QUANTITATIVE APPROACHES TO VERSIFICATION

Petr Plecháč
Barry P. Scherr
Tatyana Skulacheva
Helena Bermúdez-Sabel
Robert Kolár
(eds.)

Dedicated to Květa Sgallová

ISBN 978-80-88069-83-6
ISBN 978-80-88069-84-3 (PDF)

This publication was supported by the Czech Science Foundation, project GA17-01723S
("Stylometric Analysis of Poetic Texts") and the research institution 68378068.

Contents

Simple Heuristics for Automatic Recognition of Verse Meter in Syllabic-Accentual Versification

Oleg Anshakov
Russian State University for the Humanities
oansh@yandex.ru

Abstract

The paper contains some hypotheses about how humans perceive a poetic text, a mathematical model of poetic texts, some basic principles (that one can deduct from the above hypotheses and mathematical model) for constructing tools for the automatic recognition of verse meter, some brief descriptions of algorithms for the automatic recognition of verse meter in syllabic-accentual versification, some remarks about desirable features for tools, materials, and publications on mathematic models and methods in verse study.

The paper suggests that in perceiving a poetic text, humans apply the cognitive operation of extrapolation and abstraction (idealization); that in recognizing the rhythm in a short segment of a verse line, humans can extrapolate this rhythm to the whole line; that humans can abstract some minor irregularities in the rhythm of a verse line (she/he can imagine an idealized version of the rhythm; this idealized version comprises the representation of a verse meter).

The mathematical model of verse meter and rhythm is based on ideas that arose in Kolmogorov's seminar on mathematical verse study. (This seminar took place at Moscow State University in the 1960s.) In this model the verse-line rhythm is represented by a bit string, where 0 corresponds to an unstressed syllable and 1 corresponds to a stressed syllable.

This mathematical model allows us to define algorithms for automatic recognition of verse meter.

1 Introduction

A discussion of linguistic concepts such as meter, rhythm, ictus etc. is outside this paper's scope. All formal definitions and assertions in the paper apply only to mathematical models of verse-study entities.

However, the paper formulates several hypotheses, which deal with psychological aspects of how humans perceive syllabic-accentual verse. One can regard these hypotheses as motivation for introducing the various formal constructions. The hypotheses discussed can also be considered as an informal explanation for the fact that the above constructions turn out in one way and not others.

Obviously, the different kinds of verse rhythm exhibit various regularities that can be expressed numerically.

There are different ways for formally describing the rhythmic structure of verse. The most traditional way is to use the symbols ◡ for weak (unstressed) syllables and – or ◠ for strong (stressed) syllables. For example, the rhythm of the Russian verse line "*Мой дядя, самых честных правил"* is represented by the formal string

◡◠◡◠◡◠◡◠◡

A. Kolmogorov and A. Kondratov (1962) use the sequence of interstress intervals measured in syllables. Thus, in Kolmogorov's notation, the above verse line receives the following formal representation:

1◠1◠1◠1◠1

The next line "*Когда не в шутку занемог"* has the rhythmic representation

1◠1◠3

However, if we want to describe verse-line rhythm formally using software tools, then the most convenient form for this representation is a bit array (bit string), where 0 represents an unstressed syllable and 1 represents a stressed syllable. The representations for the two examples above are:

010101010 01010001

The bit-string representation of verse-line rhythm was introduced in Kozmin (2006). However, the algorithm of meter recognition in Kozmin (2006) uses a more complicated description of the rhythmic structure than a direct bit-string representation.

In Pilshchikov–Starostin (2011), one can find a discussion of software tools for the automated recognition of verse meter and rhythm. These powerful software tools are based on calculating the degree of similarity between the meter and the rhythm of a verse line.

Let us return to our main topic. This paper: (1) attempts to separate carefully the depiction of a mathematical model from the description of algorithms and from the discussion of software implementation; (2) in its main section describes a mathematical model; and (3) tries to use the simplest approaches, methods, and heuristics for meter recognition.

2 Hypotheses

(1) One always (or almost always) pronounces a verse text (mentally or aloud). Thus, the human perceives verse as an oral speech phenomenon. Below, we use the term *listener* for a human who is perceiving verse.

(2) The listener can recognize strong syllables (ictuses) even if these syllables are unstressed.

(3) If the listener perceives a verse line as correct, then this line does not contain extra stressed syllables (but can contain extra unstressed syllables).

(4) The listener always can recognize extra (or incorrect) stresses. The listener perceives the verse line with extra (or wrong) stresses as *incorrect*. However, if the line contains *sufficiently few* wrong stresses (for example only one) then the listener perceives this line as *admissible*. I want to emphasize: *incorrect but admissible*.

Hypotheses (1) and (2) are evident. Hypotheses (3) and (4) can be justified as follows: the listener applies the cognitive operations of extrapolation (for (3)) and abstraction (idealization) (for (4)).

When the listener perceives the initial one or two feet of a verse line, she/he recognizes a meter and extrapolates this meter to the whole line; i.e., the listener *mentally* accents the syllables of the line in accordance with the meter. Note that during this operation, some weak syllables can be accented. However, the new extra stresses do not generate any collisions. So, Hypothesis (3) allows the listener *to add mentally* an arbitrary number of stresses without any discomfort.

Suppose a verse line contain extra stresses. The listener perceives this circumstance as a collision. However, if there are sufficiently few extra syllables then the listener can abstract from this circumstance. The listener can idealize the line rhythm by removing extra stresses mentally. Note that the listener perceives the discussed line as incorrect but admissible. So, Hypothesis (4) allows the listener *to remove mentally* some stresses if the quantity of stresses to be removed is sufficiently low.

3 The mathematical model

Definition 1. The triple

$$\langle k, m, n \rangle,$$

where $m < k$, $k \geq 2$, $n \geq k + 1$ is called a *numeric metrical scheme*.

We interpret k as the *foot length*, m as the *anacrusis length*, n as the *line length*. All the kinds of length are measured in syllables.

Assertion 1. Consider a line of numeric metrical scheme $\langle k, m, n \rangle$. Denote the number of feet in this line by l. Then

$$l = (n+k-1) \setminus k,$$

where \ is the integer division operator.

Notation. Consider a verse line of n syllables. Index the syllables of this line by integers from 0 to $n - 1$. If we denote the line by L then we must denote the ith syllable of L by $L[i]$.

For example, consider the verse line "*Когда не в шутку занемог*". Split this line into syllables: "*Ког-да- не- в шут-ку- за-не-мог*".

Let L = "*Ког-да- не- в шут-ку- за-не-мог*". Then $L[0]$ = "*Ког*", $L[1]$ = "*да*", ..., $L[7]$ = "*мог*".

Similarly, consider a bit string of length n. Index bits of this string by integers from 0 to $n - 1$. If we denote the bit string by B then we must denote the ith bit of B by $B[i]$.

For example, consider the bit string 01010001. Let B = 01010001. Then $B[0] = 0$, $B[1] = 1$, $B[2] = 0$, $B[3] = 1$, $B[4] = B[5] = B[6] = 0$, $B[7] = 1$.

Definition 2. Let L be a verse line of n syllables, B be a bit string of length n. We say that B is a *bit representation of the rhythm* of L if B can be defined as follows:

$$B[i] = \begin{cases} 1 & \text{if } L[i] \text{ is a stressed syllable} \\ 0 & \text{if } L[i] \text{ is an unstressed syllable} \end{cases}$$

Assertion 2. For any syllabic-accentual verse line L there exists a unique bit string B such that B is a bit representation of the rhythm of L.

Notation. Let L be a verse line. Denote the bit representation of the rhythm of L by $\mathrm{Rh}(L)$.

Definition 3. Let $\langle k, m, n \rangle$ be a numeric metrical scheme. B be a bit string of length n. We say that B is a *bit representation of the numeric metrical scheme* $\langle k, m, n \rangle$ if B can be defined as follows:

$$B[i] = \begin{cases} 1 & \text{if } i - m \text{ is divisible by } k \\ 0 & \text{otherwise} \end{cases}$$

For example, the bit string 01010101 is a bit representation of the numeric metrical scheme $\langle 2, 1, 8 \rangle$, i.e., for the 8-syllable iambic tetrameter.

Assertion 3. For any numeric metrical scheme $\langle k, m, n \rangle$ there exists a unique B such that B is a bit representation of this numeric metrical scheme.

Notation. Let $\langle k, m, n \rangle$ be a numeric metrical scheme. Denote the bit representation of the numeric metrical scheme $\langle k, m, n \rangle$ by $\mathrm{Mt}(\langle k, m, n \rangle)$ or $\mathrm{Mt}(k, m, n)$.

Examples are given in TAB. 1.

Notation. Denote the logical operators: conjunction, disjunction, and negation by $\wedge$, $\vee$, and $\neg$, respectively.

Verse line L	$\mathrm{Rh}(L)$	Numeric meter scheme S	$\mathrm{Mt}(S)$	Meter name
Вихри снежные крутя	1010001	$\langle 2,0,7\rangle$	1010101	Trochee (Tetrameter)
Когда не в шутку занемог	01010001	$\langle 2,1,8\rangle$	01010101	Iamb (Tetrameter)
Швед, русский колет, рубит, режет	110101010	$\langle 2,1,9\rangle$	010101010	Iamb (Pentameter)
Сердце свободное	100100	$\langle 3,0,6\rangle$	100100	Dactyl (Dimeter)
Русалка плыла по реке голубой	01001001001	$\langle 3,1,11\rangle$	01001001001	Amphibrach (Tetrameter)
Озаряема полной луной	001001001	$\langle 3,2,9\rangle$	001001001	Anapest (Trimeter)

TAB. 1: Meters and rhythms

If we consider $\wedge$, $\vee$, and $\neg$ as operators on the set $\{0,1\}$ then we can define these operators as follows:

$$x \wedge y = min(x, y) \qquad x \vee y = max(x, y) \qquad \neg x = 1 - x$$

Definition 4. Let A and B be bit strings of the same length n. Define *bitwise* $\wedge$, $\vee$, and $\neg$ in the usual way. Let

$$(x \wedge y)[i] = x[i] \wedge y[i] \qquad (x \vee y)[i] = x[i] \vee y[i] \qquad (\neg x)[i] = \neg(x[i])$$

for any integer i, $0 \le i \le n - 1$.

Definition 5. Let A and B be bit strings of the same length. We say that A is *compatible with* B if $A \wedge B = A$.

Remark. Let A and B be bit strings of the same length. Suppose $A = B$. Then A is compatible with B.

Examples. Let L_1 = *"Вихри снежные крутя"*, $S_1 = \langle 2,0,7\rangle$, L_2 = *"Когда не в шутку занемог"*, $S_2 = \langle 2,1,8\rangle$. Then $\mathrm{Rh}(L_1)$ is compatible with $\mathrm{Mt}(S_1)$, $\mathrm{Rh}(L_2)$ is compatible with $\mathrm{Mt}(S_2)$.

Definition 6. Let B be a bit string of length n. The cardinality of the set

$$\{i \in \mathbb{Z} \mid 0 \le i \le n-1,\ B[i] = 1\}$$

is called the *saturation degree of* B (written $\mathrm{Sat}(B)$).

Definition 7. Let A and B be bit strings of the same length. Define *asymmetric distance* between A and B (written $\mathrm{Dist}(A, B)$) as follows:

$$\mathrm{Dist}(A, B) = \mathrm{Sat}(A \wedge \neg B)$$

Definition 8. Let A and B be bit strings of the same length. We say that A is *admissible* for B if

$$\mathrm{Dist}(A, B) \leq 1$$

Assertion 4. Let A and B be bit strings of the same length. Suppose A is compatible with B. Then A is admissible for B.

Example. Let L = *"Швед, русский колет, рубит, режет"*, $S = \langle 2, 1, 9 \rangle$. Then one can prove that $\mathrm{Rh}(L)$ is not compatible with $\mathrm{Mt}(S)$ but $\mathrm{Rh}(L)$ is admissible for $\mathrm{Mt}(S)$.

Remark. Note that the notions of compatibility and admissibility are of great interest and of great importance. Let L be a verse line. Let us identify the rhythm of L and a meter with its bit representation. Suppose R is the rhythm of L and M is a meter of appropriate length. Then R is compatible with M if L *does not contain any extra stresses*; R is admissible for M if L *contains few extra stresses*.

4 Heuristics and implementation

4.1 What we are not going to do

The paper does not concern the following matters:

(1) Nonclassical meters such as dolnik, taktovik etc.

(2) Polymetric verse

(3) Word boundaries, caesuras, etc.

Algorithms and software, which are based on the mathematical model from this paper do not use any complicated methods or hard computing.

4.2 How to process verse text to recognize meter

The theory from Section 3 allows us to propose methods for analyzing *one verse line*. Assume that a verse text contains lines written in a classic meter. Let us introduce the following notation:

(1) $|A|$ denotes the length of A if A is a string. $|A|$ denotes the cardinality of A if A is a set.

(2) Let MN = $\{\mathrm{Iamb}, \mathrm{Trochee}, \mathrm{Dactyl}, \mathrm{Amphibrach}, \mathrm{Anapest}\}$.

(3) Let $M \in \mathrm{MN}$, $n \geq 2$, if $M \in \{\mathrm{Iamb}, \mathrm{Trochee}\}$, $n \geq 3$ in other cases. Then $\mathrm{Br}(M, n)$ denotes the bit representation of M whose length is n. For example, $\mathrm{Br}(\mathrm{Iamb}, 8) = 01010101$.

(4) Let S be a set of verse lines that represents a verse text. Let

(i) $\mathrm{Adm}(S, M) = \{L \in S \mid \mathrm{Rh}(L) \text{ is admissible for } \mathrm{Br}(M, |\mathrm{Rh}(L)|)\}$

(ii) $\mathrm{Cmp}(S,M) = \{L \in S \mid \mathrm{Rh}(L) \text{ is compatible with } \mathrm{Br}(M,|\mathrm{Rh}(L)|)\}$

(iii) $\mathrm{AF}(S,M) = \dfrac{|\mathrm{Adm}(S,M)|}{|S|}$

(iv) $\mathrm{CF}(S,M) = \dfrac{|\mathrm{Cmp}(S,M)|}{|S|}$

(5) Let S be a set of verse lines that represents a verse text. Let $\alpha,\beta \in [0,1]$. Then

$$\mathrm{Filter}(S,\alpha,\beta) = \{M \in \mathrm{MN} \mid \mathrm{AF}(S,M) > \alpha, \mathrm{CF}(S,M)L > \beta\}$$

Here α and β are thresholds. The finer tuning requires that α and β depend on M. Changing thresholds, we can improve the results substantially.

Consider possible cases for $\mathrm{Filter}(S,\alpha,\beta)$:

(i) $\mathrm{Filter}(S,\alpha,\beta) = \varnothing$. Then we cannot find a common meter for all lines of S. Perhaps S is written in a nonclassical meter or S represents a polymetric text.

(ii) $|\mathrm{Filter}(S,\alpha,\beta)| = 1$. This is the best case. We find a unique meter.

(iii) $|\mathrm{Filter}(S,\alpha,\beta)| > 1$. Then we must apply more complicated heuristics to find the most appropriate meter.

4.3 A meter-recognizing system

A meter-recognizing system includes the following components:

(1) Morphological dictionary (including information about accentuation). This dictionary can be implemented as a database.

(2) Accentuation module.

(3) Recognition module.

This paper considers only the recognition process, although accentuation is no easier a problem.

A prototype for a meter-recognition system based on the theory in this paper is currently in the experimental stage. The system has analyzed approximately 800 verse texts. The preliminary results are given in TAB. 2.

Meter	Precision	Recall	F1
Iamb	0.989	0.982	0.986
Trochee	0.957	0.925	0.941
Dactyl	0.888	0.740	0.808
Amphibrach	0.929	0.913	0.921
Anapest	0.875	0.927	0.900

TAB. 2: Meter recognition

5 Conclusion

Automatic meter recognition is an extremely interesting and important problem. Now we are at the beginning of a long path. I hope we can obtain very useful and meaningful results.

Acknowledgment

I am very grateful to Tatyana Skulacheva for help, support and inspiration.

References

Kolmogorov, A.N. – Kondratov, A.M. (1962). Ritmika poem Mayakovskogo. *Voprosy yazykoznaniya* 3, 62–74.

Kozmin, A.V. (2006). Automated analysis of verse with STARLING software package. *Computational Linguistics and Intellectual Technologies. International Conference "Dialogue 2006" Proceedings,* 265–268.

Pilshchikov, I. – Starostin, A. (2011). Automated analysis of poetic texts and the problem of verse meter. *Current Trends in Metrical Analysis*. *Studies in Language and Literature*. Vol. 2. Bern, Berlin [etc.], 133–140.

Some Characteristics of Sound Patterns in English Verse

Olga Barash
independent scholar
barasolga@yandex.ru

Georgy Vekshin
Moscow Polytechnic University
philologos@yandex.ru

Abstract

The paper discusses a certain kind of sound repetition in English poetry. Our task is to find out whether our concept of phonosyllabic patterns consisting in repetition of groups of identical or similar consonant sounds within a potential syllable is valid when applied to verses written in English. The material of the research comprises randomly chosen works by English and American poets of different centuries and literary schools, from T. Wyatt to D. Thomas. Only accentual-syllabic and accentual verses were considered. G.Byron's poem "Sun of the sleepless! Melancholy star…" was chosen as the material for detailed analysis.

1 Introduction

This paper contains come reflections which have appeared in the process of work of the English version of the Phonotext computer program and web-service, the Russian version of which is already in progress. The program is being designed for automatic detection and further quantification of repeated grapho-phoneme combinations in the text.

Methods used in the program for measurement of sound cohesion in a poem are based on a syllabo-centric view of the sound composition of text (Vekshin 2006). This approach proceeds from the fact that the elementary speech constituent is the syllable, outside of which no sound and rhythmic associations of text segments are possible. The sound chain of the verse is granulated in accordance with the syllabic organization of speech and its prosody. The functional significance of individual granules is provided by analogies in the structure of the chain—by sound repetitions that, being embedded in the rhythmic and prosodic contours of words, phrases and text, complicate and redistribute its syntactic and morphological links and thereby ensure the multidimensionality of the poetic form.

The simplest unit of the text that forms series of repetitions and thus creates the aesthetically significant sound texture of the poem, is defined as phonosyllabeme

(Vekshin 2006; 2008; 2018). A phonosyllabeme is a repeatable group of consonants of variable order, that mainly disregard the quality of the vowel, and act within the limits of one potential syllable, i.e. a segment comprising the whole consonant surrounding a vowel and the nucleus of the syllable itself. The text-forming potential of phonosyllabic repetition is determined by the type of distribution of phonosyllables and their configurations (cf. Červenka 2002) as well as by their internal configurative structure, which implements the "elementary formative principles within a series" (Levý 1966). Here, two main formal types of relations are distinguished: equiphony (echo-repetition, including rhyme and alliteration) and metaphony—accentually and inversely varied morpheme-like phonosyllabic repetition (Vekshin 2008; cf. Obruchnykova 2017). Thus, in E. Poe's line *Still is sitting, still is sitting*, in which Roman Jakobson paid attention to the metaphonic chain "/ stí ... / - / sít ... / - / stí ... / - / sít. .. /" lining up variants realizing the common invariant, where "the invariance of the group is particularly stressed by the variation in its order" (Jakobson 1981: 43; cf. Brik 2014). This kind of sound repetition consists of grouping segmental sound units around syllable cores, occasionally transforming the syllabic structure of speech so that the syllable unity in certain parts of the text is perceived in view of the recurrence of the substantial sound structure.

The numerous existing algorithms for identifying sound repetition in the text are designed for detecting individual sounds and are aimed mostly at automatic analysis of euphony or at finding out the frequency of this or that sound in the text, which may also serve for the analysis of euphony and other specific phonetic features of the author's idiostyle (see Baevskii et al. 2010; Benner 2014; Plamondon 2005; Plecháč–Říha 2014).

The role of phonosyllabemes in poetic texts is not only emballishing and contributes not only to the euphony or harmony of the poem, but also to some other kinds of sound repetition (which, however, are not discussed in the paper, apart from alliteration). Repetitions of groups of sounds tend to alter the cohesive fabric of the text and thus seem to affect the very grammar of the text, emphasizing ("rhematizing") fragments which otherwise remain less conspicuous against the background of more pronounced poetic devices such as meter and rhyme. The way phonosyllabic cohesion works in an analytical language like English in which the fall of inflection and the establishment of the fixed word order had once "devoured" the Old English alliterative verse, is of especial interest for us.

The preliminary analysis involved about 10,000 lines by English poets from T. Wyatt to D. Thomas, all written in rhymed verse, either accentual-syllabic or tonic verse. As the computer program in question is at present "half-baked", it could show only very approximate results, nevertheless, they were sufficient to understand two important facts: firstly, chains of phonosyllabemes in English poetry are about twice as frequent as in English prose; secondly, the number of phonosyllabemes vary greatly not only from author to author but also from period to period. Rather scarce in the 16th–18th centuries, they seem to have reached their quantitative peak in the era of Romanticism and in the late Victorian era (this concerns also alliterations). These were the periods when the "music" of poetry was especially highly valued, and at the same

time when the attempts to somehow “reform” the English verse were especially numerous. Calculations made by hand on a small number of texts confirms this conclusion. But our main task is understanding the way the English sounds behave in poetic texts in general and in the repeated combinations, or phonosyllables, representing phonosyllabemes. The types and modes of phonosyllabic patterning of text will be shown by means of analyzing Byron’s poem “Sun of the Sleepless! Melancholy star…” (1815). The poem, being short and convenient for analysis contains all the types of sound repetition that we are interested in.

2 Sound repetition in Byron’s poem

2.1 “Sun of the Sleepless”

Sun of the Sleepless! melancholy star!
Whose tearful beam glows tremulously far,
That show’st the darkness thou canst not dispel,
How like art thou to Joy remembered well!
So gleams the past, the light of other days,
Which shines but warms not with its powerless rays:
A night-beam Sorrow watcheth to behold,
Distinct, but distant—clear—but, oh, how cold!

The poem from the cycle “Hebrew Melodies” has a simple structure: it consists of eight lines rhymed in couplets (AABB…), written in iambic pentameter with a movable caesura on the second foot. This form, introduced into English poetry by Geoffrey Chaucer and usually defined as “heroic couplets” (couplets in iambic pentameter) was widely used by poets up to the beginning of the 19th century. A specific feature of the heroic couplet is its “closed” nature, i. e. each couplet and each line being grammatically and semantically complete.

Byron here does not resort to either complex stanza or exquisite rhyming scheme, although he skillfully uses these in other works.

The relative semantic and syntactical independence of the couplets seems to hint that the sound structure of each of them also should be “closed”, i.e. that there should be separate sound devices for each couplet. On the other hand, the text is short, and the rules for “heroic couplets” by the beginning of the 19th century had ceased to be strictly obeyed, so the sound repetition can be observed in the whole text. And the external simplicity of the text allows one to pay close attention to what is going on at the sound level in each couplet and in the excerpt as a whole.

2.2 Alliteration

The first thing that draws attention in the very first line is the alliteration:

***S**u*n of the ***S**lee*pless! melancholy ***s**tar*!

This chain of alliterating words is conspicuous not only because it stands in the initial, strong position of the poem but also because it consists of three members, all of them stressed. The further alliterative chains are pairs or triads of words which do not stand out so openly but still are quite noticeable:

tearful – ***t***r***e***mulously
darkness – ***d***ispel
that – ***th***o***u***
which – ***w***arms – ***w***ith
b***e***am – ***b******e***hold
distinct – ***d***istant
cl***e***a***r*** – ***c***old

Of course, such pairs as "that – thou" and "which – with" containing auxiliary words may arouse doubt as to whether the alliteration in them is deliberate or just dictated by sheer syntactic needs; but as the first line offers the alliterative reading of the text they are included in the alliterative chains. We should remark that alliteration here is understood as "the agreement in sound of initial syllables" (Noyes 1914: 63; cf. Oertel 1892; Polivanov 1930; Vekshin 2012).

From the 60 words of this short poem 18 words alliterate, which constitute 30% of the lexical body of the text. This appears to be a lot even without comparing the text with other poems. Still, for comparison, let us randomly take two of Shakespeare's sonnets: alliterating words (including auxiliary and repeating words) constitute 21% in Sonnet XXI and 13% in Sonnet LXI. But, for instance, in the initial 14 lines of J. Swift's "Verses on the death of Dr Swift" only 6.1% of words alliterate. For Pope's "Sound and Sense" the figure is 11.2%, and for Shelley's "Ozymandias" it is 19.4%. Of course, an average value may be deduced from all these calculations, but even the untrained eye can see that the Romantic poets were more inclined to use alliteration than the Elizabethans and especially the poets of the Age of Reason. Byron's poem is intensely alliterative and deviates strongly from the average figure which we can receive by simple arithmetic methods of adding and dividing.

Although English poetry had mostly ceased to be alliterative as early as the 14th century, in Chaucer's time, alliteration frequently occurs in the works of Chaucer himself —whose general attitude to the "rum, ram, ruf", as one of his characters calls it, tends to be negative—and in the works of later authors as well. The peaks of its use seem to fall in the periods when the attention to the sound texture of the verse was especially high: those of Romanicism and the late Victorian era in which a certain "boom" of alliteration can be observed. G.M. Hopkins was the most outstanding representative of this boom, and "Tennyson uses it so extensively that he is forced to say: 'Alliteration comes so natural that when I speak my lines first they come out so allteratively that I have sometimes no end of trouble to get rid of the alliterations'" (Thoma 1949, 14). Still, the purpose of alliteration, which has long lost its fundamental function for the Old and Middle English poetry of the "front rhyme" organizing the verse, is often disputed. The question which arises most frequently is whether alliteration is just an ornament or whether it has some semantic value. Sometimes, especially in popular and scholarly texts, we come across statements like "The appearance

of repeated letters signifies that these words are important, or that an important message is being conveyed beyond simply the dictionary meanings of the individuals words themselves" (Smith n.d.).

Considering Byron's poem, we can see that alliterations are used mostly in a very rational way: it may be regarded as a means of increasing the integrity of the verse, and serves to cement together semantically significant words, to put them into relations of affinity (*tearful – tremulously*) or opposition (*clear – cold*).

It may seem that alliteration here is quite sufficient to make the poem "euphonic". But the analysis of a larger corpus of English poetic texts shows that alliteration, no matter how widely it is used by an author, never "walks by itself" and is combined with other kinds of sound repetition, some of which support the alliteration, and some of which then work separately from it, and then interact *with it*.

2.3 Phonosyllabic metaphonic repetition

Even in the Old and Middle English alliterative poems we can notice a certain variety of sound repetition:

Hwæt! Wé ***Gárd***ena in géa***rdag***um… *(Beowulf)*

Or:

…folce tó f***rófre·*** fyren***ðearfe*** ongeat…
…héah H***ealfden***e héold þen***den lifde***… *(Beowulf)*

In the works of poets who wrote in the Modern English language (starting from Thomas Wyatt) other types of repetitions dominate, in particular, metaphonic (inversive) repetitions of consonants located within a syllable. In this case, probably, it would not be erroneous to suppose that in the analytical Modern English which had replaced the inflectional Old English, sound repetitions began to perform not only a euphonic, but also a more important functional task of enhancing the cohesion of the text and establishing excess poetic morphology of interacting words.

