

# Thematic structure of images in Vladimir Nabokov's lyrics

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## ABSTRACT

Nabokov, known primarily for his prose, was also a remarkable poet. The article aims to examine the semantic (lexical) features of Nabokov's images in his lyrics. These characteristics include 23 semantic (thematic) classes of words that fill two positions of the figurative model – the position of the Target of the metaphoric transfer and the position of its Source. The material includes 4 lyrical collections by Nabokov, published at different stages of his creative path – an early collection (published when he lived in Russia), 2 later collections from the Berlin period (middle stage) and one collection of mature creative activity when Nabokov lived in the USA. The article examines the relationships between the features of the two positions of the image, the distribution of semantic classes of words in the image system, and changes in the frequencies of these classes over time.

**Keywords:** Nabokov lyrics, images, thematic classes, target, source

## 1 Introduction. System of features and research material

V.V. Nabokov's poems are in the shadow of his prose, but it was with poetry that he (under the pseudonym Vladimir Sirin) began his way in literature. The first works written by the beginning author (unsuccessful in the opinion of his contemporaries and later Nabokov himself), appeared in the collection *Poems (Stikhi)*, published in 1916 in Petrograd, when the author was only 17 years old. Then in 1918, new poems followed in a joint collection with A.V. Balashov *Two Ways (Dva puti)*. The next stage of his literary activity was the Berlin period (1922-1937) during which Nabokov not only wrote his first novels *Mary*, *The Luzhin Defense*, *The Gift* and other works, but also published collections of poems *A Bunch (Grozd')* (1923), *The Empyrean Path (Gorniy put')* (1923), *The Return of Chorb. Stories and Poems (Vozvrashcheniye Chorba. Rasskazy i stikhi)* (1930). Later Nabokov continued to write and publish poems throughout his career. He published *Poems, 1929-1951 (Stikhotvoreniya, 1929-1951)* (1952) followed by several collections in which he included poems from periodicals. From the above it follows that Nabokov's poetry should in no way be underestimated or overlooked in his creative life (Boyd 1999; De Vries 1991; Morris 2010).

The purpose of this article is to define the main features of Nabokov's poetic image system and to identify the tendencies of its development. In our study we use the scheme of images proposed for Russian poetry (Pavlovich 1995, 1999), which is based on the approach to the study of conceptual metaphor in cognitive linguistics.

According to this approach, an image is a fragment of text in which a metaphoric model is realized. The model includes Target domain (the recipient of new properties) and the Source of the properties transferred to the Target, Target and Source being not identical from the point of view of the scientific picture of the world.

Thus, in *Ti, yelochka ustala?* (Are you tired, Christmas-tree?) the author transfers the properties of a human being (ability to be tired, ability to be an interlocutor) to a plant. In the verse line *Prolyutsa shepchuschiye zvuki* (Whispering sounds will pour out) the properties of liquids are transferred to sounds.

To describe the Target and the Source, a number of thematic classes (ThC) are used, a list of which is given below. First, the name of the thematic class is given, then, if applicable, explanations in brackets, and after the colon follow examples from Nabokov's images.

*Area* (including in buildings): countryside, field, land, plain, desert, roof.

*Auditory perception*: sound, voice, music.

*Clothes* (including cloth): linen, dress, kerchief, robe, stockings, velvet

*Container*: container, box, cup, goblet.

*Darkness* (including dark colours): black, dark, darken, shadow, twilight.

*Existential phenomenon*: birth, death, die, life, live.

*Fire*: burn, burning, fire, fiery.

*Food*: anise-tasted, bread, lemon.

*Household items*: cupboard, wardrobe, chest of draws, bed.

*Information*: word, phrase, fairy-tale, tale.

*Instrument* (working or military tools): hammer, needle, scissors, shield, sword.

*Jewelry*: amber, emerald, gold, ruby, silver, pearl.

*Light*: candle, glow, lamp, light, star, sun, ray.

*Liquid*: drop, flow, pour, river, sea, water.

*Living being* (people and animals): man, mother, son, reader, soldier, beetle, bird, to be tired, to feel, butterfly, fish, grasshopper.

*Mental phenomenon* (emotions and mental processes): anger, fear, feeling, hatred, hope, idea, love, sadness, thought, memory.

*Natural phenomenon*: frost, snow-storm, storm, rain, thunder, wind.

*Part of body* (human or animal): hand, hair, heart, eye, foot, lips, tongue, wing.

*Plant*: plant, birch, flower, fur-tree, grass, oak, pine.

