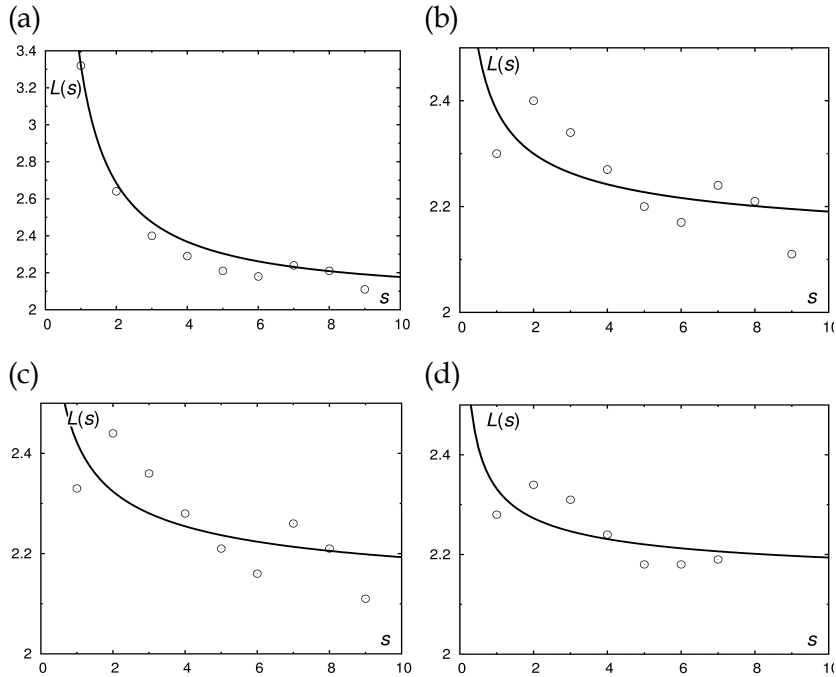
Figure 4: *The fitting results. Solid line − fitting function (1),
circles − observed data. Panel (a) demonstrates results obtained for the list of types
(at fixed c = −1), panel (b) corresponds to the whole text,
panels (c) and (d) correspond to author's and direct speech,
respectively, all at fixed c = −1/2.*

The dependence of the mean syllable length on word length for the text of the novel (a set of tokens as opposed to the list of types discussed above) was studied with respect to the whole text, the direct speech, and author's speech. The decrease of the syllable length in this case is weaker than for the types. To reduce the number of parameters, the value of c in Eq. (1) was put $c = -1/2$.

The results of calculations are presented in Table 5 and Figs. 4b–d:

s	Whole text		Author's speech		Direct speech	
	$L(s)$	$NL(s)$	$L(s)$	$NL(s)$	$L(s)$	$NL(s)$
0	∞	∞	∞	∞	∞	∞
1	2.30	2.382	2.33	2.422	2.28	2.332
2	2.40	2.300	2.44	2.324	2.34	2.273
3	2.34	2.264	2.36	2.280	2.31	2.247
4	2.27	2.242	2.28	2.255	2.24	2.231

5	2.20	2.227	2.21	2.237	2.18	2.220
6	2.17	2.216	2.16	2.224	2.18	2.212
7	2.24	2.208	2.26	2.214	2.19	2.206
8	2.21	2.201	2.21	2.205		
9	2.11	2.195	2.11	2.199		
	$L_\infty = 2.102 \pm 0.065$ $B = 0.280 \pm 0.116$ $c = -0.5$ (fixed) $R^2 = 0.456$		$L_\infty = 2.087 \pm 0.073$ $B = 0.335 \pm 0.130$ $c = -0.5$ (fixed) $R^2 = 0.486$		$L_\infty = 2.130 \pm 0.061$ $B = 0.202 \pm 0.100$ $c = -0.5$ (fixed) $R^2 = 0.451$	

Table 5: *The fitting of mean syllable length by Eq. (1) for text.*
The calculated values NL(s) are compared to the observed data L(s)

As one can see from the presented results, the suggested function can be used to model the dependence of the syllable length on the word length when the text level is analyzed. However, a high scatterring of data leads to a low value of the coefficient of determination R^2.

6. Conclusions and research prospects

In the paper, the novel *Ne spytavšy brodu [Without Asking a Wade]* by Ivan Franko received an elementary quantitative description in the light of statistical and quantitative linguistics. Such description is an integral part of the comprehensive study of a literary work, alongside qualitative analysis, which is dominant in modern linguistics.

This description is made on the basis of an electronic marked text corpus. The data provided are such features as text size, number of different words, variety index, average repetition of a word in the text, number of hapax legomena, exclusiveness index in the text and vocabulary, concentration index, the indexes of epithetization, nominalization, and verbal definitions.

The dependence of syllable length in terms of phonemes on the word length in terms of syllables is studied in order to check the Menzerath–Altmann law. Two models are tested, one of which is suitable for the dependence deduced for list of types, and another one yields a good fit for the text as a whole. Subsets of author's and direct speech are also well-fitted by this model.