In Byron's poem which, as it was mentioned above, consists of 60 words including auxiliary words, apart from alliterations and consonances of a single sound, we have revealed 22 chains of syllable-like repetitions:

1. S-N: ***sun*** – dark***ness*** – c***ans***t (***no***t) – warm***s*** ***no***t – di***stant***
2. S/Z-L: ***sle***ep***less*** – melancho***ly*** star – g***lows*** – tremu***lously*** – di***spel*** – g***lea***m***s*** – power***less***
3. S-L-P: ***sleepless*** – di***spel***
4. M-L: ***mel***ancholy – b***eam glo***ws – tre***mul***ously – g***leams***
5. F-L: tear***ful*** – tremulous***ly f***ar
6. G/K – L: melan***chol***y – ***glo***w – ***lik***e – ***glea***m – ***clea***r – ***col***d

7. S-G-L: ***glows*** – ***so glea***m***s***
8. S/Z-T/D-R: ***star*** – who***se tear***ful – gl***ows tre***mulously
9. SH-S/z: ***show's***t, ***shi***ne***s***
10 . K-N-S: dar***kness*** – ***cans***t
11: B-M: ***beam*** – rem***emb***ered
12. T/D- R: s***tar*** – ***tear***ful – ***dar***kness – ***art – tre***mulously – rememb***ere******d*** – *other da*ys
13. GHT: l***ight*** – n***ight***
14. W-R: ***war***ms – po***wer***less – sor***row***
15. S-P: ***s****l****eep***less – d***ispe***l – ***pas***t – ***i****t****s po***werless
16. W-CH: ***which – watch***eth
17. D/T – S: ***dis***pel – p***ast*** – ***its – dis***tinct – ***dis***tant
18. S/Z-N-T: c***anst not*** – warm***s not*** – di***stin****ct* – di***stant***
19. Th- T/D: ***that*** – ***the d***arkness – ***thou t***o – wi***th it***s – watche***th to***
20. F- Th: ***of th***e – o***f oth***er – ***with*** (if w – v/f are considered phonetically similar consonants).
21. B-T: ***but*** – ***to b***ehold – ***but*** – ***but***
22. W-L: g***low***s – ***well*** – po***wer******l***ess

It can be argued that in some cases not sounds but letters are repeated in this list. In general, the discrepancy between pronunciation and spelling in the English language causes a lot of difficulties in identifying sound repetitions in the text. Often it is recommended to use phonemic or phonetic transcription in the analysis of the sound (and not only sound) level of verse (cf. Hervas–Robinson–Gervas 2007: 538). But the thing is, poets do not write in phonetic transcription, nor do readers read in it. The tradition of the silent reading of poetry is long enough to provide readers with the habit of seeing a poetic text as well as hearing it (cf. Baudouin de Courtenay 1963: 212; Pertzov–Pilshchikov 2011; Pilshchikov 2016). That speaks for the fact that the functional share of graphics is high, but, on the other hand, poetry is a sound medium as well; if it is based on written forms, it becomes visual word art, which is a different genre. And the observations of English poetry show that the graphic image of the word is no less significant for many poets than the phonetic one. A poetic text is not just a speech, but a written speech phenomenon. Certain types of phonetic structures may tend to graphic, others to acoustic similarity, and all this demands achieving a balance between the graphic and phonetic image of the text that can serve an objective evaluation and quantification of various grapho-phonic phenomena.

In this regard, we have conducted an internet survey among English-speaking students in order to identify which sounds are perceived by native speakers as phonetically

similar and how important the graphics are in perceiving poetic texts (special thanks for the support in conducting the quiz to Mark Davydov and our colleagues at American universities). But there was no unanimity among the respondents, in particular, to the question: “What is more important for you when you perceive a poetic text: sound or letter?” 20% answered “letter”.

Therefore, we found it possible to take into account combinations that include mute consonants if they are included in repetition chains containing more than two members (as is the case with *r* in “remembered” and “powerless” in the text under consideration, especially since in the rhotic variants of the English language the sound / r / is not mute. In addition, we share the common opinion about the phonetic similarity of voiced and unvoiced consonants: English-speaking phoneticians are increasingly inclined to abandon the very terms “voiced / unvoiced”, considering the terms “lenis / fortis” (weak / strong) more relevant for the opposition they describe. Digraphs denoting one sound (sh, ch, wh, mb, etc., as well as the mute combination of gh) are considered one "sound-letter" in terms of A.N. Zhuravlev (1974: 36) or “graphophoneme” in terms of V.P. Grigor’ev (1979: 291).

In Byron's poem, each word is involved in one or more sound chains, with the exception of the word *joy*, which in fact emphasizes its semantic isolation in the text. Such a density of sound tissue, of course, is not typical for English-language poetry in general and for Byron's work in particular; the poet here, apparently, deliberately demonstrates the phonetic possibilities of the English verse—just as E. Poe does in his “The Raven” or A. Swinburne in the poem “The Forsaken Garden”—but he does it in a “condensed” form on a small text space. Such concentration makes the poem convenient for characterizing some of the techniques of the phonetic (or grapho-phonetic) organization of the poetic text in English.

Thus, it is easy to see that syllable-like repetition rarely affects root morphemes. Since English is not an inflectional language, the word in it, as a rule, has no morphological signs and coincides with the root morpheme, most often one-syllable and consisting of one closed syllable or two open syllables in writing, giving one syllable with a long vowel or diphthong. It is noteworthy that English “written” syllables do not necessarily correspond to the actually spoken syllables, a facts that allows us to presume that the formation of phonosyllabemes in poetic texts does not necessarily respond to the English phonotactic rules, which are rather “liberal”, i.e. allow onsets of up to three consonants and codas of even more that three consonants (such as *strengths* or *prompts*).

Therefore, the grouping of repeated consonants “around the vowel”, that of CVC type, is often associated with a change in the semantics of the word (cf., for example: lip – lap – loop; big – bag – bug, etc.) or its grammar (as in the cases of internal inflection: come – came, tooth – teeth, etc.), and therefore looks like a pun, a play on words. Such wordplay sometimes occurs in English humorous poems, such as, for example, O. Nash's well-known limerick:

> Said the **fly**, “let us **flee**!”
> “Let us **fly**!” said the **flea**.
> So they **flew** through a **flaw** in the **flue**.

This device may also be used to attach ironic connotation to a serious utterance, like in W.H. Auden's "O Where Are You Going?":

> "O where are you going?" said **read**er to **rid**er,
> That valley is fatal where ***f*urn**aces ***b*urn**,
> Yonder's the **midden** whose odours will **madden**,
> That gap is the grave where the tall return".

It is, apparently, not by chance that the first and second lines of Byron's poem contain two long (four-syllable) words of foreign origin where the root morphemess are not very obvious: ***mel****ancholy* and *tre****mul****ously*. Besides the fact that they are isomorphic to each other and occupy the same position in the line, all consonant sounds of these words are included in certain syllable repetitions throughout the text. They have a common syllabic repeat "*mel-mul*", and the similar syllables have different positions in the words and in the lines and different morphological status, except for the syllable "-mel-" which goes first, is stressed, and the "-mul" syllable is unstressed. Unstressed syllables which occupy "weak" positions in the verse, also count when it goes about repetitions, this shows that they are not just background for beats, but are of importance of their own, for without them a verse changes its rhythmic structure.

The chain "***sun*** – dark***ness*** – c***anst*** **(*n*ot)** – warm***s not*** – di***stant***" is indicative as to the possible structure of phonosyllabemes: the repetitive sounds *s* and *n* are located in the root, in suffix, at the junction of the root and the suffix, at the word juncture, and distantly (with the inclusion of an epenthetic consonant).

Syllabic repetitions can take place both in different (not necessarily neighboring) words and within the same lexeme. Thus, the word "sleepless", which gives the longest repetition chain, is according to its consonant structure, "s-l-p-l-s" a phonetic palindrome centered on the sound "p". This sound, if we follow both the formal syllabification and the division into morphemes, belongs to the first syllable, i.e. root, but due to the mirror position of the surrounding consonant sounds, can serve as part of the consonant complexes for both syllables, i.e. the sequence "s-l-p-l-s" can also be read as a phonetic chiasm—"s-l-p- + -p-l-s" (cf. Keyser 2011).

We see a similar, but simpler vibrating (Vekshin 2010: 135) phonosyllabeme (with the participation of two, not three consonants) construction in the word "tremulously", where two sounds surround the sound *s* in the same mirror way, including the latter in two sound sequences: *-lous* and *-sly*. Such a grouping of identical or phonetically similar consonants or groups of consonants around the third, which is, as it were, a part of two syllables, is characteristic not only of this poem and not only of Byron:

> Some heart once pregnant with *c*e*l*estial fire… (Th. Gray)
> Just for a hand*f*u*l o*f silver he left us… (R. Browning)
> He parted, with *gr*e*at st*rides among his dogs. (A.Tennyson)
> Glad did I live and *gladly d*ie… (R.L. Stevenson)

Again, we see that repetition can take place within one polysyllabic word or else capture the gap between two words, which is another way to avoid root repeats, especially since words longer than two syllables do not so often occur in English.

Repetition of consonants belonging to two adjacent words is quite frequent in the poem in question. Among them the phrase “so gleams”. Of course, according to phonotactic rules the combination of “sogl” can hardly be recognized as a syllable, although formally there are no obstacles not to consider it as such (CVCC), especially in the sound environment in which it is followed by a vowel and the so-called phonesteme “gl” is not syllabic. In the phrase “so gleams” the mentioned “s-l-s” sequence is contained, but not in its pure form: here it includes two epenthetic consonants, in both cases standing between the ones we are interested in. The center of the consonant sequence is the sound “l”, which at the same time enters both the “legitimate” syllable “-leams” and the hypothetical “-sogl”. Here the phonetic chiasm is complicated by two epentheses. The adverb “so” is glued to the verb “gleams” by sound repetition at the juncture, reinforcing the weak syntactical connection between the two words.

The sounds of the word “gleams” related to the semantic field of “light” which is key for the text, are involved in several repetitions: “-leam-”-“-mel-” - “-mul-” (see above); “beam glows”. If the first three cases are a simple metaphonic repetition (in which only one part of the “gl” phonesteme participates), in the fourth one another “queer” pseudo-syllabic “eamgl” (VCCC) combination is formed. Nevertheless, it is not difficult to notice that it represents a complete anagram of the word “gleam”; in fact, the anagram is still more complex: “eamglows – sogleam”. Anagram is a special, semantically loaded kind of sound repetition; in this case, the phonesteme “gl” itself may be treated as semantically loaded, for it is often part of roots associated with the meanings of “light” and “look”. Besides, the words “glow” and “gleam” are partial synonyms. Thus, the phrase “so gleams” introduces the parallelism of the images of “moonlight” in the first part of the poem and the “past” not only lexically, but also with the help of phonetic means.

It should be noted that not only words of increased significance are involved in sound repetitions, but also those that do not have independent lexical meanings (auxiliary parts of speech). The frequency of use of auxiliary words in English is very high due to the analytical structure of the language, and in the poem under consideration prepositions, articles, etc. make up a third of all the vocabulary used by the author. Not surprisingly, they are included in repetition chains either as self-sufficient syllables (“that”, “but”), or in combination with consonants at the beginning and at the end of adjacent words (“of other”, “to behold”, etc.). It should be noted that many English service words sound similarly, alliterate with one another (the, that; with, which, etc.), therefore they are very “convenient” for inclusion in the series of repeated syllabic groups of consonants.

3 Conclusion

The flow of verse speech every time is performed as a process of establishing prosodic and sound forms that overcome the regularity of syllabification. While the “natural” rhythm of the words is based on the organic division into syllables, configurative metaphonic repetitions “overcome” this kind of rhythm and underline the

non-identity of the syllable as a pronounced unity to the phonosyllabeme as a functionally determined entity. In particular with the mirror arrangement of repeated consonants around a certain consonant center, the same central sound can be perceived as the end of one syllable and at the same time the beginning of the next. Sound repetition overcoming the power of the “echo” demonstrates its ability to influence the strength and the weakness of syllabic unities, to form additional syllabic links and interruptions, to redistribute the degree of cohesion of the segment units in a super-segment, to rebuild the perception of the sound flow. It is obvious that metaphonic associations cause a significant breach of self-identity not only of the syllable, but also of the morpheme, which opens up the prospect of using syllable-like sound groups and complexes (phonosyllables) to form an alternative, poetic morphology of words and of the text, and also to use them as special syntactic or actual syntactic markers. "Pseudo-syllables", or phonosyllabemes, can occur both inside the word and at the word juncture, thus increasing the strength of the syntactic ties between words and the cohesion of the text on the whole. At the same time, taking into account the typical (for the English language) coincidence of a syllable and a word, while the latter in turn coincides with the root morpheme, there is a kind of redistribution of logical connections, in which attention is drawn to constructs that have no lexical or grammatical meaning but are capable of functioning at the metasemiotic level and in their structure are isomorphic to the word/root morpheme.

A phonosyllabeme is an unevenly actualized “sound foot”. Like a syllable, let alone a metric foot, it cannot be considered a unit of language as such, but it is developed in poetry as a unit of language faculty, an operational unit that adapts a syllable (the basic unit of speech flow) to the tasks of text composition and poetic “estrangement” of the word and phrases.

The mechanism of morphologization of phonosyllabemes and phonosyllabic complexes is based on the principle of metathesis, the same way as symbolization in the language is based on the principles of divergence and metaplasm. Convergent repetition is emblematic, allegorical, and forms the iconic principle of designation. Divergence is the basis of the mechanism of symbolization, the way of creating signs that transfigure things, unveil senses of a different, higher order in a sign, as compared to logical and utilitarian-pragmatic meanings. “Allegory and symbol provide the conceptual frame within whose channel of vision the artwork has long been characterized” (Heidegger 1993: 146).

References

Baevskii V.S. et.al. (2010). The Law of a Snake. In *Poetics and Phonostylistics*. G.V.Vekshin, ed. (193–197). Moscow: MGUP.

Baudouin de Courtenay I.A. (1963). On the Relation of the Russian Spelling to the Russian Language. In. *I.A. Baudouin de Courtenay. Selected Writings in General Linguistics*. S.G. Barkhudarov, ed. Vol. 2. (209–235). Moscow: USSR Acad. of Sciences.

Benner D. C. (2014). The Sounds of the Psalter: Computational Analysis of Soundplay. In *Literary and Linguistic Computing* (361–378), Vol. 29, Issue 3, Sept. Oxford: Oxford Univ. Press. See <https://www.semanticscholar.org/author/Drayton-C.-Benner/36217154>

Brik O.M. (2014). Sound Repetitions (The Analisys of Sound Structure of Verse). In *Methodology and Practices of Russian Formalism.* G.V.Vekshin, ed. (503–563). Moscow: Azbukovnik.

Červenka M. (2002). Hlásková instrumentace. In *Pohledy zblízka: zvuk, význam, obraz. Poetika literárního díla 20. století*. M. Červenka – M. Jankovič -- M. Kubínová, eds. (7–54). Prague: Torst.

Grigor'ev V.P. (1979). *Poetics of the Word*. Moscow: Nauka.

Heidegger M. (1993). The Origin of the Work of Art. In *Martin Heidegger. Basic Writings.* D.F. Krell, ed. (139–212). San-Francisco: HarperSanFrancisco.

Hervas R. – Robinson J. – Gervas P. (2007). Evolutionary Assistance in Alliteration and Allelic Drive (536–548). In *Applications of Evolutionary Computing*. Berlin – Heidelberg: Springer

Jakobson R. (1981). Linguistics and Poetics. In *Jakobson R. Selected Writings, Vol. 3: Poetry of Grammar and Grammar of Poetry* (18–51). The Hague – Paris – New York: Mouton Publishers.

Keyser S. J. (2011). Reversals in Poe and Stevens. In: *Wallace Stevens Journal*, 35.2 , Fall (224–239). Baltimore: The Johns Hopkins Univ. Press.

Levý J. (1966). The Meanings of Form and the Forms of Meaning. In *Poetics = Poetyka = Poetika*. R. Jakobson and K. Wyka, eds. Vol. 2 (45–59). The Hague – Warszawa: Mouton – Państw. Wyd. Nauk.

Noyes, C. (1914). Poetry: General Introduction. In *The Harvard Classics*. C. W. Eliot, ed. Vol. 51 (48–65). New York: P.F. Collier & Son.

Obruchnykova O. P. (2017). Metaphony as Antipode of the Equiphonic Sound Repetition (based on Spanish language). In *Problems of Semantics, Pragmatics and Cognitive Linguistics*, Ed. 32. N.M. Korbozerova and S.V. Skrylnyk, eds. (99–108). Kyiv: Logos.

Oertel H. (1892). Hildebrand's Theory of Alliteration. In *Modern Language Notes*, Vol. 7, No. 5 (May) (144–146). Baltimore: The Johns Hopkins Univ. Press.

Pertzov N.V. – Pilshchikov I.A. (2011). On Linguistic Aspects of Textology. In *Voprosy Jazykoznaniya*, No. 5 (3–30). Moscow: Nauka.

Pilshchikov I. (2016). The Semiotics of Phonetic Translation. In *Studia Metrica et Poetica*, 3.1 (53–104). Tartu: Univ. of Tartu Press.

Plamondon M. R. (2005). Computer-assisted Phonetic Analysis of English Poetry: a Preliminary Case Study of Browning and Tennyson. In *TEXT Technology*, 14 (153–175). Hamilton, Ontario: McMaster University.

Plecháč P. – Říha J. (2014). Measuring Euphony. In *Methodology and Practices of Russian Formalism.* G.V. Vekshin, ed. (194–199). Moscow: Azbukovnik.

Polivanov E. (1930). Alliteration. In *Literary Encyclopedia: in 11 vol.* V.M. Friche, ed. Vol. 1 (col. 96–97). Moscow: Izd. Comm. Acad. Retrieved from <http://feb-web.ru/feb/litenc/encyclop/le1/le1-0961.htm?cmd=p&istext=1>

Smith N. *Reasons we Use Alliteration*. Retrieved from <https://penandthepad.com/reasons-use-alliteration-22227.html>

Thoma M. R. (1949). *The Alliterations in Virgil's Aeneid with Special Reference to Books I-VI*. Chicago: University of Chicago.

Vekshin G. V. (2006). *Essay on Text Phonostylistics: Sound Repetition in the Prospect of Sense Formation.* Moscow: MGUP.

Vekshin G. V. (2008). Metaphony in Sound Repetition (to the Poetic Morphology of a Word). In *NLO*, N 90 (229–250). Moscow: Novoye Literaturnoye Obozreniye.

Vekshin G. V. (2010). The Views of Osip Brik on Sound Repetition and Phonosyllabics of the Poetic Text. In *Poetics and Phonostylistics.* G.V. Vekshin, ed. (129–152). Moscow: MGUP.

Vekshin G. V. (2012). Rhyme – Internal Rhyme – Alliteration (Syllabocentric View). In *Slavic Verse. IX.* (152–164). Moscow: Jazyki slavianskoj kultury.

Vekshin G. V. (2018). Phonosyllabeme as an Elementary Operational Unit of Language Faculty (Poetry, Child Speech, Word Play). In *Linguistics of Creativity*, 4. T.A. Gridina, ed. (49–74). Ekaterinburg: Ural State Pedagogical Univ.

Zhuravlev A. (1974). *The Phonetic Meaning*. Leningrad: LSU.

Macroanalysis of the Strophic Syntax and the History of the Italian *Ottava Rima*

Anastasia Belousova
Universidad Nacional de Colombia
nastassja.belousova@gmail.com

Juan Sebastián Páramo Rueda
Universidad Nacional de Colombia
sebastianparamo@gmail.com

Abstract

The article discusses the results obtained with the help of a computer program created for the automatic analysis of strophic syntax. The program was created using Boris Tomashevsky's method, which is based on analyzing the punctuation at the end of poetic lines (the strength of the syntactic pause is evaluated depending on the absence or presence of a sign: i.e. a comma, a dash, a semicolon or a full pause / question / exclamation mark).

The analyzed texts (more than 18,000 stanzas) divided into two distinct groups, consistent with chronology. The continuity of Ariosto with respect to the lyric octave of Poliziano, as well as the difference between the octave of Tasso and the octave of Ariosto, was established. This positive result shows the necessity of a macrostudy that would include a much larger number of texts from different national traditions.

1 Introduction

Rhythmical-syntactic analysis is an essential step in any critical examination of stanzaic forms, because it allows us to establish the norms that define the relationship between meter, topic and style within the poetic text.

The concepts of line (verse) and line break—and, accordingly, the syntactic relation located on the border between two poetic lines—are issues of paramount importance for verse study. Therefore, verse scholars have created classifications of syntactic ties in accordance with their relative "strength" (Vinokur 1990: 170–171; Gasparov–Skulacheva 2004: 29–33; Yarkho 2006: 84–87; Shapir 2000: 164–167 (with examples); 2009: 11–13; Tomashevsky 1958: 116 and further; cf. Belousova 2011: 54–55, 2013).

The priorities of modern verse study in the field of poetic syntax were succinctly formulated in an article by I. A. Pilshchikov and A. S. Starostin (2009): 1) studying the distribution of syntactic ties within a line, 2) computerized calculation of the strength of interline ties, and 3) studying the syntactic organization of stanzas and quasi-stanzas. These tasks can be accomplished with the use of software, but many problems arise because of the complexity of constructing a functional syntactic model. However, the third task can be carried out without a syntactic analyzer.

This work is a step in that direction.

2 Method

In 1941, G. O. Vinokur in his classical study *The Word and Verse in Eugene Onegin* (Vinokur 1990: 146–195) analyzed the internal structure of the Onegin stanza in connection with the content of Pushkin's novel. To this end, he studied the nature of the syntactic pauses on the borders between parts of the Onegin stanza (after the 4th, 8th and 12th lines) (Vinokur 1990: 170–171). The data he obtained allowed Vinokur to identify the main features of Pushkin's stanzaic structure (syntactic autonomy of the first quatrain, special compositional role of the closing distich, etc.), as well as describe many stylistic and poetic features of the novel. Later, these findings were confirmed by other scholars.

In particular, quite similar results were obtained by B. V. Tomashevsky using an entirely different method. In his *Pushkin's Strophics* the scholar proposed to build a study of syntactic pauses on the borders of stanza lines based on punctuation (Tomashevsky 1958: 116 ff), without describing specifically the nature of the interline connection. The strength of each pause was assigned a number: 0 – no pause; 1 – pause corresponding to a comma; 2 – pause corresponding to a colon or semicolon; 3 – pause corresponding to a period. The sum of the numbers was then divided by the possible maximum amount (if all the verses ended with periods), and the result was expressed as a percentage. The percentage indicator thus showed the relative average strength of the syntactic pause after each line of the stanza or quasi-stanza.

The main advantage of this method in comparison with the others (proposed by Yarkho, Vinokur, Gasparov–Skulacheva and Shapir) is its simplicity: all the decisions are unambiguous, and automatization is simplified, due to the lack of need for a functional syntax model. Tomashevsky's method is very productive when working with a large number of texts, as well as when analyzing texts in different languages.

Let us once again emphasize that the results obtained using Tomashevsky's method should be considered reliable. This has been shown not only by the data of the scholar himself (his study of the Onegin stanza and others), but also by other recent research. Thus, we used his method to study the rhythmical-syntactic organization of the Russian *ottava rima* (Belousova 2011): it allowed us to perceive different models for the assimilation of the *ottava rima* by Russian poets through relative averages. Furthermore, the data describing Pushkin's *House in Kolomna*, however approximate,

allowed us to come to similar conclusions as Shapir (Shapir 2009: 60), who used his own accurate method.

Using Tomashevsky's method, we created a tool (a computer program in the Python programming language), which enables computerized rhythmical-syntactic analysis of stanzaic texts. One can obtain preliminary descriptions of the rhythmical-syntactic structure of stanzas by different authors and in different epochs, compare these results, and find ways for further exploring one of the most important issues in versification.

3 Material

Our corpus consisted of the following Italian works: *Filostrato* (1336) and *Ninfale Fiesolano* (perhaps 1344–1345) by Giovanni Boccaccio, the anonymous poem *La Spagna* (XIV or XV), *Morgante* (1483) by Luigi Pulci, *Rime* by Poliziano (circa 1480), *Orlando Innamorato* by Matteo Maria Boiardo (1483–1495), *Orlando Furioso* (1516–1532) by Ludovico Ariosto and *Gerusalemme Liberata* (1581) by Torquato Tasso.

A total of 18,066 of stanzas were analyzed. Modern, philologically acceptable editions (listed in the bibliography) were used as the source texts. Turning to the oldest publications would have created problems due to the variability of punctuation norms. Our hypothesis is that modern publications quite adequately show the strength of the syntactic ties.

We examined the entire bodies of texts, except for the instances of "incorrect octaves". Thus, additional quatrains were eliminated in 31 octaves in *Ninfale Fiesolano*, 4 seven-line octaves in *La Spagna* were omitted, and one seven-line octave was excluded from consideration in *Orlando Innamorato*.

Since the syntactic organization of the octave has long been studied by Italian researchers (for the bibliography see Soldani 1999; Praloran 2003, 2009; Giovine 2017; Juri 2017), it is possible to compare the data we obtained with the hypotheses of Italian scholars based on a qualitative analysis of the material.

Another advantageous feature of the Italian *ottava rima* is the great number of long texts written in this poetic form.

4 Data

TAB. 1 and FIG. 1 show the obtained data.

5 Interpretation of the data

The data we obtained allows us to divide the material into two groups: the *ottava rima* of Poliziano, Ariosto and Tasso, on the one hand, and all the others on the other.

		Line							
Text	**№ of stanzas**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1 Filostrato	713	17	32	24	31	23	31	21	97
2 Nin. Fies.	473	17	33	22	38	25	33	25	97
3 Spagna	1814	21	54	30	70	33	64	26	94
4 Morgante	3763	30	46	40	57	40	52	33	93
5 Orl. Innam.	4428	25	54	32	70	34	49	32	95
6 Rime	116	19	48	19	79	27	73	29	99
7 Orl. Fur.	4842	16	51	20	76	21	54	23	97
8 Ger. Lib.	1917	8	51	11	71	11	55	12	83

TAB. 1: Strength of the syntactic ties after each octave line, %

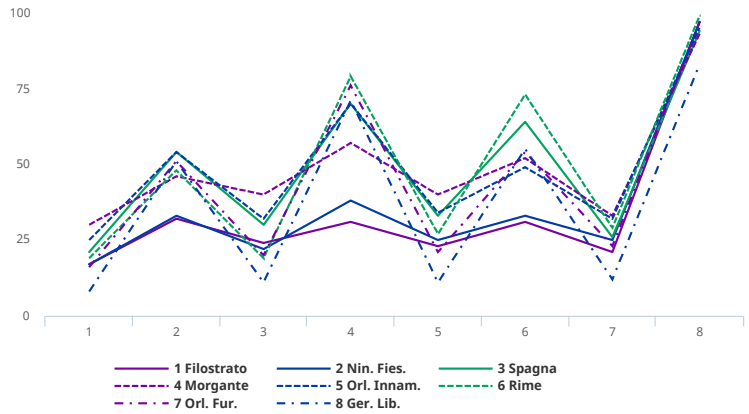


FIG. 1: Strength of the syntactic ties after each octave line, %

There is a general tendency to divide the octave into distiches, but the distribution of strong and weak pauses within the stanza varies from author to author. At the same time, one can observe a consistent tendency to increase syntactic orderliness.

Boccaccio's *ottava rima* does not show an obvious tendency to pronounced syntactic segmentation. *La Spagna* and *Morgante* give higher rates, but even here the numbers show a weak syntactic order. Therefore, in both texts there are stanzas that do not conform to the general tendency of dividing the stanza into distiches, for example:

Da ogni parte avea assai che fare;
ma que' Pagani avien miglior partito
per che stavan di sopra a guerregiare;
e qual cogliea, che non fusse guernito,
di questa vita convenia passare
e render l'anima al padre gradito.
Ed era de' Pagani il simigliante:
chi moriva si dava a Trevigante.

(*La Spagna*, XI, 12)

Tu cominciasti insino in Aspramonte
a dargli a intender che fussi gagliardo
e facessi gran cose a quella fonte.
Ma se non fussi stato il buon Gherardo,
io so che la vittoria era d'Almonte;
ma egli ebbe sempre l'occhio allo stendardo,
che si voleva quel dì coronarlo:
questo è colui c'ha meritato, Carlo.

(*Morgante*, I, 13)

In pochi dì fur tutti battezzati.
L'abergator che ritenne costoro,
quanto poteva più gli ha ringraziati
Questa novella sentì il barbassoro
e gli altri che Rinaldo avea trovati:
alla città venien sanza dimoro;
e 'l barbassoro avea nome Balante,
e molto gaudio avea del re Vergante.

(*Morgante*, XIV, 21)

The Pulci octaves are weakly structured syntactically. The strongest syntactical pauses are located after the 4th and 6th lines (and they are almost equal), while the first quatrain does not divide into distiches—the pauses after the 2nd and 3rd lines are almost identical in strength. It should be noted that the difference between the maximum and minimum indices is not very large: the pauses after all the odd lines are relatively strong. This means that Pulci quite often ends the syntactic period after the 3rd, 5th and 7th lines, his syntactic preferences are not defined, and the syntactic movement of the stanza looks random.

The octave of *Orlando Innamorato* is organized in a much stricter way syntactically. Compared to the Pulci octave, the syntactic pauses are stronger, and the "rhythm of distiches" is more pronounced. Unlike Pulci, Boiardo often separates the first couplet.

The octave of Poliziano belongs to another genre: it is not a narrative but a lyrical octave, much more descriptive by its nature. The pause after the 4th line is very strong (79%), and the final couplet is almost autonomous syntactically (73%).

This rhythmical-syntactic distinctiveness compared to previous authors should not surprise us, since we are dealing with a completely different subject and rhetoric. Still, surprisingly, the data obtained for Ariosto are very close to Poliziano's.