*Social phenomenon*: equity, freedom, peace, power, war

*Substance*: glass, dissolve, dust, murky, steel, wax

*Time period*: hour, minute, moment, day, the past.

*Transport*: airplane, boat, car, cart, train.

This scheme of features was compiled empirically during the analysis of the figurative system of Russian poetry, as well as the experience of its application to the poems of American poets (Pavlovich 1995; Andreev 2012).

Words of the above mentioned thematic classes can be found in the model both in the Source and Target positions. In the phrase *A wave of tall grass* the word *wave* (Liquids thematic class) is the source of new properties for the *grass* (Plant thematic class). On the other hand, in the example *screaming sea* it is the representative of the Liquid thematic class *sea* that takes on new properties transferred from the Living being theme, thus acting as Target.

Research material compiles 4 poetry collections that mark different stages in Nabokov's poetic life<sup>1</sup>.

*Two Ways* (TW) (1918) – the collection published by a young author unknown to the general public.

*A Bunch* (BN) (1923) – the first collection of poems published during Berlin period.

*The Return of Chorb* (RTB) (1930). The last collection with poems during Berlin period published when the author was already relatively famous thanks to his first novels.

*Poems, 1929-1951* (PM) (1952). This collection was published when Nabokov had firmly established himself among famous writers. Poems written since 1939 were taken from this collection for this study.

## 2 Results

As a result of the analysis, the following data on the frequency of the thematic classes in both positions of the model were obtained (Table 1). Counts were made separately for the Source and Target themes.

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<sup>1</sup> Nabokov, V.V. (2002). *Stihotvoreniya*. Akademicheskij proekt, Saint Petersburg, Russia.

**Table 1.** Frequencies of thematic classes in 4 books.

Thematic class	Target domain				Source domain			
	TW	BN	RTB	PM	TW	BN	RTB	PM
Area	8.14	4.12	2.83	2.46	5.81	3.61	1.94	2.90
Auditory perception	3.49	2.58	2.24	1.56	1.74	0.00	0.60	0.22
Clothes	0.00	1.03	0.30	0.45	2.91	2.58	1.04	1.12
Container	0.00	0.52	0.00	0.00	2.33	0.52	0.60	0.67
Darkness	0.00	4.64	0.75	0.45	0.58	1.55	0.15	0.67
Existential phenomenon	0.58	1.55	1.04	3.79	0.00	0.00	0.00	0.00
Fire	0	0	0	0	1.74	0.52	1.34	0.89
Food	0.00	1.55	0.00	0.00	0.00	1.03	0.30	0.45
Household items	0.58	1.03	3.13	0.67	3.49	1.55	0.45	0.22
Information	1.16	2.06	0.45	3.57	0.58	2.06	0.00	1.12
Instrument	2.91	0.52	0.89	0.22	0.00	0.00	0.75	0.45
Jewelry	0.58	0.00	0.00	0.22	2.91	4.12	0.45	0.67
Light	5.23	7.22	2.38	0.89	4.07	7.22	2.53	1.12
Liquid	2.33	2.58	0.45	0.89	2.33	2.06	1.04	0.45
Living being	1.74	10.31	1.04	5.13	30.23	24.23	11.18	11.61
Mental phenomenon	5.23	2.06	2.38	1.79	1.74	4.12	0.89	1.56
Natural phenomenon	4.07	0.52	0.30	0.00	0.00	0.00	0.30	0.22
Plant	18.60	3.61	1.49	1.12	0.58	2.58	0.30	1.79
Part of body	6.40	9.28	2.53	1.34	0.58	2.06	1.04	0.89
Social phenomenon	0.58	0.00	0.45	4.02	0.58	0.00	0.30	0.22
Substance	1.74	2.06	0.89	0.89	4.07	5.15	0.75	2.23
Time period	3.49	3.09	1.64	1.12	1.16	0	0	0.22
Transport	0.58	4.64	1.49	0.00	0.00	0.00	0.75	0.89

Notes: the frequencies are normalized to 100 lines.

The relationship between the thematic organization of Source and Target and its stability over time was established using the rank correlation coefficient. For each of the four collections, the Spearman rank correlation coefficient was calculated between the thematic classes of Source and Target.

All the obtained coefficients (for  $STW = 0.10$ ,  $SBN = 0.37$ ,  $SRTB = 0.21$ ,  $SPM = 0.17$ ) turned out to be statistically insignificant. Thus, the spectra of the ThCs that Nabokov seeks to rethink (Target) and the ThCs that he intuitively considers understandable (Source) are fundamentally different.