By virtue of such a description, the place of the novel within other long-prose works by Ivan Franko is determined. In the perspective, the study of the following features is planned: the functioning of high- and low-frequent words, the correlation between word rank and text coverage, semantic features of the vocabulary in different frequency zones, quantitative

peculiarities of proper names and other word groups in the overall context of Franko's long prose, etc.

After a consistent description of linguostatistical portraits of all the works by Ivan Franko (applying the same principles and methods) we will receive a complex representation of the statistical text structure in Ivan Franko's style. It would be impossible to do without the novel *Without Asking a Wade*.

Notes

[1]Complete Shakespeare wordlist, 2006-2014.
[2]Hanley, 1951.
[3]Čermák, 2007.
[4]Čermák *et alii*, 2007.
[5]Holman 1993.
[6]Vasić, 1998.
[7]Vasić, 2002.
[8]Krylova *et alii*, 1996.
[9]Balowski, 1997.
[10]Šajkevič *et alii*, 2003.
[11]Grebennikov, 1999.
[12]Buk, 2007; Buk, 2013b.
[13]Buk, 2010a–d; Buk, 2011.
[14]Buk, 2013a.
[15]Buk *et alii*, 2007; Buk *et alii*, 2010; Buk *et alii*, 2006–2014.
[16]Franko, 1888a.
[17]Franko, 1888b.
[18]Franko, 1927; Franko, 1929.
[19]Voznjak, 1929.
[20]Franko, 1966.
[21]Verves, 1963.
[22]Franko, 1927; Franko, 1929.
[23]Franko, 1979b.
[24]Franko, 1979a.
[25]Buk, 2009.
[26]Buk, 2013b.
[27]Buk, 2010a.
[28]Perebyjnis *et alii*, 1985, p. 152.
[29]Kamińska-Szmaj, 1988, p. 128.
[30]Ruszkowski, 2004, p. 50.
[31]Hřebíček, 2005.
[32]Buk *et alii*, 2007.

References

BALOWSKI, M. *Lista frekwencyjna poezji, prozy i dramatu Krzystofa Kamila Baczynskiego*. Prohowice: Wydawnictwo PRO, 1997 [=Balowski, 1997].

BUK, S. *Корпус текстів Івана Франка: спроба визначення основних параметрів* //Прикладна лінгвістика та лінгвістичні технології: MegaLing-2006. Київ, 2007 [=Бук, 2007].

BUK, S. *Структурне анотування у корпусі текстів (на прикладі прози Івана Франка)* //Українська мова. №3, 2009 [=Бук, 2009].

BUK, S. *"Захар Беркут" Івана Франка у світлі статистичної лінгвістики* //Науковий часопис національного педагогічного університету імені М. П. Драгоманова. Серія 10. Проблеми граматики і лексикології української мови. Вип. 6, 2010 [=Бук, 2010a].

BUK, S. *Інтерпретація лексики роману Івана Франка "Великий шум" у кількісно-статистичному аспекті* //Studia Methodologica. Вип. 30, 2010 [=Бук, 2010b].

BUK, S. *Статистична структура роману І. Франка "Борислав сміється"* //Ученые записки Таврического национального университета им. В. И. Вернадского. Серия "Филология". Т. 23(62), № 3, 2010 [=Бук, 2010c].

BUK, S. *Статистичні характеристики роману Івана Франка "Основи суспільності" (на основі частотного словника твору)* //Вісник: Проблеми української термінології. № 676, 2010 [=Бук, 2010d].

BUK, S. *Роман Івана Франка "Для домашнього огнища"* крізь призму частотного словника //Мовознавство. № 4, 2011 [=Бук, 2011].

BUK, S. *Частотний словник повісті Івана Франка "Boa constrictor" (редакція 1884 р.)* //Стежками Франкового тексту (комунікативні, лінгвосеміотичні, когнітивні та лінгвостатистичні виміри прози. Львів, 2013a [=Бук, 2013a].

BUK, S. *Квантитативна параметризація текстів Івана Франка: проект та його реалізація* //Вісник Львівського університету. Серія філологічна. Вип. 58, 2013b [=Бук, 2013b].

BUK, S., ROVENCHAK, A. *Statistical Parameters of Ivan Franko's Novel "Perekhresni stežky" (The Cross-Paths)* //GRZYBEK, P., KÖHLER, R. (eds.) *Exact Methods in the Study of Language and Text: Dedicated to Professor Gabriel Altmann on the Occasion of his 75th Birthday* (Quantitative Linguistics, 62). Berlin–New York: Mouton de Gruyter, 2011 [=Бук *et alii*, 2011].

BUK, S., ROVENCHAK, A. *Он-лайн конкорданс роману Івана Франка "Перехресні стежки"* //http://www.ktf.franko.lviv.ua/users/andrij/science/Franko/concordance.html, 2006-2014 [=Бук *et alii*, 2006-2014].

BUK, S., ROVENCHAK, A. *Частотний словник повісті І. Франка "Перехресні стежки"* //Стежками Франкового тексту (комунікативні, стилістичні та лексичні виміру роману "Перехресні стежки"). Львів, 2007 [=Бук *et alii*, 2007].