Italian scholars have noticed this fact previously. Gianfranco Contini wrote that Ariosto wanted "vincere questa scommessa: mantenere la conquista lirica del Poliziano e non rinunciare al carattere narrativo" (Contini 1974: 237). While Marco Praloran described this phenomenon as: "lo stile (...) è la prova della metamorfosi dell'apparato della tradizione lirica in un contesto diverso, appunto narrativo" (Praloran 2003: 15; see also Giovine 2017, and the bibliography, Giovine 2018: 125–126).

Let us describe the octave of Ariosto in detail. It demonstrates an extreme syntactic order, which can be immediately seen in the table. Some clear syntactic preferences are at once noticeable in the octave of *Orlando Furioso*. A strong syntactic pause after the 4th line becomes almost a constant; the index is extremely high: 76%. The first and the last distich are often autonomous. An even more interesting fact is the weakening of syntactic pauses after odd lines—none of the indices for them exceeds 25%, and after the 1st and 3rd lines it is lower than or equal to 20%! It can be said that Ariosto not only prefers to finish a syntagm after an even octave line, but that he also avoids strong pauses after the 1st and 3rd lines. The octave acquires a distinct rhythmical-syntactic cadence, thanks to which it is possible to predict the structure of the next stanza with great certainty.

Che vi fu tolta la sua donna poi:
ecco il giudicio uman come spesso erra!
Quella che dagli esperi ai liti eoi
avea difesa con sì lunga guerra,
or tolta gli è fra tanti amici suoi,
senza spada adoprar, ne la sua terra.
Il savio imperator, ch'estinguer volse
un grave incendio, fu che gli la tolse.

(*Orlando Furioso*, I, 7)

In the octave of Tasso, the syntactic tendencies of Ariosto's *ottava rima* are developed and strengthened. The strong syntactic pause after the 4th line is still very evident here (71%), but the first and last distich become autonomous more often. However, the more striking development is what happens with the pauses after odd lines. The highest index only reaches 12%! This phenomenon should be interpreted as the actual prohibition of strong pauses after odd lines. At the level of the actual poetic syntax, this is manifested in a large number of strong enjambements (three times more than in Ariosto)—breaking between a noun and its adjective, a verb and an adverbial clause of place, etc., and located at the line border (Spoerri 1922: 9, Fubini 1948).

Quivi a lui d'improviso una donzella
tutta, fuor che la fronte, armata apparse:
era pagana, e là venuta anch'ella
per l'istessa cagion di ristorarse.
Egli mirolla, ed ammirò la bella
sembianza, e d'essa si compiacque, e n'arse.
Oh meraviglia! Amor, ch'a pena è nato,
già grande vola, e già trionfa armato.

(*Gerusalemme Liberata*, 1, 47)

L'un l'altro guarda, e del suo corpo essangue
su 'l pomo de la spada appoggia il peso.
Già de l'ultima stella il raggio langue
al primo albor ch'è in oriente acceso.
Vede Tancredi in maggior copia il sangue
del suo nemico, e sé non tanto offeso.
Ne gode e superbisce. Oh nostra folle
mente ch'ogn'aura di fortuna estolle!

(*Gerusalemme Liberata*, 12, 58)

TAB. 2 shows the standard deviation data for each text: the presence of two distinct groups is clear.

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Standard deviation	25.82	25.47	25.76	19.99	23.79	30.85	30.02	30.72

TAB. 2: Standard deviation for each text

6 Conclusion

Our method, which is based on an elementary computer algorithm using Tomashevsky's approach, allows for processing thousands of stanzas and hundreds of texts, demonstrating its applicability. After testing it on the Italian *ottava rima*—the syntax of which has been perhaps more thoroughly studied than that of any other stanza—we see that the results are consistent with the conclusions reached by Italian scholars with the help of selective quantitative and qualitative analysis.

The analyzed texts divided into two distinct groups, corresponding to the chronology. The continuity of Ariosto with respect to the lyric octave of Poliziano, as well as the difference between the octave of Tasso and the octave of Ariosto, was established.

This positive result suggests the need for a large-scale study that should include many more texts from different national traditions.

Acknowledgment

This paper is part of a research project based at Lomonosov Moscow State University and supported by Russian Science Foundation Grant № 17-18-01701.

References

Ariosto, L. (1964). *Orlando Furioso: 2 vol*. Edited by E. Sanguineti, M. Turchi. Milano: Garzanti.

Belousova, A. (2011). Metr i sintaksis v russkoj oktave (Pushkin, Lermontov, Turgenev, Fet). In *Studia Slavica X* (54–71). Tallinn: Tallinn University Press.

Belousova, A. (2013). Ritmiko-sintaksicheskaja organizatsija russkoj, anglijskoj i ital'ianskoj oktavy: K probleme "stix i iazyk". *Vestnik Moskovskogo Universiteta, Serija 9, Filologija* (№ 3), 121–131.

Boccaccio, G. (1964). Filostrato. Edited by V. Branca. In G. Boccaccio, *Tutte le opere*. *Vol. II*. Edited by V. Branca. Milano: Mondadori.

Boccaccio, G. (1974). Ninfale Fiesolano. Edited by A. Balduino. G. Boccaccio, *Tutte le opere. Vol. III*. Edited by V. Branca. Milano: Mondadori.

Boiardo, M. M. (1974). *Orlando Innamorato*. Edited by A. Scaglione. Torino: Utet.

Catalano, M. (Ed.). (1939/40). *La Spagna, poema cavalleresco del secolo XIV*. Bologna: Casa Carducci.

Contini, G. (1974). Come lavorava l'Ariosto. In G. Contini, *Esercizî di lettura sopra autori contemporanei con un'appendice su testi non contemporanei* (232–241). Torino: Einaudi.

Fubini, M. (1948). Osservazioni sul lessico e sulla metrica del Tasso. In M. Fubini, *Studi sulla letteratura del Rinascimento* (216–247). Firenze: Sansoni.

Gasparov, M. – Skulacheva, T. (2004). *Stat'i o lingvistike stixa*. Moscow: Yazyki slavianskoj kul'tury.

Giovine, S. (2017). Tra ipotassi e paratassi. Sulla sintassi dell'periodo dell'ottava ariostesca. *Stilistica e metrica italiana* XVII, 73–106.

Giovine, S. (2018). La sintassi del Furioso tra narrazione epica ed esperienza lirica. In *In limine. Forme marginali e discorsi di confine*. Edited by M. De Blasi, G. Imbriaco, F. Messina, S. Orlando, V. Schettino. Università degli studi di Napoli "L'Orientale", Quaderni della ricerca-2, Napoli, 125-140.

Juri, A. (2017). *Ottava di Pietro Bembo. Sintassi, metrica, retorica*. Pisa: ETS.

Pilshchikov, I. – Starostin, A. (2009). Problemy avtomatizatsiji bazovyx protsedur ritmiko-sintaksicheskogo analiza sillabo-tonicheskix tekstov. In V. Plungian (Ed.), *Natsional'nyj korpus russkogo iazyka: 2006–2008. Novye rezul'taty i perspektiv*y (298–315). S. Petersburg: Nestor-Istorija.

Poliziano, A. (1992). Rime. In A. Poliziano, *Stanze, Orfeo, Rime*. Edited by D. Puccini. Milano: Garzanti.

Praloran, M. (2003). *Il poema in ottava: Storia linguistica italiana*. Roma: Carocci.

Praloran, M. (2009). *Le lingue del racconto. Studi su Boiardo e Ariosto*. Roma: Bulzoni.

Pulci, L. (1989). *Morgante*. Edited by D. Puccini. Milano: Garzanti.

Shapir, M. (2000). *Universum versus: Iazyk — stix — smysl v russkoj poezii XVIII–XX vekov. Vol. 1*. Moscow: Iazyki russkoi kul'tury. (= Philologica russica et speculativa; T. I).

Shapir, M. (2009). *Stat'i o Pushkine*. Sostavitel' T. M. Levina, Izdanie podgotovili K. A. Golovastikov, T. M. Levina, I. A. Pil'shchikov. Pod obshchej redakciej I. A. Pil'shchikova. Moscow: Yazyki slavianskix kul'tur.

Soldani, A. (1999). *Attraverso l'ottava. Sintassi e retorica nella Gerusalemme Liberata*. Lucca: Maria Pacini Fazzi.

Spoerri, Th. (1922). *Renaissance und Barock bei Ariost und Tasso*. Bern: Haupt.

Tasso, T. (1957). *Gerusalemme Liberata*. Edited by Lanfranco Caretti. Milano: Mondadori.

Tomashevsky, B. (1958). Strofika Pushkina. In *Pushkin: Issledovaniia i materialy. Vol. 2* (49–184). Moscow, Leningrad: AN SSSR.

Vinokur, G. (1990). Slovo i stix v "Evgenii Onegine". In G. Vinokur, *Filologicheskie issledovanija: Lingvistika i poetika* (146–195). Moscow: Nauka.

Yarkho, B. (2006). Metodologija tochnogo literaturovedenija: Izbrannye trudy po teorii literatury. Izdanie podgotovili M. V. Akimova, I. A. Pilshchikov, M. I. Shapir. Pod obshchej redakciej M. I. Shapira. Moscow: Yazyki slav. kul'tur.

English Iambic Meters and the Tension Asymmetry

Patrik Bye
Nord University, Bodø, Norway
patrik.bye@nord.no

Abstract

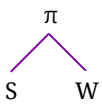
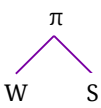
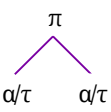
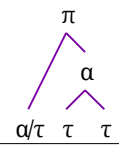
Compared with the iambic tetrameter, the iambic pentameter allows greater metrical tension, specifically, a higher relative frequency of prominence mismatches. This Tension Asymmetry is shown to hold for a corpus of 125 English poems from the last 400 years, including 47 in tetrameter and 73 in pentameter. The Tension Asymmetry is argued to be attributable to the uneven metrical structure of the pentameter, rather than to prosodic considerations. This is supported by the finding that the iambic pentameter not only shows inversion more frequently, but that it tolerates inversion at lower levels of the prosodic hierarchy. The crucial role of even versus uneven structure in explaining the Tension Asymmetry is underlined by the discovery that the (balanced) hexameter is at least as stringent as the tetrameter.

1 Introduction

Close study of the English metrical verse tradition turns up asymmetries with interesting implications for the relation between cognition, perception, and artistic endeavor. Perhaps the most striking example is the almost complete absence of isometric poems in trochaic pentameter (e.g. Fenton 2003: 39), of which the most comprehensive available anthology of English poetry (*The Norton Anthology of Poetry*; Ferguson et al. 2005) furnishes not a single example. This striking gap would seem to point to a fundamental difference between trochaic and iambic verse, and in earlier work (Bye, submitted) I have proposed that the gap is a verse manifestation of the Iambic-Trochaic Law (e.g. Hayes 1995).

Both trochees and iambs occur freely in the tetrameter, which may be taken to represent the ground pattern of the verse line, with the pentameter and hexameter as augmentations licensed by iambic foot structure. In a departure from the idea, assumed in much work in nonlinear Generative Metrics (e.g. Kiparsky 1977, and others), that verse trochees and iambs are mirror images, defined by the ordering of strong (S) and

weak (W) metrical positions, I argue that verse trochees are structurally even, while verse iambs are structurally uneven and right-branching. This Asymmetric Theory works by adding a further level of representation to the metrical hierarchy. Metrical positions, symbolized by <α>, dominate timing units <τ>, in the same way as, in the prosodic hierarchy, syllables dominate moras. The structures of the trochee and iamb according to the Symmetric and Asymmetric Theories are shown for comparison in TAB. 1. The verse foot is symbolized by <π>. Metrical positions that dominate a single timing unit are shown as <α/τ>.

	Trochee	**Iamb**
Symmetric Theory		
Asymmetric Theory		

TAB. 1: Types of Verse Feet in Symmetric and Asymmetric Theories

Although I will still refer to metrical positions as 'strong' and 'weak', in the Asymmetric Theory these notions may be derived from structural relationships.

When we group verse feet in binary fashion to give half-lines, or dipodies (δ), and half-lines to yield full lines (λ), we get the representation of the iambic tetrameter shown in FIG. 1.

Under asymmetric assumptions, the iambic pentameter may be understood as a projection of uneven foot structure at the level of the line and second half-line. Adapting the proposal by Kiparsky (1977: 230), the iambic pentameter differs from the tetrameter in the left-adjunction of an additional verse foot to the second half-line. This is shown in FIG. 2.

Thus, while the iambic pentameter incurs a structural cost (marked left-adjunction of a verse foot), there is nonetheless a payoff in terms of the enhancement of unevenness as such, since the half-line with left-adjunction mimics the structure of the right-branching iamb.[1] In the case of trochaic feet, on the other hand, projection of even foot structure at the line and half-line levels would simply be a case of vacuous application. The logically possible but negligibly attested augmentation pattern, the trochaic pentameter, would incur the structural cost but, on asymmetric assumptions, no enhancement benefit would result.

This paper examines what I argue is a quantitative manifestation of the same underlying asymmetry: the iambic pentameter affords greater metrical tension, or complexity, than the iambic tetrameter, a phenomenon I dub the Tension Asymmetry. This

1 It is possible to view the enhancement as a hierarchical version of Jakobsonian recurrence.

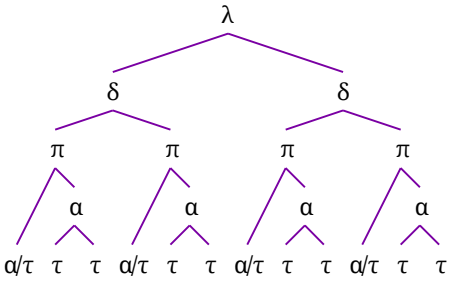


FIG. 1: Tree structure for iambic tetrameter

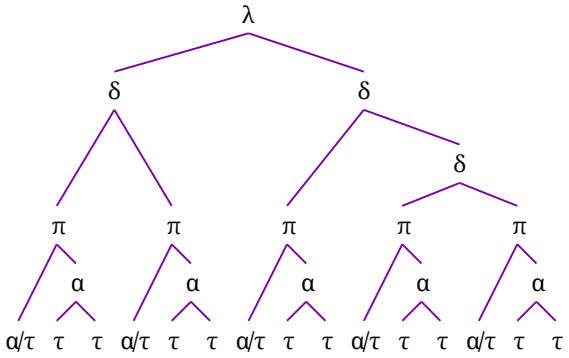


FIG. 2: Tree structure for iambic pentameter

observation is nothing new. Poets and scholars of poetry have long intuited such a connection. Timothy Steele, for example, writes the following in his primer on prosody:

> The pentameter [...] is more flexible than the shorter lines. It is not just a matter of its being longer. The line has as well a wonderfully fluid asymmetry.
>
> Steele (1999: 15)

The first empirical demonstrations of this flexibility are recent. Examining the distribution of initial inversion (the substitution of a trochee in the W S template at the beginning of a line) and erosion (where the S position is realized by a secondary stress or an unstressed syllable), Duffell (2008a, b) shows that both occur at higher rates in pentameter compared with tetrameter verse. Duffell's data allow direct comparison of the rates of initial inversion and erosion in the verse of two poets, Alexander Pope and Robert Browning, shown in TAB. 2 (put together from separate tables in Duffell 2008a: 8, 10, 13).

For Browning, the frequency of initial inversion in his iambic pentameter (8.3%) is almost twice that of his iambic tetrameter (4.3%). The relation between Pope's also goes in the same direction, although the difference is much smaller (3.7% versus

	Initial inversion (%)		Erosion (%)	
Poet	**Iambic Tetrameter**	**Iambic Pentameter**	**Iambic Tetrameter**	**Iambic Pentameter**
Browning	4.3	8.3	10.7	13.6
Pope	2.6	3.7	9.9	12.3

TAB. 2: Initial inversion and erosion in the iambic meters of two English poets (after Duffell 2008a)

2.6%). Duffell also provides data for erosion at each 'ictus' (≈ strong position) and the line average, the latter also shown in TAB. 2. As can be seen, the erosion rates are also somewhat higher for the iambic pentameters of both poets.

In this paper, I develop a slightly different approach to measuring tension. My conclusions are based on an analysis of 120 poems, 47 iambic tetrameter and 73 iambic pentameter. In addition, five hexameter poems are included for further comparison, bringing the total number of poems to 125. All are listed in the appendix.

The term *tension* refers to several types of mismatch between metrical and prosodic structure, including extrametricality and resolution. I abstract away from these here and focus on *prominence mismatch*. In the unmarked state of affairs, a metrically strong position maps onto a phonologically prominent exponent, while a metrically weak position maps onto a non-prominent exponent. The marked case in which a weak metrical position maps onto a phonological prominence I shall refer to as *prosodic fortition* (henceforth, *fortition* for short). I shall use the term *prosodic lenition* (*lenition* for short) to refer to the situation where a strong metrical position may map onto a non-prominent exponent. These terms are borrowed from segmental phonology (see, e.g. Bye–De Lacy 2008), but there is no reason why they should not be used to describe the mapping from metrical positions to prosodic exponents.[2]

2 Metrical tension and prominence mismatch

Tension is obviously a property of the individual line, just as meter is. However, it is also possible to see tension (and meter) as a property of a larger textual unit, for example, an entire isometric poem, or a coherent part of one. This conception, which I take to be the appropriate one for present purposes, is what underlies most pedagogical approaches to poetic meter. Learners are typically asked: 'What is the meter of this poem?' Put differently, tension is part of verse design, to use Jakobson's (1960) term. In the next section, I will motivate this idea further, before turning to how we can determine occurrences of prosodic fortition and lenition in detail.

2 Attridge (1982) conceives of the mapping between prosody and meter as proceeding in the opposite direction, and proposes the terms *demotion* and *promotion* to describe the mapping from syllables to 'beats' and 'offbeats' (his terms for strong and weak metrical positions). Thus, *demotion* occurs when a stressed syllable occurs on an offbeat, and *promotion* when an unstressed syllable falls on a beat.

2.1 Tension as verse design

In their earliest contributions to Generative Metrics, Halle–Keyser specifically set out to engage not only linguists, but literary scholars as well. In a response to their seminal article in *College English* (Halle–Keyser 1966), the critic W. K. Wimsatt (1970) raised searching questions about the appropriateness of Halle and Keyser's emphasis on rules, arguing that it is preferable to understand the meter of a poem as a 'norm'. While Halle–Keyser's rules are designed to distinguish between metrical and unmetrical *lines*, Wimsatt's concept of a *norm* appears to invoke meter as a property of a *poem*. One of Wimsatt's key empirical arguments for the normative conception of meter has to do with the way exponents of minor categories (function words) in strong metrical positions may be 'tilted' to the meter "*without violence* to any linguistic given" (p. 785; his emphasis). In phonological terms, what Wimsatt seems to have in mind is that function words in certain positions may optionally be incorporated into prosodic structure either as clitics or as full prosodic words (e.g. Miller 1977; Selkirk 1996; Ito–Mester 2009). Thus, in a line like Chaucer's *The Millere was a stout carl, for the nones* (The Canterbury Tales, General Prologue, l. 547), the function words *was* and *for*, which both occur in strong positions, may be tilted 'in favor of the meter' by giving them their strong (full word), rather than their weak (clitic), forms (in present-day General British English: /wɒz/$_S$ ~ /wəz/$_W$, and /fɔː/$_S$ ~ /fə/$_W$).

As Wimsatt states, tilting is not a linguistic given: it is optional. Its function is to facilitate recognition of the meter. Whether it is applied or not, however, is a matter of performance style, and this has implications for how we register prominence mismatches, a question to which we return in the next section.

While not taking his cue from Wimsatt, Fabb (2001, 2006) highlights pertinent facts concerning the statistical distribution of function words in strong and weak positions that point to a similar normative interpretation. On one level, meter is structure, and certain aspects of its relation to the prosodified text may be described using metrical rules. On another level, meter is also 'message', and as such is subject to the principles of inferential pragmatics, specifically Relevance Theory (Sperber–Wilson 1995).[3] In short, Fabb argues that the meter of a poem is part of the poet's communicative intent. From a pragmatic perspective, the prosodified text of a line of verse may be understood as an ostensive stimulus from which evidence the listener or reader is able to infer a particular meter. The persistence or recurrence of the metrical pattern (with variations) increases the chances that the desired inference is drawn. The nature of the ostension is mimetic, since "[i]t is the degree of resemblance between the decoded [phonological—P.B.] structure and the [metrical—P.B.] stereotype which warrants […] the inference". This ostensive-inferential relationship explains Fabb's finding, on the basis of a corpus of 1749 of Robert Browning's iambic pentameters, that the articles *the* and *a(n)* are overwhelmingly found in weak metrical positions (774 out of 846 instances, or 91.5%). As Fabb points out, this is a preference

3 Kiparsky (1987) incorporates inferential pragmatics into his revised version of Jakobson's program for linguistic poetics.

"not forced by the generative metrical rules, but [...] a consequence of the need to imitate a certain normative pattern".

Further evidence in favor of this normative view is that poems in the same meter and by the same poet may show global differences in tension, a point also made by Paterson (2018), who distinguishes between 'tight' and 'loose' metrical 'frames'. A good example of such a difference is between William Blake's 'The Little Black Boy' (from *Songs of Innocence*) and 'To the Evening Star', both poems in iambic pentameter. Let us first consider the first three stanzas of 'The Little Black Boy', which evinces fairly low tension over all. The fortition rate is 8.6%, while the lenition rate is 25.0% (values are for the poem as a whole).

(1) My mother bore me in the southern wild,
And I am black, but O! my soul is white;
White as an angel is the English child:
But I am black as if bereav'd of light.

My mother taught me underneath a tree
And sitting down before the heat of day,
She took me on her lap and kissed me,
And pointing to the east began to say.

Look on the rising sun: there God does live
And gives his light, and gives his heat away.
And flowers and trees and beasts and men recieve
Comfort in morning joy in the noon day.

William Blake, 'The Little Black Boy' (1789), Stanzas 1–3

Compare this with 'To the Evening Star' below, which shows considerably higher tension throughout. Here the fortition rate stands at 26.7%, the lenition rate at 35.2%.

(2) Thou fair-hair'd angel of the evening,
Now, while the sun rests on the mountains, light
Thy bright torch of love; thy radiant crown
Put on, and smile upon our evening bed!
Smile on our loves; and, while thou drawest the
Blue curtains of the sky, scatter thy silver dew
On every flower that shuts its sweet eyes
In timely sleep. Let thy west wind sleep on
The lake; speak silence with thy glimmering eyes,
And wash the dusk with silver. Soon, full soon,
Dost thou withdraw; then the wolf rages wide,
And the lion glares thro' the dun forest:
The fleeces of our flocks are cover'd with
Thy sacred dew: protect them with thine influence.

William Blake, 'To the Evening Star' (1783)

Having set out the reasons for viewing tension as a property of the poem, I turn to a discussion of how prominence mismatch is determined.

2.2 Prosodic fortition and lenition

I adopt a binary feature as sufficient to characterize the prosodic exponents of metrical positions. A metrical position realized by the head of some prosodic word, including a prosodic word that is the member of a compound word, is assigned the value of '1'; any other metrical position is assigned the value 0. Thus, each syllable in *manhunt* would be assigned '1', but in *mandate*, the final syllable, which realizes a phonological (secondary stress) foot, would be assigned '0'. Fortition entails a weak metrical position whose exponent is assigned the value '1', and lenition a strong metrical position whose exponent is assigned the value '0'. There are thus four possible prosodic expansions of the iambic verse foot: [01] (default), [00] (lenition without fortition), [11] (fortition without lenition), and [10] (fortition with lenition). Using this system, William Wordsworth's 'Scorn Not the Sonnet' is scanned as shown below. The center dot <·> delimits parts of words separated by verse foot boundaries.

(3) (Scorn not)$_{10}$ (the Son·)$_{01}$ (·net; Crit·)$_{01}$ (·ic, you)$_{00}$ (have frowned,)$_{01}$
(Mindless)$_{10}$ (of its)$_{00}$ (just hon·)$_{11}$ (·ours; -- with)$_{00}$ (this key)$_{01}$
(Shakespeare)$_{10}$ (unlocked)$_{01}$ (his heart;)$_{01}$ (the mel·)$_{01}$ (·ody)$_{00}$
(Of this)$_{00}$ (small Lute)$_{11}$ (gave ease)$_{11}$ (to Pet·)$_{01}$ (·rarch's wound;)$_{01}$
(A thou·)$_{01}$ (·sand times)$_{01}$ (this Pipe)$_{01}$ (did Tas·)$_{01}$ (·so sound;)$_{01}$
(Camö·)$_{01}$ (·ens soothed)$_{01}$ (with it)$_{00}$ (an Ex·)$_{01}$ (·ile's grief;)$_{01}$
(The Son·)$_{01}$ (·net glit·)$_{01}$ (·tered a)$_{00}$ (gay myr·)$_{11}$ (·tle Leaf)$_{01}$
(Amid)$_{00}$ (the cy·)$_{01}$ (·press with)$_{00}$ (which Dan·)$_{01}$ (·te crowned)$_{01}$
(His vis·)$_{01}$ (·ionar·)$_{00}$ (·y brow:)$_{01}$ (a glow-)$_{01}$ (·worm Lamp,)$_{11}$
(It cheered)$_{01}$ (mild Spen·)$_{11}$ (·ser, called)$_{01}$ (from Fae·)$_{01}$ (·ry-land)$_{01}$
(To strugg·)$_{01}$ (·le through)$_{00}$ (dark ways;)$_{11}$ (and, when)$_{01}$ (a damp)$_{01}$
(Fell round)$_{10}$ (the path)$_{01}$ (of Mil·)$_{01}$ (·ton, in)$_{00}$ (his hand)$_{01}$
(The Thing)$_{01}$ (became)$_{01}$ (a Trum·)$_{01}$ (·pet; whence)$_{01}$ (he blew)$_{01}$
(Soul-an·)$_{11}$ (·imat·)$_{00}$ (·ing strains--)$_{01}$ (alas,)$_{01}$ (too few!)$_{11}$

A number of the poems analyzed here evince syllable extrametricality, and other types of tension that are not reducible to fortition/lenition, and so need not detain us here. In cases of extrametricality, some prosodic material lacks a correspondent in the metrical representation. Double upbeats and resolutions fall within the permitted range in which prosodic exponents of metrical positions vary. They do not affect the computation of prominence mismatch. By way of illustration, Yeats' poem 'The Circus Animals' Desertion' includes a line (l. 20) with all three, shown in (4).

(4) (But mas·)$_{01}$ (·terful Heaven)$_{01}$ (had in·)$_{00}$ (·tervened)$_{01}$ (to save)$_{01}$ <it.>

The line ends with an extrametrical syllable. In the second verse foot both the weak and strong positions each map onto two phonological syllables, the weak position being realized by a double upbeat and the strong by a moraic trochee of (arguably) two syllables.

TAB. 3 gives the relative frequencies of each prosodic expansion for all 125 poems analyzed.

Over all, lenition without fortition [00] is 2.4 times as frequent as fortition without lenition [11], suggesting that fortition represents a more marked departure from the

Prosodic expansion	[01]	[00]	[11]	[10]
Tetrameter	73.0	16.6	7.0	3.4
Pentameter	67.3	18.9	8.3	5.5
Hexameter	77.5	17.3	3.7	1.5
All meters	69.9	17.9	7.6	4.5

TAB. 3: Relative frequency of each prosodic expansion

iambic norm than lenition does. Iambic feet may thus be ranked in a hierarchy of relative well-formedness as shown in (5), where fortition with lenition [10] is the most marked option of all.

(5) [01] ≻ [00] ≻ [11] ≻ [10]

An important methodological point is that the value of '1' is only assigned when a metrical position is realized by the head of a linguistically *given* prosodic word. This includes lexical or morphosyntactic words, which obligatorily project a prosodic word (e.g. Selkirk 1996), and also minor words (function words and/or pronouns) in two types of context. First, function words obligatorily project a prosodic word at the end of a phonological phrase, for example the stranded preposition *at* in 'What are you looking [æt]~*[ət]?' Second, function words and pronouns project a prosodic word under emphasis. Where such emphasis is indicated in the text (e.g. by italics), or the context makes it overwhelmingly likely that such emphasis is intended, I have recorded a value of '1'. The procedure thus abstracts away from choices made in performance, in particular the possibility of tilting the realization of function words 'in favor of the meter'. The point of this is to avoid introducing unconscious bias into the analysis, for example by increasing the rate of (performed) lenitions in the pentameter relative to the tetrameter. In the terms of Jakobson (1960), it restricts attention to verse instances, abstracting away from variation in delivery (instance or design).