At the same time, comparison of the ranks of the Target themes from different collections yields significantly different results – here statistically significant correlations for  $p < 0.05$  are observed (Table 2). The same applies to the Source themes (see also Table 3).

**Table 2:** Rank correlation coefficients between thematic classes of Target domains across collections.

	<b>TW</b>	<b>BN</b>	<b>RTB</b>	<b>PM</b>
<b>TW</b>	x			
<b>BN</b>	0.48	x		
<b>RTB</b>	0.66	0.63	x	
<b>PM</b>	0.44	0.38*	0.51	x

**Table 3:** Rank correlation coefficients between thematic classes of Source domains across collections.

	<b>TW</b>	<b>BN</b>	<b>RTB</b>	<b>PM</b>
<b>TW</b>	x			
<b>BN</b>	0.72	x		
<b>RTB</b>	0.60	0.53	x	
<b>PM</b>	0.50	0.80	0.58	x

As can be seen from the data in this table, in only one case is the coefficient statistically insignificant, but at the same time, almost all their values are moderate in strength. This can be interpreted as follows. On the one hand, this means that the hierarchy of classes is more or less preserved and in the sphere of metaphorical rethinking the poetic world is relatively stable over time, but on the other hand, a number of significant changes are taking place.

The distribution of Source and Target themes frequencies, ranked in descending order, was fitted using an exponential function plus 1, which has been successfully applied in a number of studies (Mistecky, Altmann 2019; Kelih 2024):

$$y = 1 + a * e^{-b*x},$$

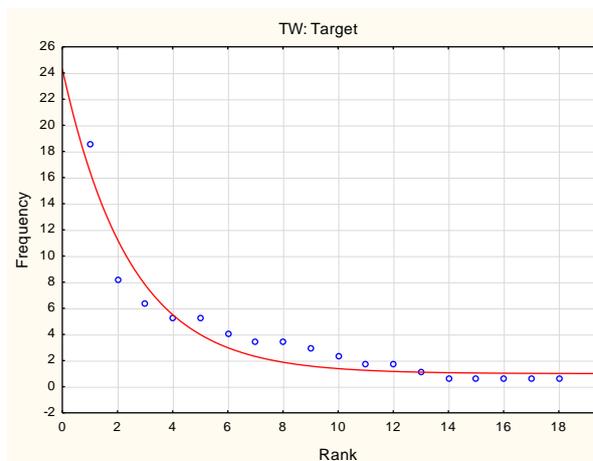
where  $a$  and  $b$  – parameters.

In our study this formula was used in all cases except one (in collection RTB for Target ThC) where the fitting was not successful. But applying the exponential function without added 1 improved the result. Thus in all cases the fitting yielded good results. Generally speaking, somewhat better results can be obtained using other functions, for example the Zipf-Alekseev function (Ráková et al. 2019), but it contains more parameters (three) while we tried to minimize their number.

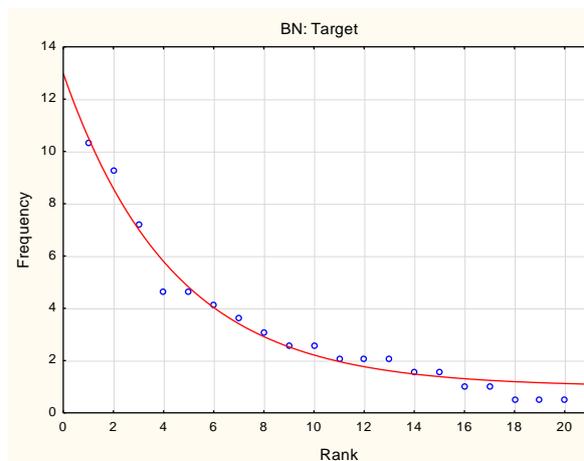
The results of the fitting are presented in Table 4 and in Fig. 1-8. More detailed data about the fitting can be found in the appendix. Classes with zero frequency values were skipped.

**Table 4:** Fitting the exponential function and the exponential function plus one to the ranked distribution of relative frequencies of thematic classes.