BUK, S., ROVENCHAK, A. *Он-лайн конкорданс роману Івана Франка "Перехресні стежки"* //Іван Франко: дух, наука, думка, воля: Матеріали Міжнародного наукового конгресу, присвяченого 150-річчю від дня народження Івана Франка (Львів, 27 вересня–1 жовтня 2006 р.). Т. 2. Львів, 2010 [=Бук *et alii*, 2010].

ČERMÁK, F. (hl. ed.). *Slovník Karla Čapka*. Praha: Nakladatelství Lidové noviny, 2007 [=ČERMÁK, 2007].

ČERMÁK, F., CVRČEK, V. (ed.) *Slovník Bohumila Hrabala*. Praha: Nakladatelství Lidové noviny, 2009 [=ČERMÁK *et alii*, 2009].

Complete Shakespeare Wordlist //http://en.wiktionary.org/wiki/Wiktionary:Frequency_lists/Complete_Shakespeare_wordlist, 2006-2014 [=*Complete…*, 2006-2014].

FRANKO, I. *Гава. Образок з життя підкарпатського народу*. Львів: Просвіта. № 110. кн. 11, 1888 [=Franko, 1888a].

FRANKO, I. *Hawa. Obrazek z natury* //*Kurjer Warszawski.* № 31–33, 1888 [=Franko, 1888b].

FRANKO, I. *Не спитавши броду* //*Червоний шлях*. 1927: № 1, 1927; № 1, № 2, 1929 [=Franko, 1929].

FRANKO, I. *Не спитавши броду. Повість (Реконструкція повісті і післямова Г. Д. Вервеса)*. Київ, 1966 [=Franko, 1966].

FRANKO, I. *На лоні природи* //*Зібрання творів у 50-ти томах*. Т. 18. Київ, 1979 [=Franko, 1979a].

FRANKO, I. *Не спитавши броду* //*Зібрання творів у 50-ти томах*. Т. 18. Київ, 1979b [=Franko, 1979b].

GREBENNIKOV, A. *Частотный словарь рассказов А. П. Чехова* /под ред. Г. Я. Мартыненко. Санкт-Петербург, 1999 [=GREBENNIKOV, 1999].

HARLEY, M. *Word Index to James Joyce's "Ulysses"*. Madison: University of Wisconsin Press, 1951; *Ulysses by J. Joyce: A Ranked Concordance* http://www.doc.ic.ac.uk/~rac101/ concord/texts/ulysses/ [=Harley, 1951].

HOLMAN, P. *Frekvenční slovník básnického díla Otokara Březiny* (něm. s tit. Frequenzwörterbuch zum lyrischen Werk von Otokar Březina). 2 sv. Köln am Rhein–Weimar–Wien, 1993 [=Holman, 1993].

HŘEBÍČEK, L. *Text Laws* //*Quantitative Linguistics: An International Handbook.* Ed. by Reinhard Köhler, Gabriel Altmann, and Raimund G. Piotrowski. Berlin–New York: Walter de Gruyter, 2005 [=HŘEBÍČEK, 2005].

KAMIŃSKA-SZMAJ, I. *Części mowy w słowniku i tekście pięciu stylów funkcjonalnych polszczyzny pisanej (na materiale słownika frekwencyjnego)* //*Biuletyn Polskiego Towarzystwa Językoznawczego.* Nr. 41, 1988 [=KAMIŃSKA-SZMAJ, 1988].

KRYLOVA, G., AZAROVA, A., ZAKHAREVICH, E. *Честотен речник на Вапцаровата поезия*. Велико Търново, 1996 [=Krylova *et alii*, 1996].

PEREBYJNIS, V., MURAVYTSKA, M., DARCHUK, N. *Частотні словники та їх використання*. Київ, 1985 [=PEREBYJNIS *et alii*, 1985].

RUSZKOWSKI, M. *Wskaźnik epitetyzacji w badaniach stylistycznych* //*Respectus Philologicus.* Nr. 5(10), 2004 [=RUSZKOWSKI, 2004].

ŠAJKEVIČ, A., ANDRJUŠČENKO, V., REBETSKAJA, N. *Статистический словарь языка Достоевского*. Москва: Языки славянской культуры, 2003 [=Šajkevič *et alii*, 2003].

VASIĆ, S. *Polazne osnove novije srpske proze. Knjiga II. Hazarski rečnik Milorada Pavića: frekvencijski rečnik*. Beograd, 1998 [=Vasić, 1998].

VASIĆ, S. *Polazne osnove novije srpske proze frekvencijski rečnik romana Oslobodioci i izdajnici Milorada Danojlića*. Beograd, 2002 [=Vasić, 2002].

VERVES, Н. *Незакінчена повість Івана Франка "Не спитавши броду" (До проблеми українсько-польських громадських зв'язків)* //Славістичний збірник. Київ, 1963 [=Verves, 1963].

VOZNJAK, М. *Спроба відбудови невикінченої повісті* //Червоний шлях. № 1, 1929 [=Voznjak, 1929].