In the last part of this section, I will briefly list which classes of word count as 'minor' in the analysis. A useful criterion is membership in a category that includes items with strong (full word) and weak (clitic) forms. Here Cruttenden (2014: 273f.) lists articles (*a*, *the*), certain quantifiers (*any*, *some*), prepositions (*at*, *for*, *from*, *of*, *than*, *to*), conjunctions (*and*, *or*, *but*), complementizers (*that*, *if*), auxiliaries (*can*, *should*, *will*), negative *not*, *just*, personal pronouns (*you*, *them*) and possessive determiners (*my*, *her*). Although weak forms are clitic, there is no generalized *phonological* reduction in cliticized function words. Thus, *on* is always /ɒn/, whether clitic or not. Cliticization is further not limited to monosyllabic words. Thus, Ito–Mester (2009) argue that polysyllabic function words, such as the prepositions *under* and *between*, are also generally cliticized. In the present study such words are thus never assigned '1' except phrase-finally or under emphasis.

Wells (2008) additionally lists several other words as having 'occasional' weak forms, which are dealt with here in the same way. These include *no* /nə/,[4] *nor* / nə(r)/, *so* /sə/,

4 In my own RP variety, the occasional weak form of *no* is permissible with the comparative forms of adjectives, e.g. *no longer* [nəʊ~nə lɒŋgə], *no wiser* [nəʊ~nə waɪzə], but not NPs, e.g. *no sane person* [nəʊ~*nə seɪn pɜːsn̩].

and the interrogative pronoun *who* (strong: /huː/; weak /hu/, /u/). The interrogative pronoun *what* /wɒt/ lacks a separate weak form, but is dealt with in the same way as *who*. Distal *that* /ðæt/ is never reduced, while proximal *this* may optionally have the weak form /ðəs/, at least as a determiner. I have therefore elected to treat demonstrative determiners as potential clitics (assigned '0'), but demonstrative pronouns as full prosodic words (assigned '1').

2.3 The corpus

The corpus for the present study consists of 125 isometric poems (47 tetrameter, 73 pentameter, 5 hexameter). Most are culled from *The Norton Anthology of Poetry* (Ferguson et al. 2005), although I have also used the *(New) Oxford Books of Poetry* series to supplement where necessary. For longer poems, shorter extracts of 20–50 lines have been used. All poems used are listed in the appendix. TAB. 4 shows the number of poems, lines and feet analyzed for each meter.

	N(poems)	N(lines)	N(feet)
Tetrameter	47	1077	4322
Pentameter	73	1766	8722
Hexameter	5	147	719
All meters	125	2990	13763

TAB. 4: Number of poems, lines and feet analyzed, by meter

For the tetrameter and pentameter, I have restricted my attention to 19 poets whose work includes both. This has not been possible to do for the much rarer hexameter, to which I return in Section 4.

Certain tetrameter poems were excluded because they evinced a pronounced metrical parallelism that produces a greater than usual divergence from the metrical norm. For example, Ben Jonson's 'Clerimont's Song' (from *Epicœne*), the first stanza of which is shown below in (6), begins with an initial inversion in the two first half-lines, a pattern that is repeated in lines 3 and 6.

(6) Still to be neat, still to be dressed,
As you were going to a feast;
Still to be powdered, still perfumed;
Lady, it is to be presumed,
Though art's hid causes are not found,
All is not sweet, all is not sound.

The result is an atypically large proportion of fortitions (22.9%). Since this is clearly due to the parallelism, it would have been misleading to include the poem in the sample. Other tetrameter poems that have been excluded for the same reasons are Thomas Carew's 'Ask Me No More Where Love Bestows', and 'Mediocrity in Love Rejected'.

3 The tension asymmetry

Box and whisker plots showing the mean rates of prosodic fortition and lenition in the tetrameter and pentameter are shown in FIG. 3 and FIG. 4 below.

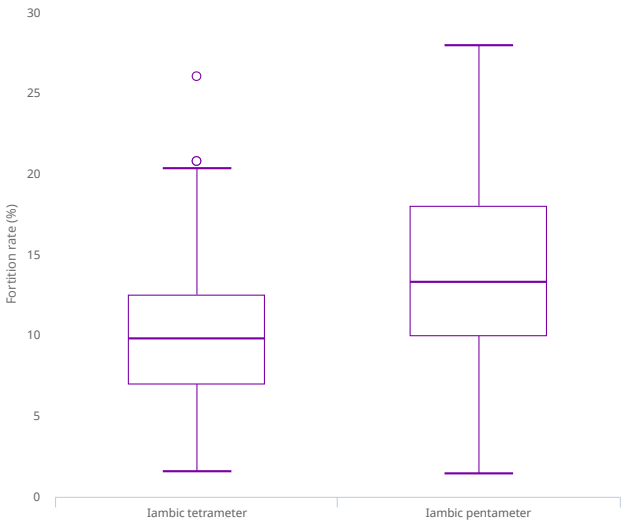


FIG. 3: Box and whisker plot showing mean fortition rate (%) for iambic tetrameter and pentameter

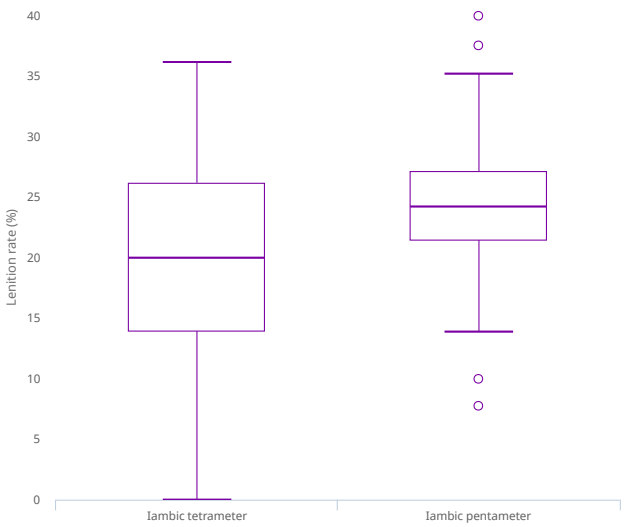


FIG. 4: Box and whisker plot showing mean lenition rate (%) for iambic tetrameter and pentameter

One-tailed t-tests indicated that fortition in the iambic pentameter (M=13.8, SD=5.8) is more frequent than the iambic tetrameter (M=10.4, SD=5.3), $t(104)=3.2$, $p<0.001$, $d=0.61$, and that lenition in the iambic pentameter (M=24.4, SD=5.6) is more frequent than in the iambic tetrameter (M=20.0, SD=7.9), $t(75)=3.3$, $p<0.001$, $d=0.64$. The intuition that pentameter allows greater tension, specifically, a higher relative frequency of prominence mismatch, is thus supported.

When we look at the work of individual poets, we see that the rates shift depending on the poet. Thus, while Andrew Marvell's verse may be said to be strict given its relatively low fortition rate, that of Philip Larkin is highly flexible. Marvell's tetrameter has a fortition rate of 3.1%, while Larkin's tetrameter has 11.6%. Compare this with the pentameters of these two poet, where Marvell has 10.2% and Larkin 20.2%. Marvell's iambic pentameter is still stricter on this measure than Larkin's iambic tetrameter. In the poetry of both, however, it is the pentameter that displays the greater flexibility.

TAB. 5 shows the average rates for fortition for fifteen of the poets studied, and the difference between the pentameter and tetrameter.

Poet	Iambic pentameter	Iambic tetrameter	Difference
William Blake	19.6	6.8	12.8
Matthew Arnold	20.8	10.8	10.0
Philip Larkin	20.2	11.6	8.6
Robert Frost	12.8	5.1	7.7
Andrew Marvell	10.2	3.1	7.1
Ralph Waldo Emerson	20.4	14.1	6.3
William Wordsworth	10.9	5.5	5.4
Jonathan Swift	13.7	8.8	4.9
Robert Herrick	12.5	11.1	1.4
Robert Browning	19.1	17.7	1.4
Ben Jonson	6.7	6.9	–0.2
William Butler Yeats	17.2	17.7	–0.5
Alfred Lord Tennyson	10.1	10.6	–0.5
Michael Drayton	10.7	12.5	–1.8
Howard Nemerov	12.3	14.7	–2.4

TAB. 5: Average rate of fortition in iambic tetrameter and pentameter by poet

For the seven poets at the bottom of TAB. 5 (Herrick, Browning, Jonson, Yeats, Tennyson, Drayton, and Nemerov), the difference in fortition rate between the pentameter and tetrameter would appear to be negligible. Indeed, for Jonson, Yeats, Tennyson, Drayton, and Nemerov, the difference is actually negative, although for Jonson, Yeats and Tennyson the difference is very small. Interestingly, Nemerov stands out somewhat as having greater stringency in his tetrameter. With respectively 12.8 and 10.0, William Blake and Matthew Arnold have the largest difference in fortition rate, with Philip Larkin not far behind at 8.6.

TAB. 6 shows the corresponding rates for lenition, along with the difference. Again, the trend is for a higher proportion of lenitions in the pentameter compared with the iambic tetrameter.

Poet	Iambic pentameter	Iambic tetrameter	Difference
Robert Browning	21.6	10.3	11.3
Philip Larkin	26.2	18.6	7.6
Alfred Lord Tennyson	21.8	14.3	7.5
William Wordsworth	26.1	19.5	6.6
William Butler Yeats	31.3	25.1	6.2
Ralph Waldo Emerson	26.5	21.1	5.4
William Blake	29.2	25.5	3.7
Matthew Arnold	21.1	17.7	3.4
Andrew Marvell	24.4	23.4	1.0
Michael Drayton	18.7	17.9	0.8
Ben Jonson	30.1	29.9	0.2
Jonathan Swift	12.2	13.2	–1.0
Robert Herrick	22.8	24.0	–1.2
Howard Nemerov	25.7	27.9	–2.2
Robert Frost	20.7	23.1	–2.4

TAB. 6: Average rate of lenition in iambic tetrameter and pentameter by poet

For the seven poets at the bottom of TAB. 6 (Marvell, Drayton, Jonson, Swift, Herrick, Nemerov, and Frost), the difference in lenition rate between the two meters is negligible. Over all, Drayton, Jonson, Herrick and Nemerov cannot be said to use either fortition or lenition to enhance their pentameter. Indeed, Nemerov stands out as having a pentameter that is more stringent than his tetrameter for both types of prominence mismatch. Browning, Tennyson, and Yeats, who showed low rates of fortition in the pentameter, score relatively high on lenition, however. Browning's verse displays the greatest difference in lenition rate.

4 Explaining the asymmetry

In this section I consider two competing hypotheses to explain the observed difference in the relative frequencies of prominence mismatch. I dub these the 'Prosodic Hypothesis' and the 'Metrical Hypothesis'. I further distinguish two versions of the Metrical Hypothesis, the 'Linear' and the 'Nonlinear'. I will argue that the Nonlinear Metrical Hypothesis provides the best explanatory account of the facts.

According to the Prosodic Hypothesis, the Tension Asymmetry is attributable to a difference in the prosodic structure that realizes the meter. Since pentameter lines are longer, the explanation goes, the chances of a line-medial major syntactic boundary, or caesura, are greater. It has long been known that inversion primarily occurs at the beginnings of verse lines, but medial inversions also occur with some frequency. Where they do, they are very largely initial in some phrase, generally an intonation phrase. As Hayes (1983, 1989) was the first to observe, metrical constraints are in general relaxed in phrase-initial position, including within the verse line. The idea is then that the greater relative tension of the pentameter may emerge from the higher frequency of line-medial phrase onsets. Duffell (2008a: 14) comes close to articulating

this position, suggesting that the iambic tetrameter "lacks the caesura variation" of the pentameter and "tends therefore to be more monotonous". Fortition with lenition [10], that is inversion in any phrasal position, occurs 475 times out of 8722 in the pentameter (5.4%), and 144 out of 4322 times in the tetrameter (3.3%). While undoubtedly a factor in producing the overall difference, phrase-initial position is not a sufficient one. One reason is that the iambic pentameter has a higher rate of fortition in weak position *without* lenition in strong position [11]. This configuration occurs 774 times in 8722 pentameter feet (8.9%), and 295 in 4322 tetrameter feet (6.8%). Such cases are the result of monosyllabic incursion and, since stressed monosyllables occur freely in weak position in English, this cannot be explained as licensed by the prosodic environment.

In order to properly falsify the Prosodic Hypothesis, though, we must eliminate the phrase-initial factor by looking specifically at the relative frequencies of phrase-*medial* inversions. A search of the corpus shows that such inversions are more common in the iambic pentameter, where they occur 95 times out of 8722 in the pentameter (1.1%). In the tetrameter, they are a little under half as frequent, occurring 20 times out of 4322 (0.5%). Examples are given in (7) with monosyllabic incursion in the weak position and a function word in the strong position. The only tetrameter example in (7) is from Browning's 'Meeting at Night' (l. 10).

(7)	In timely sleep. Let thy west wind (sleep on) / The lake; …	Blake, 'To the Evening Star' (l. 8)
	And blue (spurt of) a lighted match,	Browning, 'Meeting at Night' (l. 10)
	The meed of saints, the white (robe and) the palm.	Tennyson, 'St Simeon Stylites' (l. 20)
	So mastered by the brute (blood of) the air,	Yeats, 'Leda and the Swan' (l. 12)
	Or even last (year's or) the year's before.	Frost, 'The Wood-Pile' (l. 28)

With the exception of the first example (Blake, 'To the Evening Star', l. 8), each inversion occurs *inside* a phonological phrase consisting of an Adjective plus Noun: *blue spurt*, *white robe*, *brute blood*, and *last year's*. Since *sleep on* begins a VP, it is initial within the phonological phrase *sleep on the lake*.

Furthermore, there are cases of [10] (fortition with lenition) where the weak position contains the second member of a compound. Such inversions, illustrated in (8), are significant because the verse foot boundary can only fall inside a phonological phrase. They only occur in the iambic pentameter.

Lastly, iambic pentameter evinces at least some rare polysyllabic inversions medially or finally in the intonation phrase. There are only 14 cases (distributed between 12 lines) in the corpus, all of which are shown below in (9).

(8)	And veils the farm- (·house at) the garden's end.	Emerson, 'The Snow-Storm' (l. 5)
	And re· (·cross till) they weave a spider-web	Browning, 'Caliban upon Setebos' (l. 8)
	Coating the cave- (·top as) a brow its eye,	Browning, 'Caliban upon Setebos' (l. 8)
	The tears and takes the fare· (·well of) each friend,	Browning, 'Childe Roland to the Dark Tower Came' (l. 21)
	One flight out side· (·ways would) have undeceived <him.>	Frost, 'The Wood-Pile' (l. 17)

(9)	And the (lion) glares thro' the dun (forest:)	Blake, 'To the Evening Star' (l. 12)
	And let thy holy feet (visit) our clime!	Blake, 'To Spring' (l. 8)
	Thy soft (kisses) on her (bosom;) and put	Blake, 'To Spring' (l. 14)
	That hateful cripple, out of his (highway)	Browning, 'Childe Roland to the Dark Tower Came', (l. 44)
	To the land vaguely realizing (westward,)	Frost, 'The Gift Outright' (l. 14)
	Slouches towards (Bethle·) ·hem to be born?	Yeats, 'The Second Coming' (l. 22)
	We saw the last (embers) of daylight die,	Yeats, 'Adam's Curse', (l. 29)
	Scattering long-haired grief and scored (pity.)	Larkin, 'For Sidney Bechet' (l. 17)
	Their parchment, plate and pyx in locked (cases,)	Larkin, 'Church Going' (l. 25)
	And once the crows knew, all (nature) would know.	Nemerov, 'Brainstorm' (l. 21)
	Juices, and sodden sacks (suddenly) let go;	Nemerov, 'Brainstorm' (l. 32)
	Where it began? the vast (pudding) of knowledge,	Nemerov, 'Boy with Book of Knowledge' (l. 13)

If the iambic tetrameter were equally tolerant to such polysyllabic inversions, we would expect around 7 examples, but we find none. Some of the examples in (9) may be analyzed as initial in a phonological phrase. This includes the VP *visit our clime* (Blake, 'To Spring', l. 8), and the clausal *suddenly let go* (Nemerov, 'Brainstorm', l. 32). Five of the remaining inversions, however, involve nouns with a preceding adjective, such as *last embers* (Yeats, 'Adam's Curse', l. 29), or *vast pudding* (Nemerov, 'Boy with Book of Knowledge', l. 13). Again, this means the inversion is medial in the phonological phrase. Moreover, three of the examples show a noun preceded by a determiner, which is generally clitic, e.g. *the lion* (Blake, 'To the Evening Star', l. 12). If we assume, following Ito–Mester (2009) that cliticization entails left-adjunction to the prosodic word to create a self-embedded prosodic word, then we have to conclude that polysyllabic inversion may also take place within this larger prosodic word domain.

The iambic pentameter is thus more tolerant of initial inversion at lower levels of the prosodic hierarchy (inside the phonological phrase and even the procliticized prosodic word), which the tetrameter seems to disallow. The Prosodic Hypothesis does not predict this difference, but it is consistent with the Metrical Hypothesis to which we now turn.

Intuitively, the potential for greater tension in the iambic pentameter is attributable to the richer evidence available for uneven metrical structure that an additional iambic foot affords. Greater divergence from the metrical template becomes possible without fatally compromising the desired inference that the poem is iambic. In Section 1, I proposed that the iambic pentameter could be understood in terms of the enhancement of uneven foot structure at the level of the line and (second) half-line. The trochaic pentameter is barely attested in English precisely because it incurs the costs of an extra layer of embedding without enhancing the foot structure. It makes sense to look for a similar role for structure to explain the Tension Asymmetry. The question is whether the greater tension of the iambic pentameter is licensed by the asymmetry of structure (non-linear) or by the mere presence of an additional foot

(linear). These two possibilities are empirically distinguishable. If the linear interpretation is correct, the addition of a sixth foot, to give a hexameter, should create the conditions for even greater tension, and the hexameter should be even more flexible than the pentameter. On the other hand, if the non-linear interpretation is correct, we would expect the structurally balanced hexameter, shown in FIG. 5, to permit less tension.

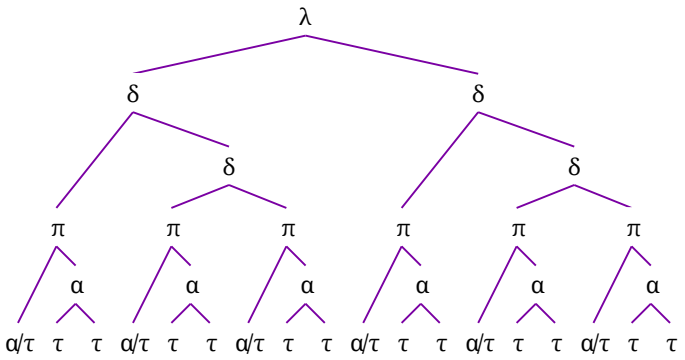


FIG. 5: Tree structure for iambic hexameter

Iambic hexameters, or Alexandrines, are not common in the English tradition. It is still less common to find poets that use all three meters in a way that would allow a direct comparison. In the present sample, Michael Drayton, William Wordsworth and Robert Browning furnish the only examples, each with one Alexandrine in the corpus. I have therefore included two additional hexameter poems to gain a fuller picture. As can be seen from FIG. 6, the hexameter has a lower fortition rate compared with the pentameter, consistent with the predictions of the Nonlinear Metrical Hypothesis, but not with the Linear Metrical Hypothesis. Indeed, the hexameter seems to be even stricter than the tetrameter. Further research is needed to determine whether this greater stringency is persistent in larger samples.

When we turn to the lenition rate, the hexameter mean is closer to the tetrameter, as shown in FIG. 7.

TAB. 7 and TAB. 8 show the fortition and lenition rates for the three poets with work in all three meters.

For all three, the iambic hexameter is at least as stringent as the tetrameter. For Wordsworth, the tetrameter and hexameter are roughly equal, but both meters show low fortition rates. For Drayton and Browning, the hexameter has between a third and a half of the fortition rate of the tetrameter.

When we turn to the lenition rates for the same three poets, shown in TAB. 8, the results support neither interpretation. For Drayton, the three meters are roughly similar. Wordsworth's hexameter patterns with his tetrameter, but Browning's patterns with his pentameter.

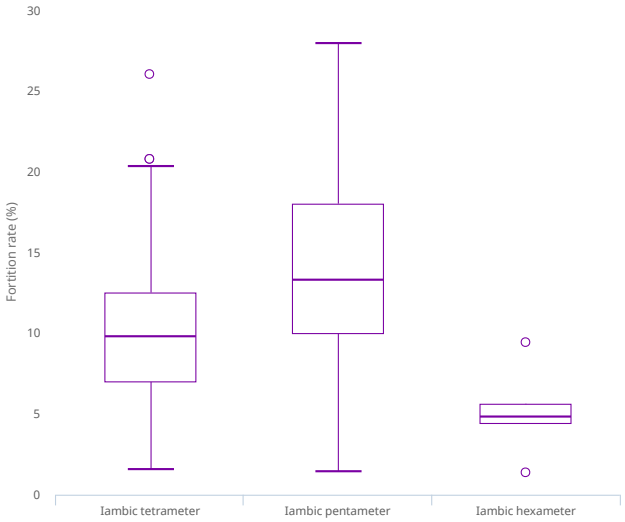


FIG. 6: Box and whisker plot showing mean fortition rate (%) for each three iambic meters

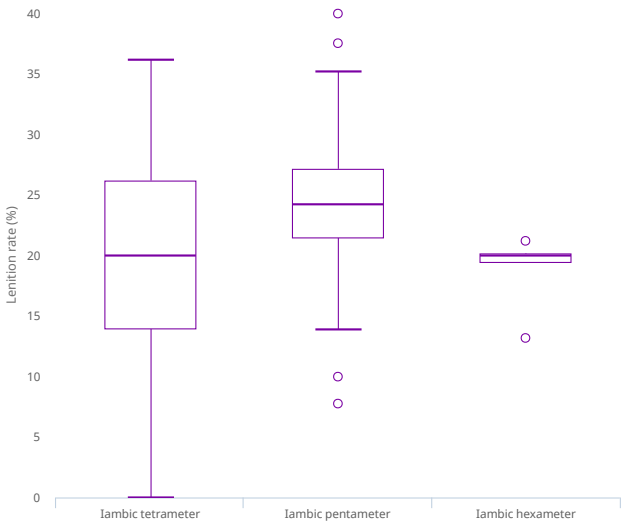


FIG. 7: Box and whisker plot showing mean lenition rate (%) for each three iambic meters

Poet	Iambic pentameter	Iambic tetrameter	Iambic hexameter
Drayton, Michael	10.7	12.5	4.4
Wordsworth, William	10.9	5.5	5.6
Browning, Robert	19.1	17.7	9.5

TAB. 7: Average rate of fortition in iambic tetrameter, pentameter, and hexameter for three hexameter poets

Poet	Iambic pentameter	Iambic tetrameter	Iambic hexameter
Drayton, Michael	18.7	17.9	20.0
Wordsworth, William	26.1	19.5	21.2
Browning, Robert	21.6	10.3	20.1

TAB. 8: Average rate of lenition in iambic tetrameter, pentameter, and hexameter for three hexameter poets

The greater stringency of the hexameter is a further strike against the Prosodic Hypothesis, since it's predictions for the pentameter and hexameter, both of which accommodate a caesura, would be the same. What we find, though, is the opposite, which leads to the conclusion that the greater tension of the iambic pentameter is an expression of its structural asymmetry. The facts are thus best explained by the Nonlinear Metrical Hypothesis.

5 Conclusions

The iambic pentameter is claimed to have greater tension than the tetrameter, and in this paper we have looked specifically at mismatches between metrical and prosodic prominence. Analysis of a corpus of 125 iambic poems (47 tetrameter, 73 pentameter) shows that the Tension Asymmetry is real, and holds for most of the poets whose work we have examined, although not all. With the one intriguing exception of Howard Nemerov, relative tension is never greater for the tetrameter.

We examined three hypotheses to account for this finding. We rejected the Prosodic Hypothesis that the iambic pentameter, due to its greater length, admits of line-medial major prosodic breaks in a way the tetrameter does not. This is because the iambic pentameter is also more tolerant of inversions inside constituents lower in the prosodic hierarchy. In particular, phrase-medial polysyllabic inversion is in the present corpus only found in the iambic pentameter. The Prosodic Hypothesis also fails to account for evidence that the iambic hexameter is at least as stringent as the tetrameter, which also speaks against a linear interpretation of the Metrical Hypothesis. The hypothesis that best explains the facts is thus the Nonlinear Metrical Hypothesis, according to which the difference between even and uneven *metrical* structure plays a crucial role. The Tension Asymmetry is thus an interesting example of a statistical expression of an underlying structural asymmetry. Since it bears on the flexibility and, therefore, the expressive capabilities of the meter, it may help cast light on the cultural dominance of the iambic pentameter in the English verse tradition.

References

Attridge, D. (1982). *The Rhythms of English Poetry*. London: Longman.

Blake, W. (2004). *The Complete Poems*. Edited by A. Ostriker. London: Penguin.

Bye, P. (submitted). Metrical Theory and the Missing Pentameter.

Bye, P. – De Lacy, P. (2008). Metrical influences on fortition and lenition. In P. Ségéral – J. Brandaõ de Carvalho – T. Scheer (Eds.) *Lenition and Fortition* (pp. 173–206). Berlin: Mouton de Gruyter.

Cruttenden, A. (2014). *Gimson's Pronunciation of English*. 8th edition. London: Routledge.

Duffell, M. J. (2008a). Some observations on English binary metres. *Language and Literature*, 17(1), 5–20. doi:10.1177/0963947007082986

Duffell, M. J. (2008b). *A New History of English Metre*. London: Modern Humanities Research Association and Maney Publishing.

Fabb, N. (2001). Weak monosyllables in iambic verse and the communication of metrical form. *Lingua*, 111(2001), 771–790. doi:10.1016/s0024-3841(00)00049-8

Fabb, N. (2006). Generated metrical form and implied metrical form. In B. E. Dresher – N. Friedberg (Eds.) *Formal Approaches to Poetry: Phonology and Phonetics* (pp. 77–91). Berlin: Mouton de Gruyter.

Fenton, J. (2003). *An Introduction to English Poetry*. London: Penguin.

Ferguson, M. – Salter, M. J. – Stallworthy, J. (2005). *The Norton Anthology of Poetry.* 5th edition. New York: W. W. Norton.

Halle, M. – Keyser, S. J. (1966). Chaucer and the Study of Prosody. *College English* 28(3), 187–219. doi:10.2307/374038

Hayes, B. (1983). A Grid-based Theory of English Meter. *Linguistic Inquiry*, 14(3), 357–393.

Hayes, B. (1989). The Prosodic Hierarchy in Meter. In P. Kiparsky – G. Youmans (Eds.) *Phonetics and Phonology, Volume I: Rhythm and Meter* (pp. 201–260). San Diego, CA: Academic Press.

Hayes, B. (1995). *Metrical Stress Theory: Principles and Case Studies*. Chicago: Chicago University Press.

Ito, J. – Mester, A. (2009). The Extended Prosodic Word. In B. Kabak – J. Grijzenhout (Eds.) *Phonological Domains: Universals and Deviations* (pp. 135–194). Berlin: Mouton de Gruyter.

Jakobson, R. (1960). Closing Statement: Linguistics and Poetics. In T. A. Sebeok (Ed.) *Style in Language* (pp. 350–377). Cambridge, MA: The MIT Press.

Kiparsky, P. (1977). The Rhythmic Structure of English Verse. *Linguistic Inquiry* 8(2), 189–247.

Kiparsky, P. (1987). On Theory and Interpretation. In N. Fabb – D. Attridge – A. Durant – C. MacCabe (Eds.) *The Linguistics of Writing: Arguments between Language and Literature* (pp. 185–198). Manchester: Manchester University Press.

Miller, D. G. (1977). Language Change and Poetic Options. *Language* 53(1), 21–38. doi:10.2307/413053

Paterson, D. (2018). *The Poem: Lyric, Sign, Metre*. London: Faber & Faber.

R Core Team (2018). R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/

Selkirk, E. (1996). The Prosodic Structure of Function Words. In J. L. Morgan – K. Demuth (Eds.) *Signal to Syntax* (pp. 187–213). Mahwah, NJ: Lawrence Erlbaum.

Sperber, D. – Wilson, D. (1995). *Relevance: Communication and Cognition*. 2nd edition. Oxford: Oxford University Press.

Steele, T. (1999). *All the Fun's in How You Say a Thing: An Explanation of Meter and Versification*. Athens, OH: Ohio University Press.

Wells, J. C. (2008). *Longman Pronunciation Dictionary*. 3rd edition. Harlow: Pearson Education.