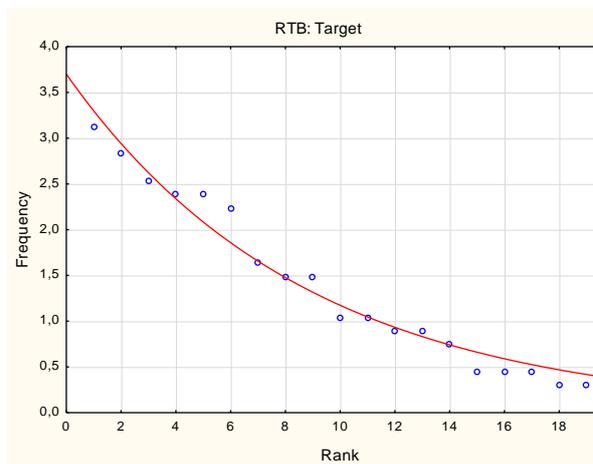
<b>TW: Target</b>	<b>BN: Target</b>	<b>RTB: Target</b>	<b>PM: Target</b>
r <sup>2</sup> = 0.91 a = 23.33 b = 0.41	r <sup>2</sup> =0.97 a=11.98 b=0.23	r <sup>2</sup> =0.97 a=3.70 b=0.11	r <sup>2</sup> =0.90 a=5.00 b=0.31
<b>TW: Source</b>	<b>BN: Source</b>	<b>RTB: Source</b>	<b>PM: Source</b>
r <sup>2</sup> =0.96 a=140.03 b=1.57	r <sup>2</sup> =0.93 a=59.04 b=0.96	r <sup>2</sup> =0.96 a=57.93 b=1.74	r <sup>2</sup> =0.95 a=47.55 b=1.74



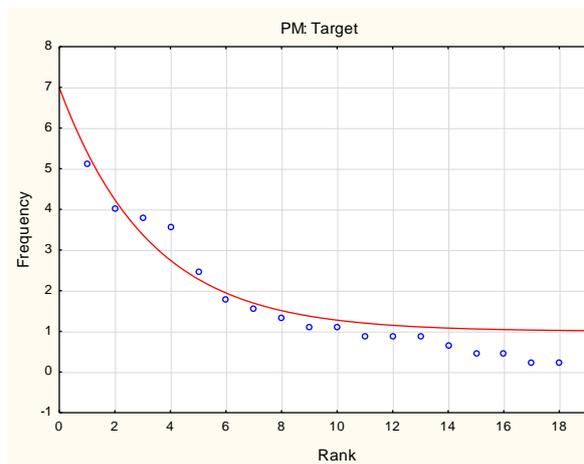
**Figure 1**



**Figure 2**



**Figure 3**



**Figure 4**

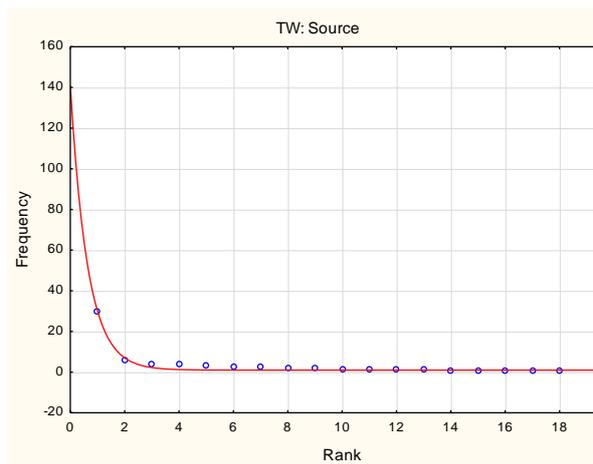


Figure 5

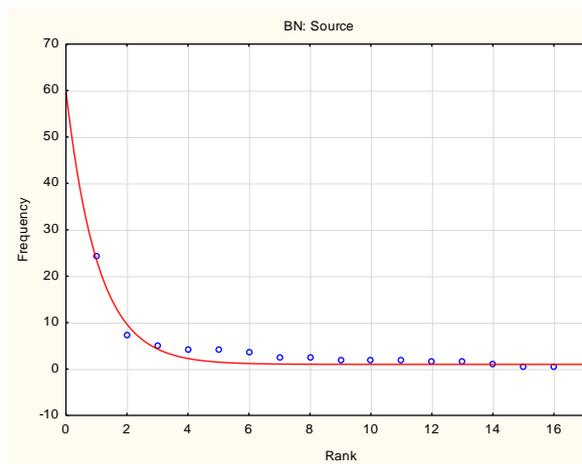


Figure 6

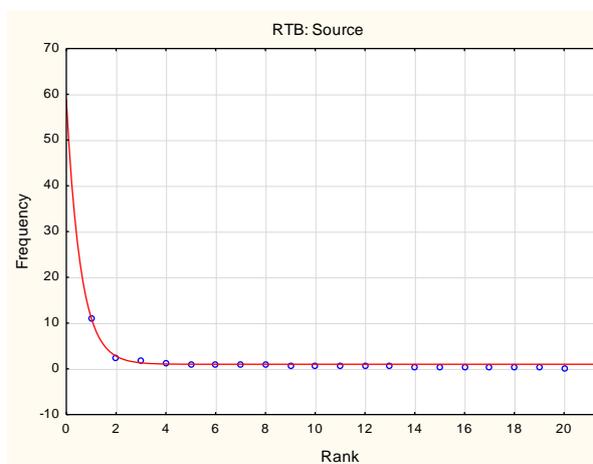


Figure 7

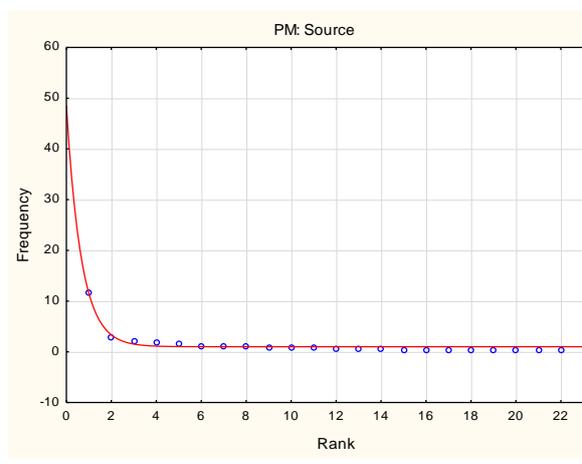


Figure 8

As seen from the data in Table 3, the parameter  $b$ , which reflects the rate of change of the function, is very different for the Target thematic classes, on the one hand, and for the Source domain, on the other hand. In the first case,  $b$  is significantly lower than 1 and reflects the tendency for a relatively slow (in Fig.3 very slow) decrease in the function. For the Source, the parameter  $b$  is greater than 1 in most cases (for BN it is equal to 1), reflecting a faster decay of the function. This is clearly visible in the figures which show the low and fast decay of the curve for the Source and the Target, respectively.

It seems appropriate to consider how these distributions affect the composition of thematic cores and their characteristics. In order to determine the core (the upper tail of the frequency curve) in the frequency list of thematic classes we use the method based on the Hirsh point ( $h$ ) which was proposed for the purpose of determining the lexical nucleus in linguistic studies in I-I. Popescu (Popescu 2007) and has been used in a number of studies (Kubát, Čech 2016; Popescu, Altmann 2006; Popescu et al. 2007). According to this approach, the rank that coincides with the frequency of the given unit is chosen as the threshold. In cases where there is no complete coincidence of the values of rank and frequency, the

following criterion proposed for such cases can be applied (Čech, Kubát 2016, p. 8; Kubát, Čech 2016, p. 152):

$$h = \frac{f(r_i)r_{i+1} - f(r_{i+1})r_i}{r_{i+1} - r_i + f(r_i) - f(r_{i+1})},$$

where  $h$  is the Hirsch point,  $r$  is the rank,  $f(r)$  is the frequency of a given rank ThC,  $r_i$  is the highest number for which  $r_i < f(r_i)$  and  $r_{i+1}$  is the lowest number for which  $r_{i+1} > f(r_{i+1})$ .

For each core an analysis of thematic concentration (TC) was performed applying the formula (Čech, Kubát 2016, p. 8; Kubát, Čech 2016, p. 152; Popescu 2007):

$$TC = 2 * \sum_{r'=1}^m \frac{(h - r') * f(r')}{h(h - 1) * f(1)}$$

where  $r'$  are ranks smaller than  $h$ ,  $f(r')$  are frequencies corresponding to these ranks,  $f(1)$  is the highest frequency,  $h$  is the value of the Hirsch point, and  $m$  is the number of ThCs with  $r < h$ .

The thematic concentration analysis allows one to quantify the ratio of frequencies of the core elements, necessary for revealing the author's systematic preferences in constructing their poetic worldview.

It should be noted that this concentration indicator is usually used for words while in this paper we use it to analyze more general entities, lexical (thematic) classes of words.

In our case thematic concentration serves as a measure of homogeneity among thematic classes in the frequency core.

As a result, the following data presented in Table 5 were obtained.