Wimsatt, W. K. (1970). The Rule and the Norm: Halle and Keyser on Chaucer's Meter. *College English* 31(8), 774–788. doi:10.2307/374225

Wordsworth, W. (2011). *The Major Works*. Edited by S. Gill. Oxford: Oxford University Press.

Appendix: List of Poems Studied

Poet	Poem title	Year	Meter	N(Lines)
Arnold, Matthew	Destiny	1849	tetrameter	8
Arnold, Matthew	To Marguerite Continued	1852	tetrameter	24
Arnold, Matthew	The Progress of Poesy	1864	tetrameter	12
Arnold, Matthew	Geist's Grave	1880	tetrameter	28
Arnold, Matthew	Shakespeare	1849	pentameter	14
Arnold, Matthew	The Scholar-Gipsy, Lines 1–30	1852	pentameter	30
Arnold, Matthew	Thyrsis	1865	pentameter	30
Blake, William	To the Muses	1783	tetrameter	16
Blake, William	How Sweet I Roamed from Field to Field	1783	tetrameter	16
Blake, William	Jerusalem	1808	tetrameter	16
Blake, William	To the Evening Star	1783	pentameter	14
Blake, William	To Spring	1783	pentameter	16
Blake, William	The Little Black Boy	1789	pentameter	28
Brontë, Emily	The Prisoner	1846	hexameter	24
Browning, Robert	Porphyria's Lover	1834	tetrameter	60
Browning, Robert	Song from Paracelsus, Part IV	1835	tetrameter	16
Browning, Robert	Meeting at Night	1845	tetrameter	12
Browning, Robert	My Last Duchess	1842	pentameter	56
Browning, Robert	The Bishop Orders His Tomb at Saint Praxed's Church, Lines 1–50	1845	pentameter	50

Poet	Poem title	Year	Meter	N(Lines)
Browning, Robert	Andrea del Sarto	1853	pentameter	
Browning, Robert	Childe Roland to the Dark Tower Came, Lines 1–48	1855	pentameter	48
Browning, Robert	Caliban upon Setebos, Lines 1–43	1864	pentameter	43
Browning, Robert	Development, Lines 1–23	1889	pentameter	23
Browning, Robert	Inapprehensiveness	1889	pentameter	32
Browning, Robert	Fifine at the Fair, verse 75	1872	hexameter	28
Carew, Thomas	To His Inconstant Mistress	1640	tetrameter	15
Carew, Thomas	To Ben Johnson	1640	pentameter	50
Carew, Thomas	Upon a Ribband	1640	pentameter	21
Drayton, Michael	A Roundelay between Two Shepherds	1600	tetrameter	32
Drayton, Michael	Idea's Mirror (extract)	1594	pentameter	14
Drayton, Michael	The Parting	1597	pentameter	14
Drayton, Michael	England's Heroical Epistles: Queen Katherine to Owen Tudor, Lines 1–24	1597	pentameter	24
Drayton, Michael	England's Heroical Epistles: Owen Tudor to Queen Katherine, Lines 157–176	1597	pentameter	20
Drayton, Michael	Idea 6	1619	pentameter	14
Drayton, Michael	Poly-Olbion, Song 8, Lines 1–15	1612	hexameter	15
Dunbar, Paul	We Wear the Mask	1896	tetrameter	15
Dunbar, Paul	A Summer's Night	1895	pentameter	8
Emerson, Ralph Waldo	Concord Hymn	1837	tetrameter	16
Emerson, Ralph Waldo	Brahma	1856	tetrameter	16
Emerson, Ralph Waldo	The Rhodora	1834	pentameter	16
Emerson, Ralph Waldo	The Snow-Storm	1841	pentameter	28
Emerson, Ralph Waldo	Hamatreya, Lines 1–10	1845	pentameter	10
Emerson, Ralph Waldo	Days	1857	pentameter	11
Frost, Robert	The Road Not Taken	1916	tetrameter	16
Frost, Robert	Stopping by Woods on a Snowy Evening	1923	tetrameter	16
Frost, Robert	Provide, Provide	1934	tetrameter	21
Frost, Robert	The Wood-Pile	1914	pentameter	40
Frost, Robert	Mending Wall	1914	pentameter	45
Frost, Robert	The Oven Bird	1916	pentameter	14
Frost, Robert	Design	1936	pentameter	14
Frost, Robert	The Gift Outright	1942	pentameter	16
Frost, Robert	The Silken Tent	1942	pentameter	14
Frost, Robert	Never Again Would Birds' Song Be the Same	1942	pentameter	14
Frost, Robert	The Most of It	1942	pentameter	20

Poet	Poem title	Year	Meter	N(Lines)
Herrick, Robert	Delight in Disorder	1648	tetrameter	14
Herrick, Robert	The Vine	1648	tetrameter	23
Herrick, Robert	To Find God	1648	pentameter	16
Herrick, Robert	To His Conscience	1648	tetrameter	18
Herrick, Robert	Upon Julia's Clothes	1648	tetrameter	6
Herrick, Robert	To the Sour Reader	1648	pentameter	6
Herrick, Robert	The Argument of His Book	1648	pentameter	14
Jonson, Ben	Vision of Beauty	1629	tetrameter	10
Jonson, Ben	An Elegy	1640	tetrameter	36
Jonson, Ben	On Gut	1616	pentameter	6
Jonson, Ben	Inviting a Friend to Supper	1616	pentameter	42
Jonson, Ben	Though I am Young and Cannot Tell	1640	tetrameter	16
Jonson, Ben	A Sonnet to the Noble Lady the Lady Mary Wroth	1640	pentameter	14
Larkin, Philip	An Arundel Tomb	1956	tetrameter	42
Larkin, Philip	Ambulances	1961	tetrameter	30
Larkin, Philip	The Trees	1967	tetrameter	12
Larkin, Philip	This Be the Verse	1971	tetrameter	12
Larkin, Philip	For Sidney Bechet	1954	pentameter	17
Larkin, Philip	Church Going	1954	pentameter	81
Marvell, Andrew	The Definition of Love	1651	tetrameter	32
Marvell, Andrew	On Milton's Paradise Lost	1674	pentameter	54
Marvell, Andrew	The Fair Singer	1681	pentameter	18
Nemerov, Howard	The Goose Fish	1955	tetrameter	45
Nemerov, Howard	The Blue Swallows	1967	tetrameter	40
Nemerov, Howard	Brainstorm	1958	pentameter	39
Nemerov, Howard	Boy with Book of Knowledge	1975	pentameter	25
Nemerov, Howard	A Cabinet of Seeds Displayed	1975	pentameter	15
Stickney, Trumbull	An Athenian Garden	1903	tetrameter	20
Stickney, Trumbull	And the Last Day Being Come Man Stood Alone	1905	pentameter	16
Swift, Jonathan	The Lady's Dressing Room, Lines 1–36	1730	tetrameter	36
Swift, Jonathan	Stella's Birthday, Lines 1–34	1727	tetrameter	34
Swift, Jonathan	A Beautiful Young Nymph Going to Bed, Lines 1–38	1731	tetrameter	38
Swift, Jonathan	Verses on the Death of Dr. Swift, DSPD, Lines 1–38	1739	tetrameter	38
Swift, Jonathan	A Description of the Morning	1709	pentameter	18
Swift, Jonathan	A Description of a City Shower	1710	pentameter	30
Tennyson, Alfred	In Memoriam A.H.H., Canto 1	1833	tetrameter	16

Poet	Poem title	Year	Meter	N(Lines)
Tennyson, Alfred	The Eagle	1851	tetrameter	6
Tennyson, Alfred	The Daisy, Lines 1–24	1853	tetrameter	24
Tennyson, Alfred	To the Rev F. D. Maurice, Lines 1–16	1854	tetrameter	16
Tennyson, Alfred	The Kraken	1830	pentameter	15
Tennyson, Alfred	Ulysses, Lines 1–32	1833	pentameter	32
Tennyson, Alfred	Morte d'Arthur, Lines 1–38	1833	pentameter	38
Tennyson, Alfred	St Simeon Stylites, Lines 1–34	1833	pentameter	34
Tennyson, Alfred	Audley Court, Lines 1–19	1838	pentameter	19
Tennyson, Alfred	Come Down, O Maid	1847	pentameter	31
Tennyson, Alfred	The Princess: Summer Night	1847	pentameter	14
Tennyson, Alfred	Tithonus, Lines 1–31	1860	pentameter	31
Wadding, Luke	Christmas Day	1620	hexameter	12
Wordsworth, William	I Wandered Lonely as a Cloud	1804	tetrameter	24
Wordsworth, William	She Was a Phantom of Delight	1804	tetrameter	30
Wordsworth, William	London 1802	1807	pentameter	14
Wordsworth, William	It is a Beauteous Evening	1807	pentameter	14
Wordsworth, William	Composed on Westminster Bridge, September 3, 1802	1807	pentameter	14
Wordsworth, William	The World is Too Much with Us	1807	pentameter	14
Wordsworth, William	Nuns Fret not at their Convent's Narrow Room	1807	pentameter	14
Wordsworth, William	Surprised by Joy	1815	pentameter	14
Wordsworth, William	Mutability	1822	pentameter	14
Wordsworth, William	Scorn not the Sonnet	1827	pentameter	14
Wordsworth, William	The Pet Lamb	1800	hexameter	68
Wright, Judith	Woman to Man	1949	tetrameter	20
Wright, Judith	Train Journey	1953	pentameter	16
Yeats, William Butler	The Scholars	1917	tetrameter	12
Yeats, William Butler	An Irish Airman Foresees His Death	1919	tetrameter	16
Yeats, William Butler	When You Are Old	1891	pentameter	12
Yeats, William Butler	Adam's Curse	1902	pentameter	38
Yeats, William Butler	No Second Troy	1908	pentameter	12
Yeats, William Butler	The Second Coming	1919	pentameter	22
Yeats, William Butler	Leda and the Swan	1923	pentameter	14
Yeats, William Butler	Sailing to Byzantium	1926	pentameter	32
Yeats, William Butler	The Circus Animals' Desertion	1939	pentameter	12

A Quantitative Analysis of the Old English Verse Line

Andrew Cooper
Stockholm University
andrew.cooper@english.su.se

Abstract

Analyses of Old English verse have depended on typologies of acceptable verse forms, however, there has never been a means of determining unacceptability, and the underlying phonological causes of the features described by these typologies have never been adduced. There are many existing analyses, but the only point of agreement is that each line has prototypically four stressed syllables marked by alliteration. These analyses become increasingly complex as they become more precise. This paper proposes that these phonological underlying features can be both identified and explained by entirely quantitative means, and that there is a single metrical model for every line of OE verse.

A large corpus of Old English verse was created and annotated for stress, syllabic weight and alliteration. It is shown that line length, foot size and metrical prominence are functions of a verse structure based around a quantitative line of 8–16 moras, with a prototypical line of 12 moras. Metrical prominence, often congruent with stress, is determined by foot length, which is normally distributed around 10 syllables (with a minimum of 8 and a maximum of 14) and 12 vocalic moras (with a minimum of 8 and a maximum of 16). This analysis is contrasted with Old Saxon verse and Old Icelandic *fornyrðislag* verse forms, and it is shown that despite the superficial similarities, the model presented here is applicable only to Old English.

These findings and the model developed from them both represent a substantial deviation from previous, qualitative, studies and provide a reliable means of distinguishing acceptable from unaccepable lines in Old English verse, while allowing all Old English verse lines to be described with a single metrical pattern.

1 Introduction

All lines of Old English poetry show evidence of having a common underlying metrical structure marked by alliteration. Nevertheless, they also show great variation in the usual quantitatively measurable indicators of metrical structure: line length and the position of stresses. The study of this mysterious form has a long but fairly homogenous history. Scholars have produced various models based on typologies of acceptable arrangements of stressed and unstressed syllables. These typologies are usually very complex and fail to investigate the underlying factors which distinguish acceptable metrical structures from unacceptable ones. The lack of systematicity in these studies makes them of limited value for linguistic study. This paper presents a metrical model of the Old English verse line using entirely quantitative criteria and without the need for a typology of acceptable forms.

Previous studies of Old English metrical structure have largely depended on a theoretical paradigm in which metrical patterns of stressed and unstressed syllables are sorted into categories of types of acceptable verses, ultimately relying on the work of Eduard Sievers (1887, 1893). These systems take into account both stress patterns and metrical weight, and can be simple, in which case they are imprecise, or precise, in which case they become increasingly complicated (e.g. Bliss 1958; Cable 1974; Kendall 1991; Hutcheson 1995; Momma 1997; Bredehoft 2005; Goering 2016). Other analyses have used OE as a test case for a newly developed theory (e.g. Halle–Keyser 1971; Getty 2002; Fabb–Halle 2008). I provide a summary of Sieversian analyses and their various limitations in Cooper (2017).

Rarely, scholars have tried to produce a new model from scratch, sometimes with a statistical basis, with both limited scope and success (Hoover 1985; Golston–Riad 2003). Russom (1987, 1998) offers a heuristic describing an OE half-line as containing any two dictionary words, an appealing but limited generalisation. In the first modern attempt at a purely quantitative analysis of Beowulf, Golston & Riad (2003) demonstrate that standard lines in Beowulf can be measured according to their total metrical weight, with the unusual proviso that consonantal codas are not counted. They show that standard lines have a length of between 8 and 16 vocalic moras. These two heuristics represent serious modern attempts to describe OE verse lines without complicated typologies. To these heuristics are added a core set of fundamental features, including the four-position principle (Cable 1974) and the association between alliteration and metrical prominence (Bliss 1962). These principles inform and prefigure the development of the model in section 4.

An understanding of the distribution of phonological structures in the OE verse line is dependent on an understanding of stress and its relationship with metrical prominence. Primary stress in OE is associated with the root syllables of words from nominal word classes (Campbell 1959; Kuhn 1933; Riad 1992). Secondary stress is found in polymorphemic words as the result of compounding, or affixation under certain circumstances (Campbell 1959). Long strings of unstressed syllables are sorted into verse feet and compete with one another so that the most lexical syllable forms the metrical head (Cooper 2017). In addition to analyses of stress conditions, a treatment

of metrical quantity is also included in all successful previous studies. Quantitative analyses depend on the distinction between short and long syllables, a distinction which is controversial in OE. All these analyses regard open syllables with a short vowel as light, with 1 mora. Some scholars also regard syllables with a short nucleus and a short coda as light (Campbell 1959; Lass 1994; Lahiri 2000), while others, especially scholars of metrical studies, view them as heavy (e.g. Bliss 1962; Dresher–Lahiri 1991; Hogg 1992; Russom 1998). This disagreement is complemented by Minkova and Stockwell (1994) who demonstrate that CVC syllables (i.e. those with a short vowel followed by a single consonant) can be either heavy or light in different phonological or historical circumstances. In the analysis presented in the present study, words with syllabic structures like *se* 'the' and *sel* 'hall' are therefore counted as light for metrical purposes. Syllables with long nuclei, e.g. *sēl* 'good', or with a complex coda, e.g. *seld* 'seat' are unambiguously heavy. A distinction in the orthography should be made between complex codas, which have two consonants with distinct articulations, and those with spelling conventions which indicate underlying geminate consonants and affricates, such as *sett* 'seated' and *secg* 'man'. These are considered non-complex codas for determining metrical weight in word-final syllables. These assumptions regarding stress distribution, syllable quantity and the association between the prosodic word and the verse foot underlie the model presented in the following sections.

2 A metrically annotated corpus of Old English verse

The metrical analysis presented in the present study is based on a selected corpus of OE verse texts which were subjected to a line-by-line analysis for stress, syllable quantity, and alliteration patterns. The OE line is identifiable in verse texts because of alliteration, and sometimes punctuation. Considering the factors described in the preceding section, a corpus of Old English verse (14 texts for a total of c. 7000 lines) was analysed for metrical structure including syllabic structure, metrical quantity, stress and alliteration. The small size of the surviving OE manuscript collection means that any large selection from it will inevitably be opportunistic and unbalanced. Unbalanced corpora are unsuitable for statistical analysis, so only descriptive statistics have been used to show broad tendencies. Each text in the corpus was entered into a spreadsheet, split into lines, verses and syllables, and annotated manually for stress, metrical quantity and alliteration. TAB. 1 shows the texts, number of lines and percentages of the total corpus.

The texts shown in TAB. 1 provide a sample of OE verse with a range of subject matter, metrical features and sources. In the figures which follow, degenerate and hypermetric lines are removed, as is *Genesis B*. Hypermetric lines are listed by Bliss (1962), and degenerate lines in the study are defined as any line not containing a caesura in editions. A total of 846 lines are removed from the figures in the next section. Of these, 209 are hypermetric (see list in Bliss 1962), which I address separately elsewhere (Cooper 2017), 617 are from *Genesis B,* which is metrically distinct from the

Title	Lines	% approx.
Genesis A, B	2936	42
Andreas	1722	25
Daniel	764	11
Judith	345	5
The Battle of Maldon	325	5
The Dream of the Rood	156	2
Seafarer	124	2
Wanderer	115	2
Gifts of Men	113	1
Selected Riddles	97	1
The Rhyming Poem	87	1
Panther	74	1
The Wife's Lament	53	1
Deor	42	1
Total	**6953**	**100%**

TAB. 1: Texts used for the metrical corpus

rest of the poem, and 20 are degenerate. The data below comprise a reduced selection with only standard lines, for a total of 6107.

2.1 Comparative balanced corpora of Old Icelandic and Old Saxon

The variation in line length found in old English verse lines is much greater than that found in Old Icelandic, and much less than in Old Saxon. To place the Old English data in the context of its two nearest traditions, two small balanced and representative samples of lines were collected from them. There are only two extant verse texts in Old Saxon of any significance, *Heliand* and *Genesis*, sampled from Behaghel (2012). As examples of Old Icelandic verse, *Rígsþula*, *Völuspá* and *Hymiskviða* were selected as being representative of the *fornyrðislag* from Bray (1908).

From each text, 100 lines were collected, with the criterion that they should be rendered as whole lines in the edited version. The Old Icelandic corpus comprised samples from the following three poems.

- The first 27 stanzas of *Rígsþula*, plus the first two lines of stanza 28,
- The first 23 stanzas of *Völuspá*, plus the first line of stanza 24,
- The first 29 stanzas of *Hymiskviða*.

The Old Saxon texts are taken in 25-line sections from the first four fitts of the *Heliand* and the *Genesis*, excluding the preface and any degenerate lines. The principles of the phonology of OS are taken from Robinson (1993) and Rauch (1992). These lines were subjected to the same analysis as the Old English lines, for comparative purposes.

3 Results

The texts were entered and annotated manually into MSExcel with markings for metrical weight, stress and alliteration. TAB. 2 shows an example line with these annotations.

9	Syll	*ro*	*fe*	*rin*	*cas*	X	*þon*	*ne*	*rond*	*and*	*hand*	XX
	mora	2	1	1	1		1	1	2	1	2	12
	stress	/	x	/	x		x	x	/	x	/	9
	allit	R		R					R			

TAB. 2: Example line, *Andreas* 9, with phonological annotations[1]

In TAB. 2, X in the *Syll* row marks the caesura, and XX the line end. The line is divided into syllables. The *mora* row shows metrical quantity values for each syllable. The *stress* row uses / for a stressed syllable, and x for an unstressed syllable. The *allit* row shows the alliterating syllables. The totals for each line and half-line were automatically calculated and compiled in MS Excel 2013.

3.1 Line lengths by syllables

The quantitative analysis of the corpus revealed a range in line lengths by syllables and metrical weights. The figure for the lengths of the standard lines by syllables is shown in TAB. 3.

Syllable length	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**Total**
Freq.	20	607	1707	1914	1136	505	161	33	14	6	1	6107
Percent	0.3	9.9	27.9	31.3	18.6	8.3	2.6	0.5	0.2	0.1	0.0	100

TAB. 3: Line lengths by syllables

These figures show that lines of OE verse have a mean length of 9.98 syllables (σ), with a mode of 10σ. Because of the tail of a small number of long outliers, the median average of 12σ is unhelpful. The data are visualised in FIG. 1.

The corpus data showed the length of lines in syllables to be normally distributed, with a near-minimum of 8σ, an average of 10σ, and a quickly diminishing tail of lengths after 12σ. The 7σ lines are all from *Genesis A*, and all contain infinitive weak verbs with an *-ian* suffix. The longest lines are mostly from the late and metrically divergent *Battle of Maldon*, and may contain some hypermetric lines not identified by Bliss (1962).

1 '...valiant men, | when shield and hand...'

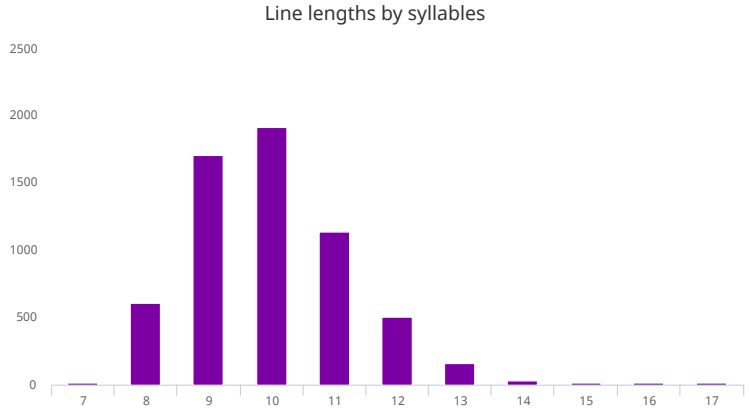


FIG. 1: Line lengths in syllables

3.2 Line lengths by syllables

The quantity analysis is based on the phonological weight of words as described in sections 1 and 2. The figures for the lengths of the standard lines in moras are shown in TAB. 3.

Outliers are condensed to a single column for ease of reference. These long lines are restricted to the metrically divergent *Battle of Maldon*, of which the longest is 23μ. The data are visualised in FIG. 2.

In FIG. 2, the moraic quantity of the lines in the corpus is shown. The values are normally distributed with an average of 12μ. Minimal and near-minimal lines of 8μ and 9μ are very few, less than 3%. There is a rightward skew towards longer lines, with less than 5% longer than 16μ.

The relationship between the 10σ and the 12μ average are the key features of the quantitative data which inform the model described in the next section.

4 A quantitative model of the prototypical Old English verse line

The results show lines with an average of 10σ and 12μ, as well as a range between 8–14σ and 8–16μ with some outliers, which may be significant. It is clear from previous studies that the underlying metrical system depends on the association of alliterating syllables with four prominent metrical positions. Because of this, lines must be divided into four metrical structures, each of which is headed by a prominent position. In prototypical lines, the prominent positions are marked by primary stress, of which there are four. A prototypical standard line therefore should have four verse feet, each of which has 3μ and 2–3σ. Each foot comprises two metrical positions.

Moraic length	8	9	10	11	12	13	14	15	16	17	18	19	>19	Total
Freq.	25	136	447	930	1241	1177	977	560	343	148	64	29	30	6107
Percent	0.4	2.2	7.3	15.2	20.3	19.2	16.0	9.2	5.6	2.4	1.0	0.5	0.5	100

TAB. 4: Lengths of standard lines by metrical quantity

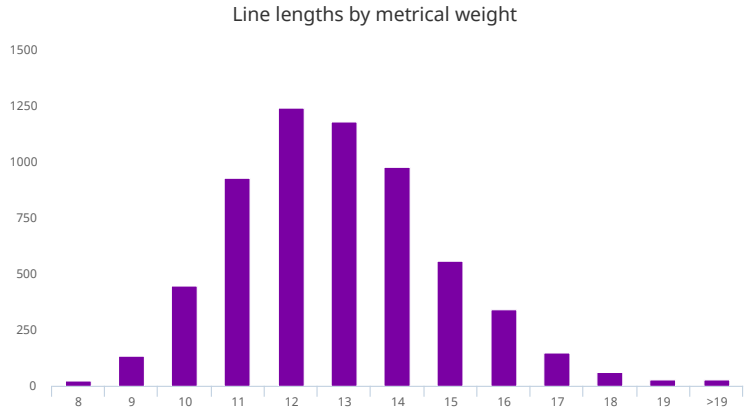


FIG. 2: Line lengths by moras

In each foot, the left position is by default strong, meaning that it attracts prominence, such as primary stress, and is by preference long (μμ). The right position is by default weak, meaning that it does not attract prominence, and is short (μ-). This creates a binary branching structure with the feet as shown in FIG. 3. Parentheses are used to show the congruence between the verse feet and the prosodic words which occupy them. The terms on the right are the prosodic structures upon which the metrical structures are modelled, and with which they are preferentially matched (Nespor–Vogel 1986; Selkirk 1986; Hayes 1989).

In FIG. 3, a metrical structure modelled on the prosodic hierarchy is shown (Selkirk 1980). The categories are similar to those given by Golston and Riad (2003) with the modification that the right metrical position (m) of each verse foot (VFt) is short by default. This leaves each prototypical VFt with 3μ. To allow for the variation found in the line length analyses, the metrical positions may alternate between 1μ and 2μ. This analysis allows for the description of 94% of the standard lines between 8μ and 16μ, as well as explaining the distribution of moraic and syllabic line lengths within the corpus in terms of deviation from an average line length. In accordance with Russom (1987, 1998), the default structure of the verse foot reflects a prototypical prosodic word. These are grouped into two pairs, verses, with a syntactic break between them. This feature is fixed, except in hypermetric lines in which one or two verses contain three feet (Bliss, 1962). The foot is the same in both types of line. The OE prosodic word includes the head, any other unstressed syllables within the word and any prosodic clitics, and the stress is assigned to the root of lexical words. However, the metrical template allows a prominent position to occur anywhere within the verse foot.

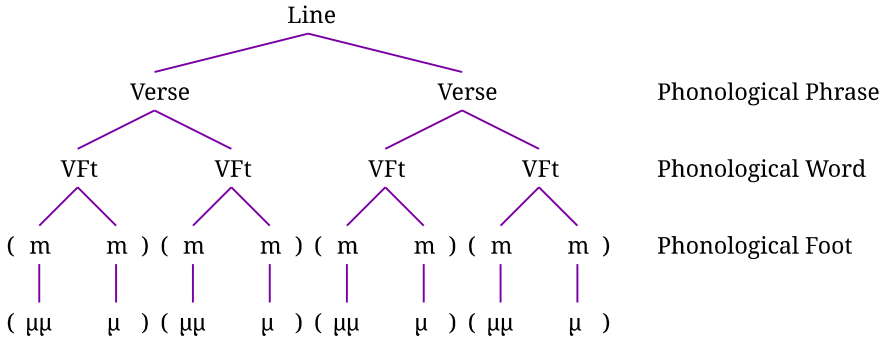


FIG. 3: Metrical model

As such, stress is not assigned by this model to any particular position, but can occur anywhere within the foot. In terms of stress, left-headedness is preferred only because the verse foot is prototypically congruent with the preferred prosodic structure of OE words (Dresher–Lahiri 1991; Riad 1992). This congruence between the prototypical prosodic word and the default verse foot serves only to describe highly regular prototype lines. However, the variation in lengths, and the variable amount of unstressed syllables which are apparently permitted around the metrical heads, needs to be taken into account.

In prototypical lines, there are four phonological words which are congruent with four verse feet. Each of these verse feet contain 3μ according to the phonological generalisations given above. In example 1, a prototypical line, long vowels (marked with a macron) have 2μ, short (unmarked) vowels have 1μ. In addition, each verse foot contains two metrical positions, one with two moras (μμ) on the left and another with only one mora (μ-) on the right. Close matching between metrical structures and their equivalent prosodic structures is usual for prototypical and shorter lines. A prototypical 10σ/12μ line in which verse feet and prosodic words overlap is shown in FIG. 4.

In FIG. 4, a prototypical line is shown in which metrical and prosaic phonological structures exactly match. In this line, the four verse feet are congruent with four prosodic words, which are also graphological word. Each verse comprises three moras and has a prominent syllable on its left boundary. Note that the highest phonological category, the intonation phrase, is not included at the bottom of the figure, as the line very rarely represents a whole syntactic sentence, which is the usual domain of the intonation phrase (Selkirk 1980). An actual sentence (and therefore intonation phrase) in OE can be any number of phrases (and therefore verses) long, and can start either at the beginning of the line or after the caesura, which is more common. The line therefore embodies the core prototypical features of the OE metrical verse line as a combination of two syntactic phrases congruent with two metrical verses.

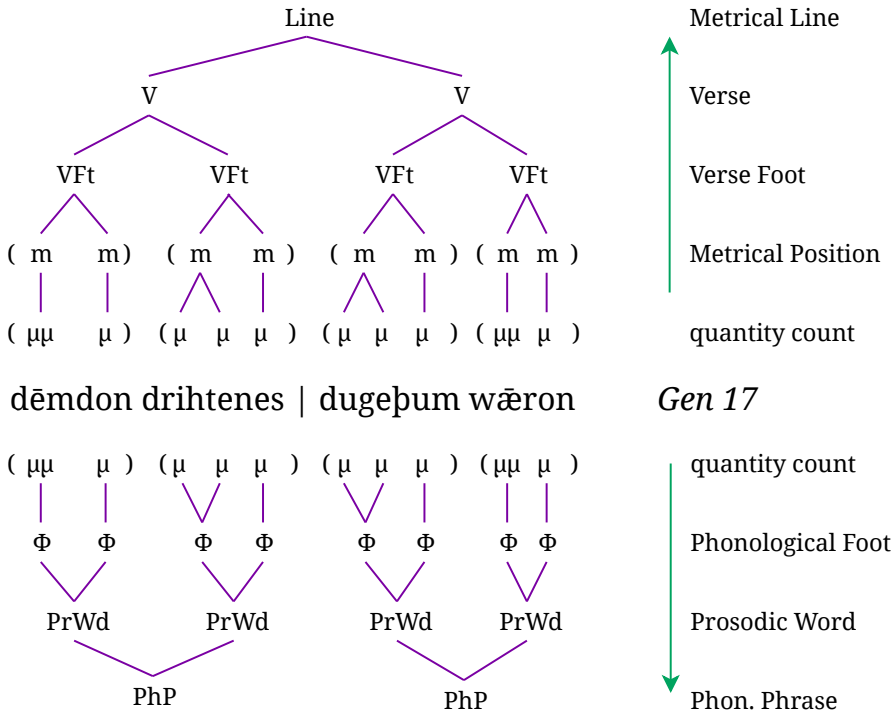


FIG. 4: Matching between metrical and prosaic phonological structures

4.1 Variation from the prototype

Describing prototypical lines is only the first step. Most lines are not prototypical and it is this variation which causes the verse structure to be so difficult to adduce. In this model, all variation in length in standard (i.e. non-hypermetric) lines is explained in terms of single moras being added to or subtracted from verse feet. Depending on word choice factors, including the lexical items chosen by the author, and the grammatical items required to express the meaning, each position can be switched to either long or short, depending on the phonology of the word(s) occupying the foot. With this condition, the default foot can be modified to have two further possible structures. A reduced first position, with 1μ instead of 2μ, allows a short foot, and an expanded second position, with 2μ instead of 1μ, creates a long foot. Each of these modifications constitutes one deviation from the default foot structure and, in combination, several violations allow for the variation between lines of 8μ and 16μ.

Default	**Short**	**Long**
(μμ μ-)	(μ- μ-)	(μμ μμ)

TAB. 5: Available foot structures

The value of these feet depends on word choice, which determines whether the syllables in the feet are long or short. A foot may be occupied by a single heavy syllable, or four light syllables, or anything in between. Metrical positions may be simple, with a single syllable, or resolved, with two light syllables. The verse foot, if minimal, can in turn be resolved, so that two 1μ positions can unite in a single heavy syllable. These conditions allow for the development of a variably-sized verse foot with a minimum of 2μ/1σ, and a maximum of 4μ/4σ. The possible arrangments of syllables are shown in TAB. 6.

In TAB. 6, eight structures are shown, giving the available arrangements of moras for each verse foot, and the possible syllable arrangements. Heavy syllables are marked with a macron. There are two possible 3μ feet: a left-heavy foot with 2σ and a resolved foot with 3σ. This kind of default foot can have two syllables, of which the first is heavy (μμ μ-), or three syllables, all of which are light (μ μ μ-). The minimal 2μ foot always has one mora per position, but may cover one long or two short syllables. The maximal 4μ foot can have two, three or four syllables, in various combinations, shown in stuctures e-h. The variety shown in the corpus data in FIG. 1 and 2 is produced by a combination of any four of these verse feet in each line, with a preference for the left-heavy structures shown in a and b.

4.2 Shortened lines

Both the syllabic and the moraic data sets show a leftward skew to the moraic distribution and particularly an overrepresentation of 11μ lines relative to 13μ lines. This suggests that the addition of 1μ to the rightward, degenerate position in the foot should be considered a more serious deviation than the reduction of the leftward, full position. Any line that is shorter than 12μ has one or more short feet, such as in the first foot of example 1.

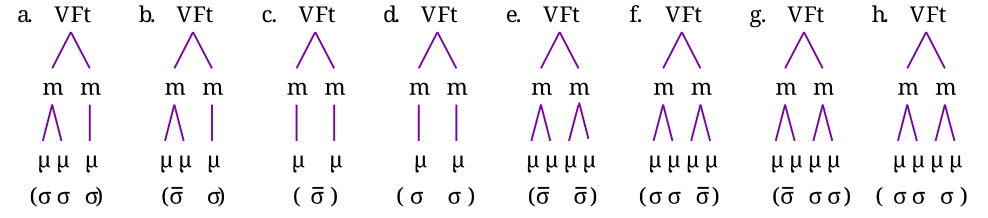
1.	(μ- μ-) (μ μ μ-) (μ μ μ-)(μ μ μ-)	Σ=11μ
	sorgum geswenced | sigore gewyrðod[2]	*Andreas* 116

The 11μ line in example 1 comprises four verse feet, three of which have the default asymmetrical arrangement (μμ μ-). The first verse foot, however, is short with two light positions (μ- μ-).

The flexibility of the length of the verse feet allow for *sorgum* at 2μ to be accommodated across two minimal metrical positions.[3] The shortest possible line is one composed of four verse feet, each of which has two light positions making 8μ and because of the four-position principle, 8σ, as in example 2a.

2 'with sorrows wearied | with victory honoured'

3 If Minkova's (2008) notion of the prefix *ge-* being outside the PrWd is accepted, the foot boundaries in TAB. 6b could be considered more optimal than TAB. 6a.



TAB. 6: Foot structures when assigned to syllables

2a.	(μ- μ-) (μ- μ-) (μ- μ-)(μ- μ-) Adam gespræc | eargra worda[4]	Σ=8μ *Genesis* 580
2b.	(μ- μ-)(μ- μ-) (μ- μ-) (μ- μ-) his waldendes | willan fremman[5]	Σ=8μ *Genesis* 2381

Example 2a shows a minimal line in which the foot boundaries coincide with word boundaries. Example 2b shows a derived noun, *waldendes*, with secondary stress on its middle syllable, which occupies the head of the second foot. Minimal lines are always 8σ/8μ long and composed of four feet each with two light syllables. These minimal lines are very few but entirely acceptable according to all existing theories mentioned in section 2, in which they are sometimes assumed to be default, or minimally metrically complex, perhaps because they are most common to Old Icelandic verse lines.

4.3 Lengthened lines

In FIG. 1 above, it is shown that the line length by syllables is normally distributed around 10σ per line, accounting for roughly 30% of the total. This distribution is marked by a leftward skew, showing a large proportion of 9σ lines compared to 11σ lines. The 8σ minimal lines are less than 10% of the total, which fails to support Sievers' implication that 8σ lines are prototypical. 9σ lines are necessarily made of one 5σ verse and one 4σ verse, in either order. 10σ lines can either be composed of one 6σ verse and one 4σ verse, or of two 5σ verses. Longer standard lines can be made up of a combination of verses between 4σ and about 8σ. These maximally long lines are very few, such as example 1, which has 14 syllables, marked for stress value, in which ⋮ indicates primary stress, and . indicates unstress.

3.	(⋮ . .) (⋮ . . .) (. . . ⋮) (. ⋮ .) Abraham maðelode | hæfde on ān gehogod[6]	15μ/14σ *Genesis* 2893

4 'Adam spoke wicked words'
5 'perform his lord's will'
6 'Abraham spoke, he had about one [thing] thought'

In example 3, each verse has seven syllables. The first verse comprises two prosodic words which overlap with the graphological words. The second verse has more graphological words, but only two prosodic words. This exemplifies the longest an OE line can become without adding further stresses and becoming hypermetric.

Theoretically, lines can have any number of syllables between 8σ to 16σ, but because of the available words in the language, their inflectional morphology and grammatical requirements, 16μ lines are usually 10–14σ. Lines longer than 14σ tend to fulfill at least some of the requirements for 16μ lines but the boundaries of the prosodic words do not coincide with the boundaries of the feet. In maximal lines, one of the verse feet usually stretches over the caesura, and syllables are often split across feet, as shown in example 4b. Example 4a is a rare 16μ line where no foot crosses over either the caesura or prosodic word boundaries.

4a. (μμ μ μ) (μ μ μ μ) (μμ μμ)(μ μμ μ)
ādrifen from duguðum | dōð swā ic hāte[7] *Genesis* 2325

4b. (μ μ μμ)(μμ μ μ)(μ μμ μ)(μ μ μμ)
efne swā wīde | swā ðā wī… te…lāc[8] *Genesis* 2556

In 4a, the verb *ādrifen* has 4μ over 3σ and occupies a foot on its own. The second foot is occupied by a prepositional phrase which is a prosodic word congruent with the foot. The third foot is occupied by two words with 2μ each, a verb in the imperative and a common adverb. The fourth foot contains a pronoun and inflected verb. In this line, the feet neatly align with the boundaries of the prosodic words. In contrast, the first foot of 4b conforms to the edges of the first two graphological words. In a breach of the footing structure, the *swā* after the caesura borrows one mora from the second foot (mostly occupied by wīde) and another from the third. *Ðā* is within a foot, but split across two positions, which is more common and a less serious breach. The compound noun *wītelāc* is written with ellipses to allow the foot boundary to be shown. With 5μ, *wītelāc* must reach over two verse feet, but at only 3σ, it cannot occupy a verse on its own. With an inflectional suffix this word can occupy a verse on its own, such as *in weras bāsnedon | wītelāces* (*Genesis* 2419). In this second verse, the minimum length requirement (at 4σ), and the prototypical quantity requirement for two verse feet (3μ +3μ) for the verse are met. In 4b, however, *wītelāc* is aligned to the right edge of the line, where it occupies the whole of the fourth foot and borrows the final mora of the third foot. This final mora is also part of the prosodic head of the third foot, as is demonstrated by the alliteration between the second and third feet. This line shows the effectiveness of the metrical template, even when tested with multiple breaches of the basic structure. Example 4b is analysed with the metrical structure divided into verse feet and with the prosodic structure divided into prosodic words in FIG. 5.

7 ‘driven from the company, | do as I command!’
8 ‘even as widely | as the punishments…’

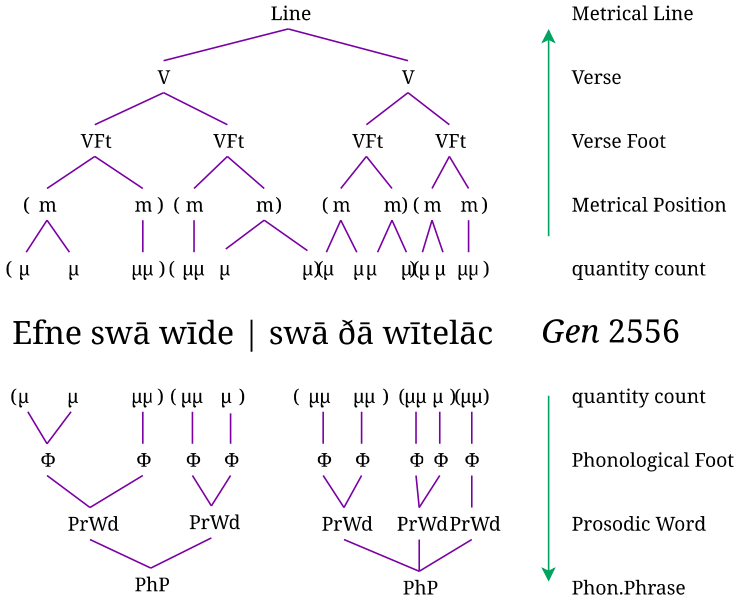


FIG. 5: Maximal line showing breaches of syllable, foot and verse boundaries

In FIG. 5, a metrically complex line is shown, and an ellipsis is added to allow the foot marking to be accommodated. Lines with so many disjunctions between the PrWds and the VFt are disfavoured and therefore rare.

4.4 The primary stress problem in non-typical lines

This section addresses how different types of words occupy the heads of verse feet, and how relative metrical prominence is established between different word groups. It is argued that while nominals have a special status in relationship to prominent metrical positions, there is no need to posit further superordinate categories. A heuristic is described by which the head of a verse foot is shown to be filled by the most prosodically prominent word within the foot.

Highly lexical words, such as nouns and adjectives, come with a root stress and prototypically occur in alliterating positions. This root stress creates the head of a prosodic word in the prose phonology, and also prototypically occupies the head of a verse foot in the metre. There is a distinction between verbs in the infinitive and finite verbs, in that infinitive verbs frequently occupy the final non-alliterating prominent position, but finite verbs do so less frequently (Bliss 1962; Cable 1974). In this way they are similar to other middle-ranking words, such as underived adverbs, in that they only occupy alliterating positions under certain circumstances (Bliss 1962; Kendall 1991). In addition to these, some function word classes, including conjunctions and demonstratives, are not included by Bliss (1962), as they have no detectable effect on

alliteration. In feet which do not contain a root stress, it can be shown that other words gain metrical prominence without being displaced and without necessarily needing to invoke positionally assigned stress, or a change in prosodic categories. In the absence of lexically stressed syllables, other morphologically prominent syllables occupy the heads of verse feet, such as in example 2. This example is theoretically unacceptable in all analyses which associate alliteration with primary stress.

5. . ! . . ⋮ : . . ! ! .
genāp under nihthelm | swā hēo nō wǣre[9] *Wanderer* 96

In example 2, : indicates secondary stress, while ! indicates syllables without lexical stress (according to e.g. Bliss 1962), but which nevertheless occupy the heads of metrical feet. In the first verse, *genāp* is an inflected verb and *nihthelm*¸ a compound noun. In the second half-line, *swā* is a conjunction, and *hēo* is a pronoun. *Nō*, which takes the alliteration, is a common adverb. The final position is fulfilled by the inflected verb *wǣre* alone. This distribution can be treated with the same analysis as for prototypical lines.

4.5 Secondary stress

In verses where two nominals occur as separate words, the stressed syllables are straightforward to identify on morphological grounds alone. This generalisation, however, only applies to those words which fulfill the prominence requirements of a single verse foot. For words long enough to occupy two feet, the system must be elaborated. In the cases of compounds and derivational nouns, it can be shown that they sometimes occupy the heads of two feet and sometimes only the head of one. In example 6, three instances of the commonplace compound *ælmihtig* 'almighty' with different inflections are shown to occupy different metrical structures in different metrical circumstances, with stress conditions and metrical weights included.

6a. (⋮ .)(⋮ : .) (⋮ .) (: .)
(μμ μ-)(μ μ μ-) (μμ μ-) (μμ μ-)
ēce ælmihtig, | ānfor...lætan,[10] *Andreas* 1287

6b. (⋮ . .)(. ⋮ .) (. . ⋮) (: . .)
(μμ μ μ)(μ μ μ μ) (μ μ μ-) (μ μ μ-)
īcest þī...ne yrmðo.| Đe se æl...mihtiga[11] *Andreas* 1190

6c. (. . ⋮)(. . ⋮) (⋮ .) (⋮ : . .)
(μ μμ μ)(μ μ μμ) (μ- μ-) (μ μ μ μ)
Him þā feran gewāt | fæder ælmihtiges[12] *Genesis* 1779

9 'disappeared under cloak of night | as if it had never been'
10 'eternal almighty | forsake [me]'
11 'you increase your misery | whom the almighty [humbled]...'
12 'he then set out to depart | of the Father almighty's [commands he was mindful]'

In 6a, *ælmihtig* occupies the second verse foot alone. In 6b, alliteration reveals that the first component of the suffixed form *ælmihtiga* occupies the head of the third foot, while the second component of the word occupies the final foot alone. In both instances, an ellipsis is added to show verse foot boundaries. In 6c, alliteration reveals that the suffixed form *ælmihtiges* occupies the whole final foot on its own. The generalisations shown in the examples 6 a-b are typical of the distribution of nominal compounds.

4.6 An example analysis of a section of OE verse text

The system presented in this chapter can be used to analyse any section of Old English verse comprised of whole lines. An example analytical procedure of the first four lines of the *Seafarer* follows.

1. Count Moras

Identify and sum the vowels in the line. Vowels or diphthongs can be long with 2μ, in which case they are marked with a macron in editions. Otherwise they are short with 1μ. If a short vowel is followed by a complex coda, a further 1μ is added for a maximum of 2μ per syllable. In example 8, only the syllables *mē* and *sōð* have long vowels, and no syllable has a complex coda.

7. μ μ μ μμ μ μ μμ μ μ μ (Σ = 12)
mæg ic be mē sylfum | sōðgied wrecan[13] *Seafarer* 1

2. Identify heads

Locate the prominent positions, firstly by stress conditions, and in the absence of primary or secondary stress, find the most lexical word within the range of a verse foot. In example 8, stress notation is given and arrows point to the underlined prominent syllables.

8. ! . . . ⋮ . ⋮ : ⋮ .
mæg ic be mē sylfum | sōðgied wrecan
↑ ↑ ↑ ↑

In example 8, stress is the first indicator of prominence. In the b-verse, the primary alliteration is on the first syllable of *sōðgied*, a compound noun, with primary stress. The unalliterating final position is occupied by *wrecan*, a non-finite verb, with primary stress. The alliterating item in the a-verse is on *sylfum*, a reflexive pronoun. Reflexive pronouns are usually left out of lists of stressed elements, perhaps because they are so morphologically similar to nouns. Nevertheless, the alliteration shows unambiguously that *sylfum* occupies the second prominence. The first prominence is occupied by the auxiliary verb *mæg*, which as a verb is prominent compared to the personal pronoun *ic* and the preposition *be*. This identifies the heads of the feet.

13 'I can, about myself, | tell a true story'

3. Build feet

On the basis of the presence of the metrical heads, group the vowel moras into feet of between 2 and 4 moras. Ensure that all syllables are included, use word boundaries as a guide for foot boundaries.

9. (μ μ μ)(μμ μ μ) (μμ μ) (μ μ)
   mæg ic be mē sylfum | sōðgied wrecan

In example 9, the feet are enclosed by parentheses. The foot boundaries are neatly aligned with the boundaries of prosodic words.

4. Identify metrical positions

Fill in the feet by identifying the full (2μ) and degenerate (1μ) positions. Identify eight metrical positions. There must be two metrical positions per verse foot, one of which must contain a prominent position. Each position may consist of one or two moras distributed over one or two syllables. In example 10, the metrical positions are shown to comprise four verse feet, as found in all standard lines.

10. (m m)(m m) (m m)(m m)
    (μ μ μ-)(μμ μ μ) (μμ μ-)(μ- μ-) (Σ = 12)
    mæg ic be mē sylfum | sōðgied wrecan

In *Seafarer* 1, the less prototypical a-verse can be explained according to the same analysis as the seemingly more orderly b-verse, and with the same number of modifications to foot lengths. The a-verse is however more metrically complex because the alliterating syllable is in the right branch of the second verse foot. The b-verse has its primary alliteration in the preferred initial position. The dispreferred but acceptable alliteration pattern in the first verse is forced by word choice and word order constraints.

The subsequent lines show further features, not found in *Seafarer* 1. *Seafarer* 2 shows a foot breaching the caesura and a primary alliteration position some distance rightwards of the caesura, which is nevertheless accommodated by the analysis.

11. (m m)(m m)(m m)(m m) (m m)
    (μμ μ-)(μ μ μμ)(μ μ μμ) (μ- μ-) (Σ = 12)
    sīþas secgan, | hū ic geswincdagum[14] *Seafarer* 2

In the a-verse of example 11, the first foot is prototypical. The second foot reaches over the caesura, so that the verse foot covers the entire prosodic word *secgan* and part of the following verse, the subordinator *hū*. The primary alliteration position is in the final position of the third foot on the alliterating syllable *-swinc-*. This complexity is forced by subordination and word choice.

Seafarer 3 exhibits maximal breaches of the default structure, which cause the third foot to reach over the caesura.

14 'tell of journeys, | how I, in laborious days'

12. (m m)(mm)(m m)(m m)
(μ- μ-)(μ-μ-)(μ- μμ)(μμ μ μ) (Σ = 10)
earfoðhwī…le | oft þrōwade,[15] *Seafarer* 3

In example 12, the third foot borrows a syllable across the caesura, crossing both the caesura and a word boundary, an ellipsis is added to allow the annotation to fit above the line, but has no metrical significance.

Line 4 is a much more orderly, near-prototypical line, with four phonological words matching onto four verse feet.

13. (m m)(m m) (m m)(m m)
(μ- μ-)(μμ μ μ) (μ μ μ-)(μ- μ-) (Σ = 11)
bitre brēostceare | gebiden hæbbe,[16] *Seafarer* 4

This procedure for taking lines of variable length and fitting them into a four foot model based on metrical weight can be applied to the great majority of OE lines without modification, and to hypermetric lines by adding an additional foot to the hypermetric verse. The first four lines of the Seafarer show variable levels of metrical complexity but can all be explained using the basic model.

5 Comparison with Old Saxon and Old Icelandic

One of the most dominating limitations on the study of Old Germanic metrical structure is the assumption that the rules of composition or analysis should apply equally to the three extant verse forms with substantial corpora: Old English, Old Icelandic and Old Saxon. This desire for unity is inherited from but not originated by Sievers (1893). This conflation leads to the further assumption that the features shared by these traditions must be the core components of a single metrical system, regardless of other features, no matter how dissimilar. This section demonstrates that the analysis presented in the present study is not applicable to these related traditions, but only to Old English.

5.1 Syllable count in comparison

The following histograms show the line lengths by syllables for Old Icelandic, Old English and Old Saxon respectively.

Syllable length	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**Total**
Freq.	26	20	32	20	34	19	15	15	8	4	3	2	2	300
Percent	8.7	6.7	10.7	6.7	11.3	6.3	5.0	5.0	6.0	1.3	0.1	0.1	0.1	100

TAB. 7: Syllable sample from the Heliand and the Genesis

15 ‘a time of hardship | often suffered’
16 ‘bitter anxiety | I have endured’

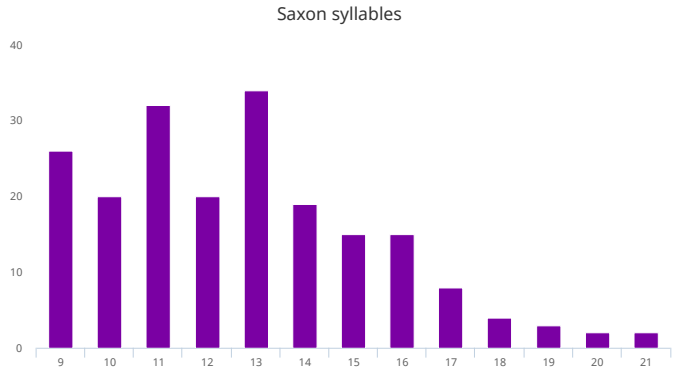


FIG. 6: Syllable sample from the Heliand and the Genesis

The syllable lengths of Old Saxon lines have a flat distribution between 9 and 16 σ, with zero 8σ lines. There is a tail-off after 17σ. These data are not particularly informative, as they lack a clear pattern, particularly when compared to the OE data in FIG. 1 above.

The Old Icelandic data are shown in TAB. 8 and FIG. 7 below.

Syllable length	7	8	9	10	11	12	**Total**
Freq.	15	122	109	41	10	3	**300**
Percent	5.0	40.7	36.3	13.7	3.3	1.0	**100**

TAB. 8: Syllables in the Rígsþula, the Völuspá and the Hymiskviða

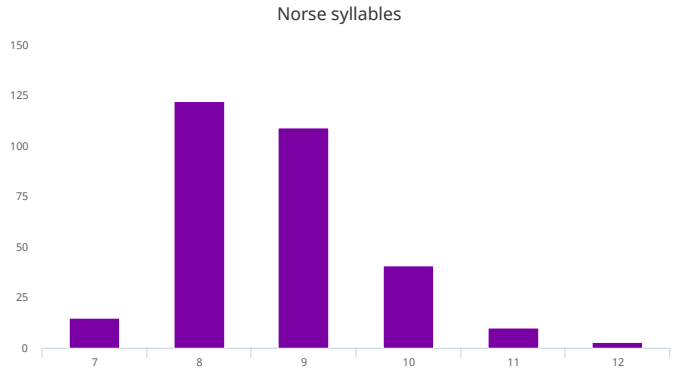


FIG. 7: Syllables in the Rígsþula, the Völuspá and the Hymiskviða

The Old Icelandic data show a clear preference for shorter lines, composed of verses of four or five syllables, with very little variation.

5.2 Metrical quantity distribution

The following data are the metrical quantity lines from the samples of Icelandic and Saxon verse:

Moraic weight	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**Total**
Freq.	9	12	28	52	58	45	44	58	14	8	1	0	1	**300**
Percent	3.0	4.0	9.3	17.3	19.3	15.0	14.7	19.3	4.7	2.7	0.3	0.0	0.3	**100**

TAB. 9: Metrical quantity in the Rígsþula, the Völuspá and the Hymiskviða

These data are visualised in FIG. 8.

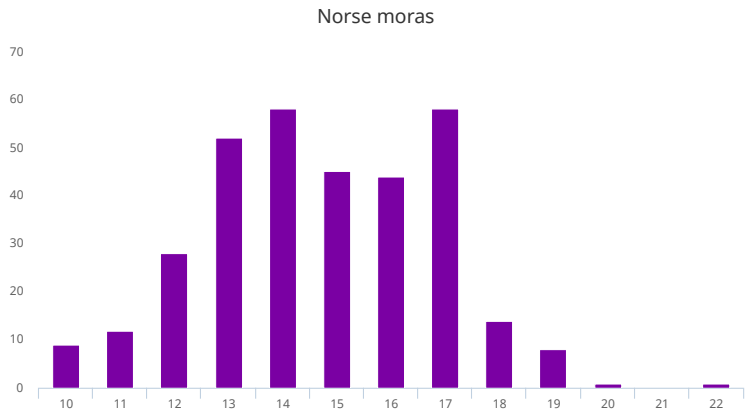


FIG. 8: Metrical quantity in the Rígsþula, the Völuspá and the Hymiskviða

Old Icelandic syllable structure differs from the Old English primarily in that complex codas, including those with quasisyllabic endings are very common. This gives a preponderance of short lines with many more heavy syllables, particularly word-internally, than are found in Old English. The shortness of Old Icelandic lines means that the model presented for Old English is unsuitable. These data suggest that Old Icelandic verse lines are best described using a Sievers-like model predicated on lines composed of combinations of four or five syllables.

The following data and histogram show the lengths of the Old Saxon sample by metrical weight.

Moraic weight	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
Freq.	9	12	20	11	16	12	23	19	11	18
Percent	3.0	4.0	6.7	3.7	5.3	4.0	7.7	6.3	7.0	6.0

Moraic weight	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**Total**
Freq.	5	12	10	8	7	2	2	1	1	0	1	**300**
Percent	7.7	4.0	8.3	8.7	9.0	0.7	0.7	0.3	0.3	0.0	0.3	**100**

TAB. 10: Metrical quantity in the Heliand and the Genesis

TAB. 10 is split into two to fit the page. The data are visualised in FIG. 9.

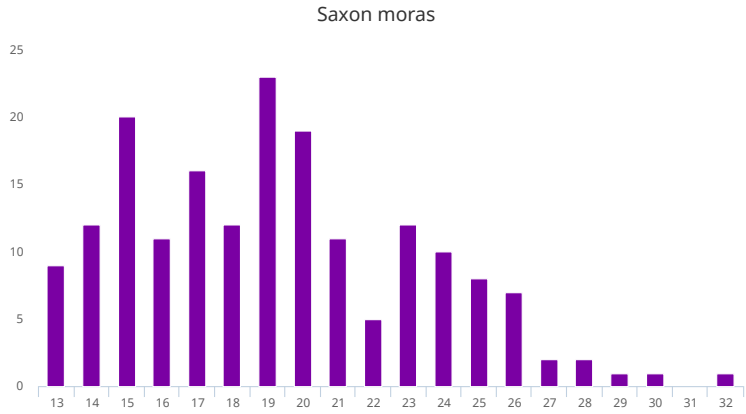


FIG. 9: Metrical quantity in the Heliand and the Genesis

The Old Saxon quantity data show a flat and uneven distribution over a large range of values with no pattern or indication of any particular trend.