**Table 5:** H-point and concentration index in the core.

	Target		Source	
	H-point	TC	H-point	TC
<b>TW</b>	6.6	0.55	5.6	0.46
<b>BN</b>	7	0.76	6.43	0.47
<b>RTB</b>	9	0.82	7	0.40
<b>PM</b>	7	0.77	6	0.47

At the final stage of the analysis, we considered the degree of similarity of the collections in the space of the full list of parameters, using the Euclidean distance:

$$d_{(p,q)} = \sqrt{\sum_{k=1}^n (p_k - q_k)^2},$$

where  $p$  and  $q$  are points in  $n$ -dimensional space.

The distances between adjacent collections are graphically reflected by the histogram in Fig. 9. Judging by the height of the histogram columns reflecting the distances between collections, one can draw conclusions about the degree of changes in the representation of thematic classes across collections.

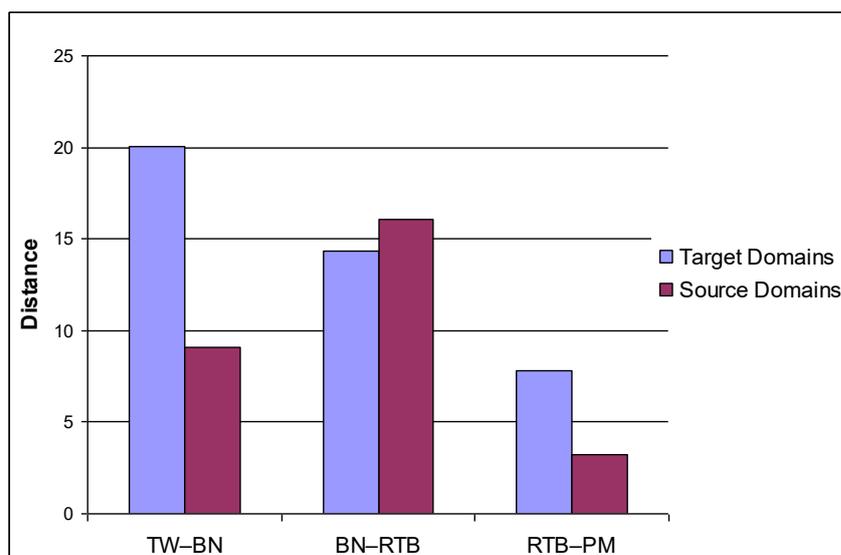


Figure 9: Distances between collections adjacent in time.

### 3 Discussion

The analysis reveals significant divergence between Target and Source domain core structures: Target domains exhibit greater frequency homogeneity among thematic classes, while Source domains show marked frequency disparities, particularly between the dominant Living being class and other core elements. While Living being metaphors constitute the most frequent cross-author pattern, the magnitude of intra-core frequency variation differs substantially. We interpret this variability as an objective signature of individual authors' figurative systems.

The disparity is particularly pronounced in RTB, where the Target domain's concentration index (0.82) doubles that of the Source domain (0.40), indicating fundamentally different organizational principles in their core structures. In the youth collection (TW) this tendency is somewhat less expressed. If we consider the concentration indicators of themes for the Target and the Source separately, we can see that in the Source domain the concentration of themes in the core initially increases, and in the later collection decreases to approximately the average values of the Berlin period.

In early lyrics Nabokov's core of the Target domain reflects his interest in the metaphorical interpretation of nature (Plant, Space, Light, Substance), where the typical locus is a sunlit meadow with sparse trees or a grove on a summer day.

Human being is represented by his material and mental features (Part of body, Mental phenomenon). In the Source domain Living being tops the list of the most frequent thematic classes. The remaining thematic classes of the core (Area, Light, Substance) perform the functions of both the Target and the Source.

The beginning of the Berlin period is associated with a shift in the author's focus on human being. The number of representatives of the human world grows, including Transport.

In the Source domain, the concentration is stable, with the exception of RTB. The themes that are represented here to the greatest extent are those covering the human micro-world (Part of body, Instrument, Living being, Transport, etc.).

The Source core remains sufficiently stable due to the ThCs of the Living being, Light and Area. The concentration of the Source fluctuates within a narrow range of values.

Changes in the frequencies of thematic classes in the Source and Target domains are quite pronounced, but manifest themselves differently at different stages.

The cores of thematic classes, identified using the Hirsch point, include mostly 6-7 elements. Two different trends are observed in the concentration of thematic classes in the core. The concentration of the Target increases, reaching a peak by the end of the 1920s. The maximum changes in the frequencies of Target domain ThCs are observed between TW, the early collection, and BN, the first poetry collection of the Berlin period. During the Berlin period, changes continue but are less pronounced, and after the Berlin period are significantly reduced. The Source is characterized by a more stable level of concentration.

Among the Source domain thematic classes, the peak of changes occurred during the Berlin period itself (BN–RTB). The changes between the first and second collections under study are less than this peak value (16.07) in the Berlin period and are clearly inferior to the changes recorded in the Target Sphere between TW and BN. Furthermore, between the final collection of the Berlin period and the subsequent collection, the changes in the Source domain are very minor. Thus, here both domains of thematic features behave identically showing minimal changes.

It is quite obvious that Nabokov's poetic style was formed towards the end of his Berlin period and his worldview changed little thereafter. The development of the Target domain was more intensive and began earlier, the development of the Source domain became more active towards the last poetry collection of the Berlin period already after the appearance of prose works.

## 4 Conclusion

Analysis of the figurative system of Nabokov's lyrics has shown a number of tendencies in the structure of images and their development over time. Thematic classes filling the positions of Target and Source in the image model in each collection differ significantly in their hierarchical structure.

Small values of the correlation between thematic classes in the Target and Source domains shows that the description of the world in Nabokov's poetry required an asymmetry in the hierarchical organization. At the same time, correlation of the thematic classes of the Target and of the Source across different collections reveal certain continuity in Nabokov's poetic images over time. On the other hand the frequencies of the Target and Source thematic classes vary across collections.

The study of the similarity of images in different collections according to the frequencies of thematic classes in the Target and Source domains made it possible to identify the main stages of changes. The greatest changes for the Target ThCs occurred between the earliest collection under study and the collection of the beginning of the Berlin period. Among the Source themes, the peak of change occurred during the Berlin period itself (BN–RTB). Nabokov's style changed until the end of the Berlin period, moving away from the model established in his youth. Berlin was at that time one of the centers of the Russian émigré creative intelligentsia and it was precisely during the Berlin period, by the end of the 1920s, Nabokov's poetic worldview was formed.

The distribution of thematic classes in both positions is well fitted by the exponential function plus 1 and the exponential function without the added 1. For the Target themes the graph declines much more smoothly than for the Source.

The research has contributed to a better understanding of the individual style of Nabokov as a poet. The findings of this research show the importance of investigating poetry written by the famous prose writer which can provide additional material for the study of periodization of Nabokov's creative activity, the dynamics of style not only in poetry but also in prose, and will help reveal the main trends in his style alteration.

The findings, however, remain intermediate. Future research of semantic classes frequency in prose compared to the presented data may provide better prospects for research into Nabokov's style.

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## Appendix

Fitting the exponential function plus one to the ranked distribution of thematic relative frequencies of thematic classes

TW: Target			BN: Target			RTB: Target			PM: Target		
Plant	18.60	16.48	Liv-B	10.31	10.53	H-hold	3.13	3.30	Liv-B	5.13	5.41
Area	8.14	11.27	PoB	9.28	8.58	Area	2.83	2.94	Social	4.02	4.24
PoB	6.40	7.81	Light	7.22	7.03	PoB	2.53	2.62	Exist	3.79	3.38
Ment	5.23	5.52	Tr-port	4.64	5.79	Ment	2.38	2.34	Inf	3.57	2.75
Light	5.23	4.00	D-ness	4.64	4.81	Light	2.38	2.08	Area	2.46	2.28
Nat	4.07	2.99	Area	4.12	4.03	Audit	2.24	1.86	Ment	1.79	1.94
Time	3.49	2.32	Plant	3.61	3.41	Time	1.64	1.66	Audit	1.56	1.69
Audit	3.49	1.87	Time	3.09	2.92	Plant	1.49	1.48	PoB	1.34	1.51
Instr	2.91	1.58	Liq-ds	2.58	2.53	Tr-port	1.49	1.32	Time	1.12	1.37
Liq-ds	2.33	1.38	Audit	2.58	2.21	Liv-B	1.04	1.17	Plant	1.12	1.28
Sbst	1.74	1.26	Sbst	2.06	1.96	Exist	1.04	1.05	Sbst	0.89	1.20
Liv-B	1.74	1.17	Inf	2.06	1.77	Sbst	0.89	0.93	Liq-ds	0.89	1.15
Inf	1.16	1.11	Ment	2.06	1.61	Instr	0.89	0.83	Light	0.89	1.11
J-ry	0.58	1.07	Food	1.55	1.49	D-ness	0.75	0.74	H-hold	0.67	1.08
H-hold	0.58	1.05	Exist	1.55	1.39	Liq-ds	0.45	0.66	Cls	0.45	1.06
Social	0.58	1.03	H-hold	1.03	1.31	Inf	0.45	0.59	D-ness	0.45	1.04
Tr-port	0.58	1.02	Cls	1.03	1.24	Social	0.45	0.53	J-ry	0.22	1.03
Exist	0.58	1.01	Cont	0.52	1.19	Nat	0.30	0.47	Instr	0.22	1.02
Food	0.00	-	Instr	0.52	1.15	Cls	0.30	0.42	Food	0.00	-
Cont	0.00	-	Nat	0.52	1.12	J-ry	0.00	-	Cont	0.00	-
Cls	0.00	-	J-ry	0.00	-	Food	0.00	-	Nat	0.00	-
D-ness	0.00	-	Social	0.00	-	Cont	0.00	-	Tr-port	0.00	-
Fire	0.00	-	Fire	0.00	-	Fire	0.00	-	Fire	0.00	-
$r^2 = 0.91$ $a = 23.33$ $b = 0.41$			$r^2 = 0.97$ $a = 11.98$ $b = 0.23$			$r^2 = 0.97$ $a = 3.70$ $b = 0.11$			$r^2 = 0.90$ $a = 5.00$ $b = 0.31$		