A comparison between the Old Icelandic, the Old Saxon and the Old English data show that the model developed for Old English provides no insights into the structure of Old Icelandic or Old Saxon, which are better described by existing studies than Old English.

6 Conclusion

These findings and the model developed from them both represent a substantial deviation from previous, qualitative, studies and provide a reliable means of distinguishing acceptable from unaccepable lines in Old English verse. It has been shown that the variation in the features of the Old English verse line is caused by deviation from a metrical template, which preferentially creates prototypical lines, which deviate from a 12-mora line comprising four verse feet, each headed by a metrically prominent syllable such as a stress. The metrical template is based on a preference for verse feet to be congruent with prosodic words, and for prosodic words to be measured in length by the combined syllable weight of metrical feet. In addition, it is shown that Old English verse structure must be explained with a different analysis than Old Icelandic and Old Saxon verse, despite their historical relationship and superficial similarities.

References

Behaghel, O. (2012). *Heliand und Genesis*. Halle: M. Niemeyer.

Bliss, A. J. (1958). *The Metre of Beowulf* (1st ed.). Oxford: Blackwell.

Bliss, A. J. (1962). *The Metre of Beowulf* (2nd ed.). Oxford: Blackwell.

Bray, O. (1908). *The Elder or Poetic Edda; commonly known as Saemund's Edda.* New York, NY: AMS Press.

Bredehoft, T. A. (2005). *Early English Metre*. Toronto: University of Toronto Press.

Cable, T. (1974). *The Meter and Melody of Beowulf*. Urbana, IL: University of Illinois Press.

Campbell, A. (1959). *Old English Grammar*. Oxford: Clarendon Press.

Cooper, A. (2017). *A unified account of the Old English metrical line* (PhD Thesis). Stockholm University, Stockholm. Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-148370

Dresher, B. E. – Lahiri, A. (1991). The Germanic Foot: Metrical coherence in Germanic. *Linguistic Inquiry*, *22*(2), 251–286.

Fabb, N. – Halle, M. (2008). *Meter in Poetry: A New Theory*. Cambridge: Cambridge University Press.

Getty, M. (2002). *The Metre of Beowulf: A Constraint-Based Approach*. New York: Walter de Gruyter.

Goering, N. (2016). *The linguistic elements of Old Germanic metre: Phonology, metrical theory, and the development of alliterative verse* (Unpublished DPhil Thesis). Oxford University, Oxford.

Golston, C. – Riad, T. (2003). Alliteration och avkodning i germansk vers. *Rytm Och Dialog. CMS*, *14*. Retrieved from http://zimmer.csufresno.edu/~chrisg/index_files/AllitterationAvkodning.pdf

Halle, M. – Keyser, S. J. (1971). *English Stress. Its Form, Its Growth, and Its Role in Verse*. New York, NY: Harper & Row.

Hayes, B. (1989). *The Prosodic Hierarchy in Meter. In Rhythm & Meter (Vol. 1)*. Cambridge, MA: Academic Press.

Hogg, R. M. (1992). *A Grammar of Old English, Volume 1: Phonology*. Oxford: John Wiley & Sons.

Hoover, D. L. (1985). *A new theory of Old English meter*. Bern: Peter Lang.

Hutcheson, B. R. (1995). *Old English Poetic Metre*. Cambridge: D. S. Brewer.

Kendall, C. B. (1991). *The Metrical Grammar of Beowulf*. Cambridge: Cambridge University Press.

Kuhn, H. (1933). Zur Wortstellung und -betonung im Altgermanische. *Beiträge Zur Geschichte Der Deutschen Sprache*, *57*, 1–109.

Lahiri, A. (2000). Hierarchical restructuring in the creation of verbal morphology in Bengali and Germanic: evidence from phonology. In A. Lahiri (Ed.), *Analogy, Levelling, Markedness,* (71–123). Berlin: Mouton.

Lass, R. (1994). *Old English: A Historical Linguistic Companion*. Cambridge: Cambridge University Press.

Minkova, D. – Stockwell, R. P. (1994). Syllable Weight, Prosody and Meter in Old English. *Diachronica*, *11*(1), 35–64.

Minkova, D. (2008). Prefixation and stress in Old English. *Word Structure, 1*, 21–52.

Momma, H. (1997). *The Composition of Old English Poetry*. Cambridge: Cambridge University Press.

Nespor, M. – Vogel, I. (1986). *Prosodic Phonology*. Dordrecht: Foris Publications.

Rauch, I. (1992). *The Old Saxon Language: Grammar, Epic Narrative, Linguistic Interference*. P. Lang.

Riad, T. (1992). *Structures in Germanic Prosody: A Diachronic Study with Special Reference to the Nordic Languages*. Stockholm University: Doctoral Dissertation, Department of Scandinavian Languages.

Robinson, O. W. (1993). *Old English and Its Closest Relatives: A Survey of the Earliest Germanic Languages*. Stanford, CA: Stanford University Press.

Russom, G. (1987). *Old English Meter and Linguistic Theory*. Cambridge: Cambridge University Press.

Russom, G. (1998). *Beowulf and Old Germanic Metre*. Cambridge: Cambridge University Press.

Selkirk, E. O. (1980). The Role of Prosodic Categories in English Word Stress. *Linguistic Inquiry*, *11*(3), 563–605.

Selkirk, E. O. (1986). *Phonology and Syntax: The Relation Between Sound and Structure*. Cambridge, MA: MIT Press.

Sievers, E. (1887). Zur Rhythmik des Germanischen Alliterationverses I. *Beiträge Zur Geschichte Der Deutschen Sprache Und Literatur (PBB)*, *10*(2), 209–314.

Sievers, E. (1893). *Altgermanische Metrik.* Halle: Niemeyer.

Micro- and Macro-variation in Verse. A Typology of Romance Renaissance Meter

Mirella De Sisto
Meertens Institute
mirella.de.sisto@meertens.knaw.nl

Abstract

During the Renaissance, a new meter spread across Europe and imposed itself as the main way of versification. Every poetic tradition adapted it in its own way and, even within Romance languages, the resulting new poetic forms varied considerably from each other. The aim of this paper is to make a typology of the Romance instantiations of Renaissance meter and to analyse the elements characterising metrical variation. A significant aspect of divergence among the poetic forms is related to their tendency towards an iambic rhythm. According to the literature, the main Romance forms can be divided into three groups in this respect: 1) purely syllabic poetry of the French tradition, 2) a meter tending towards iambic rhythm of Italian and Spanish endecasyllable (Nespor–Vogel 1986; Piera 1981; Gasparov 1987) and 3) the one tending towards syllabicity of Catalan and Portuguese decasyllable (Duffell 1994; Spaggiari 2003, respectively). I propose a quantitative approach to test and compare the degree of deviation from an iambic pattern as a way to verify this grouping and to answer the ongoing question about the iambic element of Renaissance meter. I do so by analysing 20 samples (130 lines for each author, ca. 2 authors per language) and calculating the percentage of stressed and unstressed syllables in each metrical position. The samples are from major languages, namely, Italian, French, Spanish, Catalan and Portuguese, and less investigated varieties, namely Occitan, Neapolitan, Sicilian and Venetian. A phonological account supports the findings.

1 Introduction

During the Renaissance, a new meter blossomed across Europe and its great success made it the most popular verse in various poetic traditions. Nevertheless, the way of implementing the new poetic form varied from language to language. The present article proposes a typology of the Romance instantiations of Renaissance meter based on the analysis of the elements determining metrical variation. The main focus is rhythmical grouping, which can subdivide Romance Renaissance forms into three classes: 1) purely syllabic poetry of the French tradition, 2) a meter tending towards iambic rhythm of Italian and Spanish *endecasillabo* (Nespor–Vogel 1986; Piera 1981; Gasparov 1987) and 3) the one (almost) syllabic of Catalan and Portuguese decasyllable (Duffell 1994; Spaggiari 2003, respectively). An analysis of each meter's deviation from a perfect iambic template sheds light on the rhythmical classes and contributes to the investigation of their motivations.

In the present study, 20 samples are considered, each of them being from one poet. They consist in almost all cases of 130 lines per sample and every language is represented by two authors. The percentage of stressed and unstressed syllables in each metrical position for each sample and its deviation from a strictly iambic pattern is calculated. The samples are from major languages, namely, Italian, French, Spanish, Catalan and Portuguese, and less investigated varieties, namely Occitan, Neapolitan, Sicilian and Venetian. Two extra samples, one from English and one from Dutch are included in order to compare their distance from an ideal perfectly iambic line with the one obtained for the Romance traditions.

The aim of this paper is to investigate three main issues: 1) the validity of the rhythmical grouping and the microvariation within the groups; 2) the meaning of "tendency towards iambic rhythm", the elements defining it and the extent to which the tendency differs from an actual iambic poetic form; 3) the difference between traditions with a pre-Renaissance decasyllabic meter, namely, Catalan and Portuguese, and those ones, which directly adopted the new form. A model, is proposed, which can test these questions and allow more quantitative data exploration and visualization.

After a brief paragraph (2) on background information, the rhythmical question is presented (in 3). In 4, the samples are described and the methodology is outlined. Paragraph 5 presents the results of the study, while paragraph 6 is the section dedicated to discussion. A conclusive paragraph closes the paper.

2 Background: Romance Renaissance meter

Renaissance meter spread all over Europe and became the most common and prestigious way of versification in numerous traditions. For the purpose of the present paper, the focus will be only on the Romance traditions, which implemented the new poetic form; but the Renaissance meter played a significant role in Germanic poetic traditions as well.

Italian *endecasillabo* represents the canonical Renaissance poetic form. It was also the main source from where the poetic trend quickly spread across countries and poets. The origins of the meter, though, need to be found in Occitan poetry, in the verse elaborated by troubadours (Beltrami 1986; Di Girolamo–Fratta 1999; Billy 2000); they were the first to elaborate the ten-syllable line. The new poetic form reached Italy via the *Scuola Siciliana* and the international and vibrant cultural center that was the court of Frederick II in Sicily (Di Girolamo 2008). There, poets started imitating the Occitan meter, which, then, reached the Peninsula. From the verse of Petrarca, it spread to Spanish and, later on, to poems written in Neapolitan, Venetian and Sicilian. French already presented a decasyllable (Gasparov 1987), which was substituted by the alexandrine during the Renaissance. A particular case is constituted by Catalan and Portuguese poetry, which already presented a ten-syllable line in their tradition. Consequently, with the blossoming of Renaissance, the pre-existing meters were slightly modified in order to accommodate the new poetic trends (Ramírez 1985; Duffell 1994 for Catalan and Spaggiari 2003 for Portuguese).

The incorporation of Renaissance meter into the various poetic traditions did not lead to one unique result. In fact, the instantiations varied significantly from each other and presented only few characteristics in common. Interestingly, though, despite all variations in the way of implementing the new poetic form, none of the Romance languages developed a strictly iambic meter. This was the case, instead, when the meter was incorporated into Germanic traditions; it, in fact, represents a strong clear cut between the implementation of Renaissance meter into Romance languages and into Germanic ones: while Germanic poetry developed an iambic meter, Romance tradition preserved the colon-based element of the source poetic form.

Romance Renaissance meters are composed by ten metrical positions, where the tenth needs to be filled by a stressed syllable. One extrametrical syllable (or feminine ending) can occur line-finally. Some of the languages present a higher percentage of these optional positions; for example, in Italian, the majority of lines ends with one extrametrical syllable. This is due to the large amount of paroxytone words in the Italian lexicon (Duffell 1991; Gasparov 1996: 122). On the contrary, languages like Catalan and (to a lesser extent) Venetian, whose lexicons are rich in oxytone words, present less often extrametrical positions in their poetry. In (1), an example of verse rich in extrametrical positions, namely the Italian endecasillabo, is given; the example in (2), shows some Catalan lines, all with oxytone line-final words.

(1) Italian *endecasillabo*

Gli occhi di ch'io parlai sí calda**men**te,
Et le braccia et le mani et i piedi e'l **vi**so,
Che m'avean sí da me stesso di**vi**so,
Et fatto singular da l'altra **gen**te

(Francesco Petrarca, Sonnet 292, Canzoniere)

(2) Catalan decasilláb

Qui no es trist, de mos dictats no **cur**,
o'n algun temps que sia trist es**tat**,
e lo qui es de mals apassio**nat**,
per fer se trist no cerque loch es**cur**;

(Ausiás March, Cants d'Amor)

In this respect, it is important to observe that, despite the widespread presence of the eleventh extrametrical syllable among most traditions, no tradition developed a fully eleven-syllable meter but they all preserved the optionality of the eleventh syllable.

In addition, all Romance ten-syllable forms have some kind of mid-line break. However, its optionality, position and type vary significantly. From this perspective, two main groups can be distinguished, based on the type of break present in the line; the optionality and the position follow from this distinction. An obligatory and fixed (right after the fourth position) caesura, which coincides with a word boundary, is attested in French, Occitan and Catalan verse; the other traditions, instead, present what I would define as a mid-line break: not fixed, but whose position can actually vary across the same poem (it usually occurs after the fourth or the sixth syllable) and not strongly necessarily marked in every line. This type of mid-line break does not usually coincide with a word boundary but is preceded by a prominent position. In (3) and (4), the two types of mid-line pause are shown:

(3) Mid-line break	(4) Caesura
Muerte, prisión no pueden, ni embarazos quitarme de ir a veros, como quiera, desnudo espiritu o hombre en carne y hueso.	D'autant que **l'Art** peut moins que la Nature, c'est ouevre **mien**, qui sus le vif est pris, Est moins par**fait**, et moins digne de prix.
(Spanish, Garcilaso de la Vega, Sonetos)	(French, Jacques Peletier)

In (3), the Spanish example illustrates how the mid-line break does not need to coincide with word-boundary and how its position can vary across different lines of the same poem. In fact, while the first two lines present the prominent position on the sixth syllable and a clear break marked with a comma right after the following word-boundary, the third line has a less marked prominent position on the fourth syllable. In (4), instead, the caesura coincides in every French line with a word-boundary and is, occasionally, marked by a comma.

The Catalan case is somehow a step in-between the French/Occitan model and the mid-line break of the other traditions, since it presents aspects from both groups. In fact, while the Catalan meter has a proper caesura, fixed and corresponding with a word boundary, this is not always as strongly marked as the French one. On the other hand, the fourth position, which is right before the caesura, is obligatorily prominent and always filled by a stressed syllable. From a phonological perspective, if we assume that French does not have word stress (Féry 2001, 2003) and, hence, cannot have metrical marking on the foot level, it, consequently, needs to have a strongly marked caesura as the metrical element determining the metrical pattern[1] (Duffell 1994; Beltrami 2002). On the other hand, Catalan could mark the pause at the middle of the line with a word stress but stylistically still preserves the caesura.

1 The claim about French not having word stress and, consequently, not presenting metrical marking on lower levels than the cola are still disputed issues. In the present paper I follow these theoretical assumptions and, for the sake of brevity, I do not discuss the opposite hypotheses here.

Caesura and mid-line break are related to each other and constitute the answer to the same need, namely generating a pause in the middle of the line. In fact, Beltrami (2002: 298) observes that the mid-line break attested in the Italian meter represented the way of adapting the caesura of the source poetic form, the Occitan decasyllable, in the recipient language. A proper caesura, which divided a bipartite line, was transformed into the requirement of having a prominent position in the middle of the line producing some kind of syntactic break. Another innovation of the Italian meter was the fact that the mid-line break was no longer mainly only after the fourth position but became more and more common also after the sixth position. It is important, however, to mention that the possibility of having a pause after the sixth position was already attested in Occitan poetry, even if this was extremely rare (Di Girolamo–Fratta 1999).

Finally, Romance traditions can be divided into three groups based on their rhythmical properties: completely syllabic, tending to iambic and tending to syllabic. The French form is considered a purely syllabic meter. This means that no colon-internal stress pattern is normally attested and this can be accounted for by considering the lack of word stress of the language, as mentioned before; the marking of stress on the phrase level causes the two stressed positions to be placed before the caesura and line-finally. Italian and Spanish meters tend towards an iambic rhythm (Nespor–Vogel 1986; Piera 1981; Gasparov 1987). Gasparov (1987) has calculated the "index of iambicity" of their lines and proved that indeed the metrical forms tend rather towards iambic meter than towards syllabism; however, he observes, they cannot be considered as fully iambic, due to the large possibility of deviating from such a rhythmical alternation. In conclusion, Catalan and Portuguese poetic forms are described in the literature as syllabic (Navarro 1991; Duffell 1994; Spaggiari 2003, respectively), having only the mid-line prominent position and the line-final position as obligatorily stressed. In addition, in Catalan, the fifth position is sometimes filled with a stressed syllable, in order to reinforce the break between the first and second colon of the verse (Duffell 1994). As for Venetian, Sicilian and Neapolitan, the prediction is that they would to some extent tend to an iambic rhythm.

3 The question: the tendency towards iambic rhythm

It has been claimed that Italian *endecasillabo* and its English version, the iambic pentameter, are both built on a metrical template where weak and strong positions alternate, leading to a sequence of iambic feet (Kiparsky 1977; Hanson 1997). The difference between the Italian and the English instantiations of the template, it has been argued, lies in the fact that, while the latter presents constraints on the foot level requiring the iambic alternation, the former, instead, no constraint appears to be present regulating the foot (Hanson 1997). Some requirements are present on the colon-level and, more specifically, on the right edge of the two cola, hence, line-medially and line-finally (Nespor–Vogel 1986). The same has been claimed by Piera (1981) regarding Spanish Renaissance meter. Fabb (1997), when discussing the Italian meter, has observed that, while the weak-strong alternation is realized at the right

edges of the two cola, other positions of the line do not need to be specified nor to be necessarily divided into feet. Therefore, colon-internal metrical positions can be considered to only have a counting purpose.

Despite the general agreement regarding Romance meter not having requirements about following an iambic rhythm, it has been largely observed, as mentioned in the previous section, that some of the traditions do present some kind of tendency towards that rhythm (Nespor–Vogel 1986; Piera 1981; Gasparov 1987). However, this tendency does not resembles the strictly iambic meter, which resulted from the adaptation of Renaissance verse into Germanic poetry. The result of Romance implementations was not very uniform and the possibilities of deviating from an iambic alternation were generally quite broad. Whether some of Romance Renaissance verse could be considered a quite free instantiation of iambic meter is still an open question; intuitively, in those cases, some kind of iambic rhythm can be perceived. The present study investigates the concrete aspects of this apparent tendency by means of calculating the distance among and of the samples from full iambicity, in order to determine its factors. In addition, the claimed Portuguese and Catalan syllabicity constitutes an interesting case since both languages presented a pre-Renaissance poetic form, which resembled what would then become the Renaissance meter. An exploration of the adaptation of the pre-existing forms, first of all, tests the beforementioned claims and shows how the two traditions diverge from the others and their position within a typological picture.

4 Samples and methodology

4.1 Samples

20 samples have been considered in the present study, consisting of 130 lines each (an exception was made for one of the Neapolitan samples—namely, Velardiniello—where the whole 192-line poem was included). The samples are both from major languages, such as Italian, Spanish, French, Portuguese and Catalan and from less investigated varieties, namely Occitan, Neapolitan, Venetian and Sicilian.

All languages are represented by two authors. In some cases, one earlier poet has been selected, or even one from the previous poetic tradition, and one from the full Renaissance period. This choice was made in order to observe metrical changes due to the spread of the Renaissance poetic trend; in particular, this is of significant relevance for the cases of Catalan and Portuguese where an autochthonous pre-Renaissance poetic tradition was already quite similar to the Renaissance form. The comparison permits us to determine which characteristics were preserved and how the existing verse was instead adapted to the new meter. Obviously, for Occitan, both authors are predecessors of Renaissance poetry. The samples in Neapolitan, Venetian and Sicilian are from a later period, when the Renaissance meter was incorporated into vernacular poetic traditions. For both Neapolitan and Italian one extra sample has been selected. The extra samples were written by the same Neapolitan author,

Niccolò Capasso, in the two languages. They were included in the study in order to compare the metrical differences of the same poetic form when written by the same poet in two different languages. This could provide insight into the metrical requirements of the two traditions and to the conscious stylistic choices of the poet in one and the other language.

The following is a brief summary of the samples considered; in the appendix, a table containing a more detailed list of the samples with relevant information is given.

In chronological order, the first samples are the Occitan ones, which are from the two troubadours, Bernart de Ventadorn (1135–1194) and Raimon Gaucelm de Bezers (fl. ca. 1262–1275). Giacomo da Lentini (ca. 1210–1260) has been included, as a representative of *Scuola Siciliana* and the later Sicilian vernacular poet, Antonio Veneziano (1543–1593), represents the subsequent Sicilian tradition. One hundred thirty lines from *Canzoniere* by Petrarca (1304–1374), represent the canon of the Renaissance meter and, together with the verses written by the Petrarchist Luigi Tansillo (1510–1568), constitute the Italian sample. As for Catalan, predecessor of the Renaissance, Ausiás March (1400–1459), and the later poet, Pere Torroella (1420–1492), have been analysed. Verses from Garcilaso de la Vega (1501–1536) and Francisco de la Torre (ca. 1483–1507) constitute the Spanish sample. As for Portuguese, one pre-Renaissance author, namely, Diniz I de Portugal (1261–1325), and a Renaissance one, namely, Luís de Camões (ca. 1524–1580), were selected. Two French poets writing in decasyllable were included, namely, Joachim du Bellay (1522–1560) and Jacques Peletier du Mans (1517–1582). The two Venetian authors are Giovanni Battista Maganza (1513–1586) and Andrea Calmo (1510–1571), both vernacular poets who integrated the Renaissance meter in dialectal poetic tradition. Analogously, Velardiniello (XVI century) and Giulio Cesare Cortese (1570–1640) used the *endecasillabo* form in their Neapolitan poetry. In conclusion, as already mentioned before, two samples from the poetry by Niccolò Capasso (1671–1744) were included, one written in Italian and one written in Neapolitan.

For the sake of exemplification, two extra samples are considered in one occasion, in order to highlight the difference between them, being instantiations of iambic meter, and those samples, which only tend to iambic rhythm. They are constituted by one sample of 130 lines from the sonnets of William Shakespeare (1564–1616) and 130 lines written by the Dutch poet, Joost van den Vondel (1587–1679).

4.2 Methodology

The Italian and Spanish samples were taken from annotated corpora, namely, the Archivio Metrico Italiano (AMI)[2] and the Corpus of Spanish Golden-Age Sonnets,[3] respectively. The other samples were annotated manually by the author of this paper.

2 http://www.maldura.unipd.it/ami/php/index.php
3 https://github.com/bncolorado/CorpusSonetosSigloDeOro

The manual annotations were verified and corrected by phonologists of the languages under investigation and/or experts of the relative metrical forms.[4]

The metrical annotation was either made or converted into a sequence of 0 and 1, the former indicating unstressed syllables and the latter stressed ones. The stressed positions were assigned by considering the phonology of the languages and disregarding an eventual iambic alternation. The reason for this decision was that the present study aims to look at how the different verses can deviate from an iambic template. The 01 sequences of every sample were processed in order to calculate the percentage of deviation from a perfect iambic pattern for each position. Caesura or mid-line break were not marked in the samples, however, tendencies regarding their positions in the line can be elaborated by looking at the percentage of stressed syllables either on the fourth or sixth position.

The comparison of the different deviation percentages allowed us to see the differences among the different authors and to define a general trend among the various traditions, for example, regarding which metrical positions are less constrained. The total variance of all deviations was also calculated. In addition, the deviation values were also used to calculate the distance of each sample from a perfectly iambic template and the distance among samples. This led to the visualisation, via a dendrogram, of groupings of samples based on their metrical characteristics.

5 Results

The attested deviations from a perfect iambic pattern in each position in every sample were plotted. In FIG. 1 to FIG. 9, the deviation of the various samples, grouped according to language, can be observed. The straight line in all figures represents an ideal perfect iambic line, hence, with 0% deviation in every position. FIG. 1 contains the samples from the French authors, Du Bellay and Peletier, while FIG. 2 and FIG. 3 show the Occitan, Guacelm and Ventadorn, and the Sicilian Da Lentini and Veneziano, respectively. In FIG. 4, the Italian sample is represented, hence, Petrarca, Tansillo and the poetry written in Italian by Capasso. FIG. 5 contains the Venetian samples by Maganza and Calmo, while FIG. 6 the Neapolitan one by Capasso, Cortese and Velardiniello. The last three figures are the Catalan group (March and Torroella), the Spanish group (Garcilaso and De La Torre) and the Portuguese one (Diniz I de Portugal and Camões), respectively. As can be observed in FIG. 1–FIG. 9, no sample appears to strongly follow an iambic pattern and each sample can vary greatly from the other.

By comparing the different figures, it can be claimed that the metrical positions in the different samples do not present the same rate of deviation. Nevertheless, samples within one language group appear to follow similar tendencies, with an exception of

4 In this respect, I would like to thank Dr. Francesc Torres-Tamarit, Prof. Dominique Billy, Dr. Romain Benini, Prof. Ângela Correia and Prof. Isabel Almeida for double-checking my annotations of Catalan, Occitan, French and Portuguese, respectively.

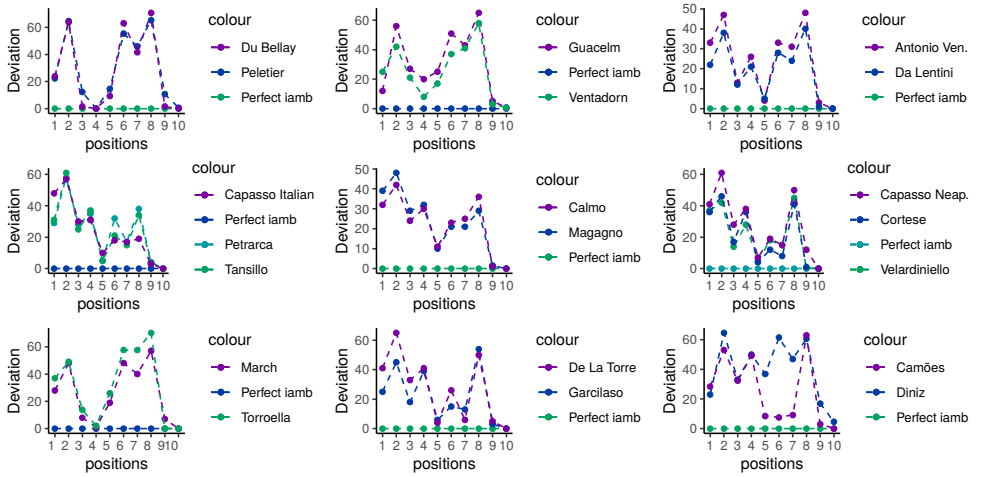


FIG. 1–9: Deviation patterns of all samples

the Portuguese group represented in FIG. 9, where the two samples seem to follow two very different patterns. In particular, the verse by Diniz I de Portugal, that is, the pre-Renaissance Portuguese poetry, seems to be an outlier compared to all other samples, not strongly resembling other traditions. Some aspects, which are shared by all samples can be delineated, but the pre-Renaissance Portuguese lines, do not necessarily present them. First of all, almost no deviation is recorded for the tenth position, which means that all samples present a strong (or rather obligatory) requirement of having a stressed syllable on the tenth position; however, in the case of Diniz, the deviation rate is higher (the 4.6% against the mean of 0.1% for the other samples), mainly due to the fact that not all lines are composed by exactly ten syllables (they can sometimes be of nine or eleven syllables). No caesura or mid-line break was marked nor considered in the present study, however, the tendency of having a stressed syllable either on the fourth or the sixth position in all samples presumes the presence of some form of a mid-line pause. The French, the Occitan and Catalan samples, as can be observed in FIG. 1, FIG. 2 and FIG. 8, strongly show mid-line prominent positions on the fourth syllable (in 94.4% of lines, versus 47.81% of occurrences of stressed syllables on the sixth position). The pause after the fourth position in Catalan is sometimes reinforced by a stress on the fifth position (in 22.65% of lines), which strengthens the division between the two cola. The two Portuguese samples diverge from each other from this perspective: while Camões presents an evident tendency (in 92.4% of the lines) of having a mid-line prominent position on the sixth syllable, Diniz does not present a strong tendency towards a line-medial prominent position, but it shows a light preference for having a stressed fourth syllable (50% of the lines), rather than the sixth (38.5% of the lines). The other traditions present prominence on both the fourth and sixth position, but the tendency seems to favor prominence on the sixth (see, again, FIG. 1–FIG. 9), with an exception for the Sicilian samples, which seem to slightly favor a fourth prominent position (76.1% versus 69.6%). In general,

there is a tendency in all samples to reduce the percentage of deviation gradually line-medially and from the ninth position onwards.