TW: Source			BN: Source			RTB: Source			PM: Source		
Liv-B	30.23	30.09	Liv-B	24.23	23.60	Liv-B	11.18	11.15	Liv-B	11.61	11.55
Area	5.81	7.04	Light	7.22	9.65	Light	2.53	2.78	Area	2.90	3.34
Sbst	4.07	2.25	Sbst	5.15	4.31	Area	1.94	1.31	Sbst	2.23	1.52
Light	4.07	1.26	J-ry	4.12	2.27	Fire	1.34	1.05	Plant	1.79	1.12
H-hold	3.49	1.05	Ment	4.12	1.49	Liq-ds	1.04	1.01	Ment	1.56	1.03
J-ry	2.91	1.01	Area	3.61	1.19	PoB	1.04	1.00	Inf	1.12	1.01
Cls	2.91	1.00	Plant	2.58	1.07	Cls	1.04	1.00	Light	1.12	1.00
Liq-ds	2.33	1.00	Cls	2.58	1.03	Ment	0.89	1.00	Cls	1.12	1.00
Cont	2.33	1.00	Liq-ds	2.06	1.01	Sbst	0.75	1.00	Fire	0.89	1.00
Audit	1.74	1.00	Inf	2.06	1.00	Instr	0.75	1.00	PoB	0.89	1.00
Fire	1.74	1.00	PoB	2.06	1.00	Tr-port	0.75	1.00	Tr-port	0.89	1.00
Ment	1.74	1.00	H-hold	1.55	1.00	Audit	0.60	1.00	J-ry	0.67	1.00
Time	1.16	1.00	D-ness	1.55	1.00	Cont	0.60	1.00	Cont	0.67	1.00
Inf	0.58	1.00	Food	1.03	1.00	J-ry	0.45	1.00	D-ness	0.67	1.00
PoB	0.58	1.00	Cont	0.52	1.00	H-hold	0.45	1.00	Liq-ds	0.45	1.00
Plant	0.58	1.00	Fire	0.52	1.00	Food	0.30	1.00	Food	0.45	1.00
Social	0.58	1.00	Time	0.00	-	Plant	0.30	1.00	Instr	0.45	1.00
D-ness	0.58	1.00	Audit	0.00	-	Nat	0.30	1.00	Time	0.22	1.00
Food	0.00	-	Instr	0.00	-	Social	0.30	1.00	Audit	0.22	1.00
Instr	0.00	-	Nat	0.00	-	D-ness	0.15	1.00	H-hold	0.22	1.00
Nat	0.00	-	Social	0.00	-	Time	0.00	-	Nat	0.22	1.00
Tr-port	0.00	-	Tr-port	0.00	-	Inf	0.00	-	Social	0.22	1.00
Exist	0.00	-	Exist	0.00	-	Exist	0.00	-	Exist	0.00	-
r2=0.96 a=140.03 b=1.57			r2=0.93 a=59.04 b=0.96			r2=0.96 a=57.93 b=1.74			r2=0.95 a=47.55 b=1.74		