FIG. 10 shows the computed average variance of all deviation patterns together. As can be observed, the deviation rate increases and decreases at different points of the plot, which represent the various positions of the line.

The position which, on average, allows more deviations is position eight, followed by positions six and two. The high rate of variance on the second and sixth position can be explained by considering that verse tends to be more varying line-initially and, more in general, at the beginning of a chunk. The rate of variance on the eighth position is, instead, surprising. Any prediction, in fact, would expect deviation to gradually decrease towards the end of the line, following the Strict End Hypothesis (Kiparsky 1968; Hayes 1983; Prince 1989), according to which line regularity increases line-finally. As for the ninth and tenth position, a stronger iambicity, hence, lower deviation is indeed extensively attested across all samples. This point will be further discussed in the discussion section in 6.

It could be observed that the samples of syllabic meters could affect the calculation of the variance, hence, influencing the results in a misleading way. However, if we do exclude them, that is, if we exclude the French, Occitan, Catalan and Portuguese samples, the resulting variance (see FIG. 11 in the next page) is not significantly different from the one shown in FIG. 10. In fact, if FIG. 10 and FIG. 11 are compared, despite some differences in values of deviation, they both present a quite high value on position eight; the difference being rather on the relation between position six and eight, than on eight being high.

Finally, the three-group distinction is only partially confirmed by the test, as can be observed in the dendrogram in FIG. 12. The branch named “iambic” indicates a perfect iambic line, hence, 0% of deviation in every metrical position. The dendrogram shows a clear distinction between syllabic samples and the ones somehow closer to iambic rhythmical alternation. Diniz, the Portuguese pre-Renaissance sample, is the furthest branch from the iamb. French (Peletier and Du Bellay) is placed in a sub-branch of the syllabic group, closely related to the Catalan (March and Torroella) and Occitan (Ventadorn and Guacelm) sub-branch; the other samples are grouped in a number of subgroups under a separate branch. The two Portuguese samples are far apart, Diniz, the pre-Renaissance one, being an isolated branch in the syllabic side, while Camões is placed in a branch close to the samples with a tendency towards iambic rhythm, close to the Venetian and Neapolitan/Spanish sub-branches.

The French branch, the pre-Renaissance Portuguese and the Catalan-Occitan one have no relation to the iambic branch. The other samples are also not very close to iamb but they are somehow connected, namely their branches have the same origin point. As for the subgroups of the bigger branch, it can be observed that both Giacomo da Lentini (from *Scuola Siciliana*, hence one of the predecessors of Petrarca) and Antonio Veneziano, a Sicilian poet writing in Sicilian, are grouped together. This shows that there is a continuum between *Scuola Siciliana* and the later stages of

FIG. 10: Average variance of all deviation patterns

FIG. 11: Average variance of deviation patterns of non-syllabic samples

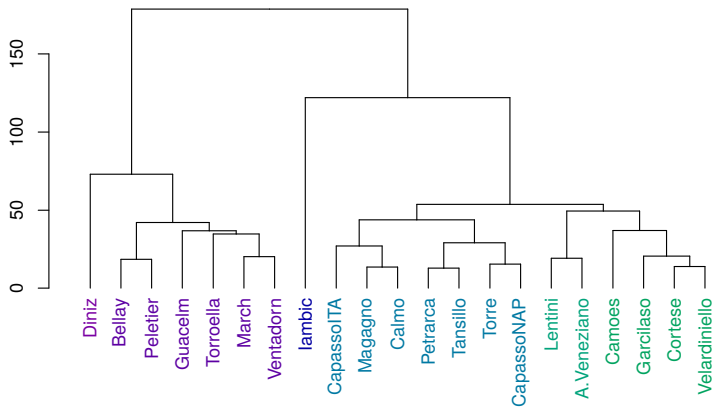


FIG. 12: Dendrogram of all Romance samples

Sicilian poetry. The branch directly connected contains the Portuguese Camões. Next to the Sicilian group, under the same branch, a three-author group can be noticed, composed of the two Neapolitan poets Velardiniello and Cortese and the Spanish Garcilaso. It is not surprising to find a Spanish poet and, in particular, Garcilaso grouped together with Neapolitan authors, since he discovered the new way of versification during a trip to Naples and, in fact, his poetry was deeply influenced by his stay there (Samonà 1998). The other branch consists of other two sub-branches divided in two smaller subgroups. In the leftmost subgroup, the work written in Italian by the Neapolitan poet Niccolò Capasso is alone in one branch. In these lines the author comically imitates Petrarchist poetry. The expectation would be to find it closer to Petrarca, since Capasso purposely exasperates Petrarchan metrics; however, it is not extremely far. The Italian poetry by Capasso is quite close to the sub-branch consisting of the two Venetian poets, Maganza and Calmo. The last branch shows two subgroups: one consisting of Petrarca and the Southern Italian Petrarchist, Luigi Tansillo; the other presenting the second Spanish author, Francisco De La Torre, together with the poetry by Capasso written in Neapolitan. This last subgroup is not very surprising, since the cultural contact between Naples and Spain was quite strong during that period, nevertheless, this grouping was not expected. In conclusion, it is interesting to highlight how relatively far the two samples by Niccolò Capasso are, since they are at the two extremes of the sample group presenting a tendency towards iambic rhythm. This shows substantial metrical differences between the two samples and one particularly notable aspect: despite the fact that in his Italian poetry, Capasso, tries to exaggerate the verse of Petrarca, it is actually his verse in Neapolitan, which gets closer to the Petrarchist way of versification (and, in addition, quite far from the previous Neapolitan poetic traditions). Finally, the perfect iamb was placed alone in one branch, far from any sample; its isolation ends when two samples from Shakespeare and the Dutch poet, Vondel, both big representatives of Renaissance iambic poetry, are added (see FIG. 13 in the next page). Based on the rate of deviation from iambic alternation of the two samples, they both are placed in the same branch of the perfect iambic meter; the Dutch sample is particular close to the ideal iamb. The present example gives extra support to the claim of Romance traditions not being iambic, proving their distance not only from an ideally perfectly iambic line but also from the two Germanic iambic meters, namely the English and the Dutch one.

6 Discussion

Before discussing the results and their relation to the questions proposed in the introduction, an observation can be made: the fact that all samples are quite strict in presenting a prominent position somewhere in the middle of the line (either on the fourth or the sixth position) and even more strict line-finally (with a mean, among samples, of 97.5% of cases), clearly shows the relevance of the colon-level in the metrical template. This confirms that these forms are not constrained on the position(foot)-level, but rather, in the colon domain (Nespor–Vogel 1986; Hanson 1997;

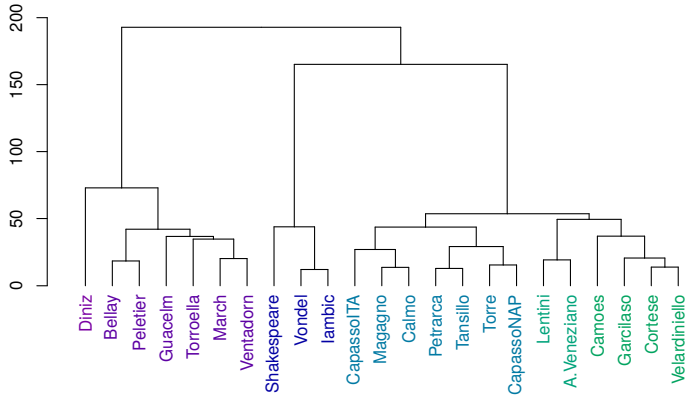


FIG. 13: Dendrogram of all Romance samples with English (Shakespeare) and Dutch (Vondel) samples

Fabb 1997; Versace 2014) and that metrical positions only have a counting purpose. These forms can be considered, then, colon-based, since they are constrained within a higher domain than the foot.

Regarding the validity of the rhythmical grouping, this is not fully confirmed. In fact, recalling the dendrogram in FIG. 12, French, representing the purely syllabic group, is placed in a separate branch from the other traditions and not connected to the perfect iambic branch but not far from Catalan, Occitan and the pre-Renaissance Portuguese author. While the fact that Catalan and Occitan are together in a separate branch, far from and not connected to the perfect iamb, confirms the literature claim regarding their syllabism, the results from the Portuguese samples, instead, are unexpected. One, the pre-Renaissance sample, is in the syllabic branch, and the other, Camões, is placed in the group of samples showing some tendency towards iambic rhythmical patterns. Therefore, while the former confirms literature claims, the latter strongly diverges from them. More data is definitely needed in order to elaborate a stronger claim about these results, since they are based on two very limited samples. A corpus study of Portuguese pre-Renaissance and Renaissance poetry would be needed, in order to verify this observation.

Finally, the other traditions, which display to a certain extent an iambic alternation in their lines, are not on the same branch of the iamb but their branches start from the same node. This shows that there is some connection, or, tendency towards an iambic rhythm, but the actual iambic alternation is still quite distant. Regarding the microvariations within groups, these, apart from Portuguese, smoothly recreates language groups and stronger cultural contacts (for example, Spanish poets being together with Neapolitan ones). The addition of the two iambic samples from Shakespeare and the Dutch poet, Vondel, which end up being in the iambic branch, gives extra evidence for the difference between actual iambic verse and verse, which simply shows a tendency towards that rhythm.

This leads to the second issue, namely, which elements define the iambic tendency and distinguish it from iambic meter. Apart from the higher rate of possible deviations

from an iambic pattern, another element can be identified. This aspect is shared by all Romance samples, despite rhythmical groups, and is significant in the iambic versus non-iambic distinction. It concerns the eighth position and its percentage of deviation. As shown in FIG. 10 and mentioned in the previous section, the eighth position appears to allow on average quite a broad range of deviation (the mean being the 49.3% of deviation, versus the 4.1% and 0.33% of deviation on the ninth and tenth position, respectively). The general tendency is to gradually lower deviation from the second position to the fifth; deviation raises again on the sixth position, lowers on the seventh, then, goes strongly up on the eighth position, just to drastically drop on the ninth and tenth. Of course, some differences between the Catalan-Occitan pattern, the French one, the Portuguese pre-Renaissance one and the other traditions are observed. For example, in the Catalan-Occitan data the eighth position is extremely deviating, even more than the second one. However, no difference is encountered regarding the high rate of deviation on the eighth position and the following abrupt lowering of deviation on the ninth and tenth position. As briefly mentioned before, this seems to contradict the Strict End Hypothesis restriction (Kiparsky 1968; Hayes 1983; Prince 1989) (SEH, henceforth), according to which, strictness would gradually increase towards the end of the line. The recent corpus study by deCastro-Arrazola (2018a: 85, 2018b) has given extra evidence for SEH predictions. In this study, corpora from English, Dutch, Sanskrit, Estonian and Tashlhiyt Berber have been analysed in order to test SEH and the predictions were confirmed. The data of the present paper, despite being typologically much more limited, do not seem to show a gradual increase of rhythmical strictness towards the end of the line in terms of increase of iambic rhythm, especially if we look at the regularity drop on the eighth position. A way to interpret this aspect is to consider what was observed by deCastro-Arrazola (2018a), namely that SEH relates to the kind of constrained features and that it can be localized into specific positions and be gradual or categorical. It can be concluded that no Romance meters, included those, which show a tendency towards iambic rhythm, are actually iambic. The necessity of following an iambic template would lead, like in other cases, to a gradual increase of iambicity. What is overly regular, instead, in these poetic forms, is the prominence requirement on the right edge of the two cola. In other words, iambicity does not increase towards the end of the line because iambic rhythm is not a strong metrical requirement of these poetic forms. No strict requirement of iambic rhythm means no necessity of gradually increasing towards the end of the line. The iambic tendency, then, would naturally come from the phonology of the language fitting the template. To explain, all samples, which show some sort of iambic tendency, are written in trochaic languages. Consequently, it would be expected that the head of the prosodic foot would surface somewhere in the line and the intention of elaborating something not recalling natural language but rather sounding refined would lead to a stronger tendency of having an iambic-like rather than a trochaic rhythm. This can also easily account for French being purely syllabic and not displaying any strong colon internal rhythmical pattern, since the language itself lacks stress patterns on a word level. Unresolved remains the case of Catalan, a trochaic language with strong word stress, which does not show any iambic tendency. On the one hand, it could be observed that vowel reduction affect-

ing the language might inhibit an iambic alternation, since, for example, some monosyllables cannot bear stress. On the other hand, vowel reduction does not seem to prevent the Renaissance Portuguese sample to present some iambic tendency. It is worth mentioning, though, that two traditions, namely the Catalan and Portuguese one, despite both presenting a pre-Renaissance decasyllable and being written in languages with pervasive vowel reduction, do present a significant metrical difference: while in the Portuguese Renaissance sample the iambic rhythm is fed by an extensive use of synalepha (the same happens in Neapolitan, another variety presenting vowel reduction); in Catalan, instead, hiatus is the strategy used to deal with adjacent vowels. This surely leads to more unstressed vowels sequences. A purely phonological account might not exhaustively explain the Catalan case and cultural aspects eventually need to be taken into account. Both Catalan and Portuguese poetry already had some kind of ten-syllable meter, which was built on the syllabic template of the Occitan source. The two traditions went on different paths when the Renaissance form spread and the pre-existing form was adapted. Stronger changes seem to have characterised the development of Portuguese meter; while in Catalan the syllabic template was preserved with only slight changes. The fact that the Catalan pre-Renaissance tradition was quite similar to the new trend and quite strong from a cultural perspective inhibited innovation and the original template was preserved. The Portuguese form, instead, presented still numerous differences from the Renaissance form. The drive towards preservation, which was in Catalan somehow much stronger than in Portuguese, prevented any iambic tendency to develop. The role of the cultural background becomes clearer when considering an opposite case: in Spanish poetry, Renaissance represented a strong break with the previous tradition (Samonà 1998); this gave an extra push to innovation and led the preceding poetic forms to be substituted by the new type of verse. This break did not occur in Catalan poetry; hence, the syllabic form could be preserved.

7 Conclusion

The present paper illustrated the variation within the implementations of Renaissance meter in Romance languages. The rhythmical groups, which can be elaborated by considering the literature regarding the various poetic forms, were tested and their validity was partly confirmed, except for the Portuguese samples. In this respect, a corpus analysis of Portuguese pre-Renaissance and Renaissance meter would be needed in order to verify the somehow controversial findings. The calculation of the deviation from a strictly iambic alternation of each metrical position in each sample has shown how all Romance meters do not present constraints on the foot level, hence, are neither foot-based nor fully iambic. The tendency towards iambic rhythm appears to be related to the presence of word stress in some of the traditions and to the fact that all languages considered are trochaic languages. A peculiar case is the one of Catalan and Portuguese. In the former, the cultural and identity aspect related to having a pre-existing decasyllabic meter quite similar to the Renaissance one hindered the development of some rhythm recalling iambic alternation; the latter,

instead, seems to have strongly adapted the meter to the new template. The comparison with the two Germanic samples shows how distant the Romance traditions are from an iambic meter and highlights the Germanic versus Romance distinction in terms of poetic instantiations. The model proposed here could be further used to develop quantitative data exploration and visualisation.

Primary sources

Ausiás, March (2003). *Opere di Ausiás March.* In RIALC Repertorio informatizzato dell'antica letteratura catalana. Costanzo Di Girolamo (Università Federico II e gli Atenei Catalani di Barcellona, Autònoma e Girona) (Ed.). (htto://rialc.unina.it)

Calmo, Andrea (1557). *Le bizzare, faconde et ingeniose rime pescatorie.* Iseppo Foresto: Venezia.

Camões, Luis de (1843). *Rimas*. In *Obras completas de Luis de Camões.* José Victorino Barreto Feio and José Gomes Monteiro (Ed.).

Capasso, Niccolò (1761). *Varie poesie di Niccolò Capassi.* Stamperia Simoniana: Napoli.

Cortese, Giulio Cesare (2004). *Viaggio di Parnaso.* Biblioteca Italiana: Roma. (http://bibliotecaitaliana.it)

Henry R. Lang, *Cancioneiro d'El Rei Dom Denis e Estudos Disprsos* (Edição organizada por Lênia Márcia Mongelli e Yara Frateschi Vieira), Niterói, RJ: Xunta de Galicia, EdUFF, 2010.

Du Bellay, Joachim (1549). *L'Olive et quelques autres oeuvres poeticques. Le contenu de ce livre. Cinquante sonnetz à la louange de l'olive. L'Anterotique de la vieille, & de la jeune amye. Vers lyriques. Par I.D.B.A.* Publisher Arnoul L'Angelier: Paris.

Gaucelm de Bezers, Ramon (1996). *Raimon Gaucelm de Béziers. Poesie.* Anna Radaelli (Ed.). La Nuova Italia: Firenze. In *Corpus des Troubadours*. Institut d'Estudis Catalans & Union Acadèmique Internationale. (https://trobadors.iec.cat/)

Lentini, Giacomo (1965). *Sonetti della scuola siciliana.* Edoardo Sanguineti (Ed.). Einaudi: Torino.

Maganza, Giambattista (1558–1583). *Rime di Magagnò, Menon e Begotto.* Archivio Digitale Veneto (Ed.). Biblioteca online dei testi veneti dale origini al XVII secolo.

Peletier, Jacques (1547). *Les oeuvres poétiques de Jacques Peletier du Mans ([Reprod.]).* De l'impr. De Michel de Vascosan, pour luy et Gilles Corrozet: Paris. (source: https://gallica.bnf.fr, Identifier: ark:/12148/bpt6k53487q)

Torroella, Pere (2003). *Opere di Pere Torroella.* In RIALC Repertorio informatizzato dell'antica letteratura catalana. Costanzo Di Girolamo (Università Federico II e gli Atenei Catalani di Barcellona, Autònoma e Girona) (Ed.). (http://rialc.unina.it)

Velardiniello. *Storia de cient'anne arreto.* Salvatore Argenziano (Ed.)

Veneziano, Antonio (2012). *Libro delle rime siciliane. Antonio Veneziano. Edizione critica a cura di Gaetana Maria Rinaldi.* Centro di studi filologici e linguistici siciliani: Palermo.

Ventadorn, Bernart (1915). *Bernart von Ventadorn, seine Lieder, mit Einleitung und Glossar*. Appel, Carl (Ed.). Halle a. S.: Verlag von Max Niemeyer. In *Corpus des Troubadours*. Institdut d'Estudis Catalans & Union Acadèmique Internationale. (https://trobadors.iec.cat/)

References

Beltrami, P. G. (1986). Cesura epica, lirica, italiana: riflessioni sull'endecasillabo di Dante, *Metrica*, IV (1986), pp. 67–107.

Beltrami, P. G. (2002). *La metrica italiana*. Il Mulino: Bologna.

Billy, D. (2000) L'invention de l'endecasillabo. In *"Carmina semper et citharae cordi". Études de philologie et de métrique offertes à A. Menichetti*, Genève: Slatkine, pp. 31–46.

deCastro-Arrazola, V. (2018a). *Typological tendencies in verse and their cognitive grounding*. PhD thesis. Leiden University.

deCastro-Arrazola, V. (2018b), Testing the robustness of final strictness in verse lines. *Studia Metrica et poetica*, (2), 5, pp. 55–76.

Di Girolamo, C. – Fratta, A. (1999). I decenari con rima interna e la metrica dei Siciliani, (Ed.), R. Coluccia et R. Gualdo, Galatina, Congedo, in Dai Siciliani ai Siculo-toscani. *Lingua, metro e stile, per la definizione del canone. Atti del convegno di Lecce* (21–23 aprile 1998), pp. 167–186.

Di Girolamo (2008). *I poeti della scuola siciliana: Poeti della corte di Federico II*. Bologna: Mondadori.

Duffell, M. J. (1991). The Romance (Hen)decasyllable: an exercise in comparative metrics. PhD thesis, Queen Mary University of London.

Duffell, M. J. (1994). The metrics of Ausiás March in a European context. *Medium Aevum*, (63), 287–300.

Fabb, N. (1997). *Linguistics and Literature: language in the verbal arts of the world*. Blackwell: Oxford.

Féry, C. (2001). Focus and Phrasing in French. In *Audiatur Vox Sapientiae. A Festschrift for Arnim von Stechow*. Caroline Féry – Wolfgang Sternefeld (Eds.). Berlin. Akademie-Verlag, 153–181.

Féry, C. (2003). Gradient prosodic correlates of phrasing in French, in Trudel Meisenburg – Maria Selig (Eds.) *Nouveaux Départs en Phonologie*. Niemeyer.

Gasparov, M. L. (1987). A probability model of verse (English, Latin, French, Italian, Spanish, Portuguese). *Style*, 21(3), 322–358.

Gasparov, M. L. (1996). *A history of European versification*. Clarendon Press: Oxford.

Hanson, K. (1997) 'From Dante to Pinsky: A Theoretical Perspective on the History of the Modern English Iambic Pentameter'. *Rivista di Linguistica* 9(1), 53–97.

Hayes, B. (1983). A grid-based theory of English meter. *Linguistic Inquiry*. 14, 3, 357–394.

Kiparsky, P. 1968. Metrics and morphophonemics in the *Kalevala*. In C. Gribble (Ed.), *Studies presented to Roman Jakobson by his students*, 137–148. Cambridge (MA, USA): Slavica.

Kiparsky, P. 1977. The rhythmic structure of English verse. *Linguistic Inquiry* 8(2), 189–247.

Navarro, T. (1991), *Métrica española*, Barcelona: Editorial Labor. E-periodica.ch

Nespor, M. – Vogel, I. (1986). *Prosodic Phonology*. Mouton de Gruyter: Berlin.

Piera, C. (1981). *Spanish Verse and the Theory of Meter.* PhD thesis. UCLA.

Prince, A. 1989. Metrical forms. In P. Kiparsky – G. Youmans (Eds.), *Rhythm and meter*, 45–80. Academic Press.

Ramírez, P. (1985). El decasíllab d'Ausiàs March i la recepció de l'endecasílabo petrarquista. *Versants*, 7, 67–88.

Samonà, C. (1998). L'etá di Carlo V. In A. Varvaro – C. Samonà (Eds.), *La letteratura spagnola: dal Cid ai Re Cattoloci*. BUR Biblioteca Univ. Rizzoli: Milano.

Spaggiari, B. (2003). The decasyllable in Portugal. In C. Michaux – M. Dominicy (Eds.), *Linguistic Approaches to Poetry* 15. Amsterdam and Philadelphia: John Benjamins.

Versace, S. (2014). A Bracketed Grid account of the Italian endecasillabo meter, *Lingua* 143, 1–19.

Appendix

Language	Author	Work	Period	n. of lines	source of annotaion
Italian	Francesco Petrarca	Canzoniere		130	AMI[5]
Italian	Tansillo	Il Canzoniere	1560	130	Manually annotated
Italian	Niccolò Capasso	Varie poesie di Niccolò Capassi	1761	130	Manually annotated
Spanish	Garcilaso de la Vega	Sonetos	1543	130	Corpus of Spanish Golden-Age Sonnets[6]
Spanish	Francisco de la Torre	Obras del Bachiller Francisco de la Torre (1631)	ca. 1534–1594	130	Corpus of Spanish Golden-Age Sonnets
French	Jacques Peletier	Les oevres poétiques de Jacques Peletier du Mans	1547	130	Manually annotated[7]
French	Du Bellay	L'Olive	1549	130	Manually annotated[8]
Portuguese	Diniz I de Portugal	Cantigas	ca. 1275- 1325	130	Manually annotated[9]
Portuguese	Luis de Camões	Sonetos	1595	130	Manually annotated[10]
Catalan	Ausiás March	Cants d'amor	1539	130	Manually annotated[11]
Catalan	Pere de Torroella	-	ca. 1451	130	Manually annotated[12]
Occitan	Raimon Gaucelm de Bezers	-	ca. 1270	130	Manually annotated[13]
Occitan	Berdnardt de Ventadorn	-	1147–1180	130	Manually annotated[14]
Neapolitan	Velardiniello	Storia de cient'anne arreto	1590	192	Manually annotated
Neapolitan	Cesare Cortese	Viaggio nel Parnaso	1621	130	Manually annotated
Neapolitan	Niccolò Capasso	Varie poesie di Niccolò Capassi	1761	130	Manually annotated
Venetian	Maganza	Rime di Magagnò. Menon e Begotto	1560	130	Manually annotated
Venetian	Andrea Calmo	Le bizarre, faconde, et ingeniose rime pescatorie	1553	130	Manually annotated
Sicilian	Antonio Veneziano	Celia	ca. 1575–1580	130	Manually annotated
Scuola Siciliana	Giacomo da Lentini	Sonetti	Ca. 1233–1241	130	AMI

TAB. 1: List of samples

5 Archivio Metrico Italiano http://www.maldura.unipd.it/ami/php/index.php
6 https://github.com/bncolorado/CorpusSonetosSigloDeOro
7 Annotated with the help of Dr. Romain Benini
8 Annotated with the help of Dr. Romain Benini
9 Annotated with the help of Prof. Ângela Correia
10 Annotated with the help of Prof. Isabel Almeida
11 Annotated with the help of Dr. Francesc Torres-Tamarit
12 Annotated with the help of Dr. Francesc Torres-Tamarit
13 Annotated with the help of Prof. Dominique Billy
14 Annotated with the help of Prof. Dominique Billy

Identification of Concrete Poetry within a Modern-Poetry Corpus

Hussein Hussein
Department of Literary Studies
Free University of Berlin
Berlin, Germany
hussein@zedat.fu-berlin.de

Burkhard Meyer-Sickendiek
Department of Literary Studies
Free University of Berlin
Berlin, Germany
bumesi@zedat.fu-berlin.de

Timo Baumann
Department of Informatics
University of Hamburg
Hamburg, Germany
baumann@informatik.uni-hamburg.de

Abstract

This work aims to discern the poetics of concrete poetry by using a corpus-based classification focusing on the two most important techniques used within concrete poetry: semantic decomposition and syntactic permutation. We demonstrate how to identify concrete poetry in modern and postmodern free verse. A class contrasting to concrete poetry is defined on the basis of poems with complete and correct sentences. We used the data from *lyrikline*, which contain both the written as well as the spoken form of poems as read by the original author. We explored two approaches for the identification of concrete poetry. The first is based on the definition of concrete poetry in literary theory by the extraction of various types of features derived from a parser, such as verb, noun, comma, sentence ending, conjunction, and asemantic material. The second is a neural network-based approach, which is theoretically less informed by human insight, as it does not have access to features established by scholars. This approach used the following inputs: textual information and the spoken recitation of poetic lines as well as information about pauses between lines. The results based on the neural network are more accurate than the feature-based approach. The best results, calculated by the weighted F-measure, for the classification of concrete poetry vis-à-vis the contrasting class is 0.96.

1 Introduction

In the mid-1950s, there emerged the genre of "concrete poetry", which, like Futurism and Dadaism, attempted to prevail over traditional poetry. For the founder, Eugen Gomringer, traditional poetry was based on semantic references in language, while concrete poetry understood language as pure material. Concrete poetry focuses the linguistic material of language by using segmentations and collages of everyday language in order to draw attention to the smallest particles of language—for example, individual letters, words, or word groups. Through new arrangements beyond the usual syntax, words and letters are freed from their accustomed context and are experienced anew.

"Concrete poetry" could be seen as a specific type of the "experimental poetry" that developed in the 20th century (Hartung 1975). The former is based on two principal techniques: The 'decomposition' of the semantic material of words, the poem's vocabulary, or its syntactic connections on the one hand; and the reordering of syntactic structures of sentences, so-called 'permutation', on the other hand. Decomposition focuses on the words, reducing them either to syllables or even to letters. Permutation is based on a certain technique of repetition, varying the position of the words within the poem. Thus concrete poetry can be identified by three different devices: syllabic decomposition, lettristic decomposition, and syntactic permutation.

All three techniques are very typical for concrete poetry, although two of them—lettristic and syllabic decomposition—are already familiar from pre-war German poetry. The two forms of decomposition had originated in dadaistic "sound poems" during the 1920s, and were reused after 1945 by authors such as Isidore Isou, Ernst Jandl, Valerie Scherstjanoi, Franz Mon, Gerhard Rühm or Michael Lentz (Emanuely 2013). All these concrete poets used dadaistic techniques to reduce the poem's semantics to syllables or letters, leaving only a few normal words (Mon 2012). A typical example for such dadaistic decomposition is the famous "Ursonate" by Kurt Schwitters, written between 1922 and 1932. The phonetic material of the Ursonate varies from the lettristic sound poem entitled "fmsbwtözäu / pggiv-...?mü" by Raoul Hausmann from 1921. Schwitters translated it into abstract syllable sequences which create one of the four 'themes' of the Ursonate: "Fümms bö wö tää zää Uu, / pögiff, / kwii Ee" (Mittelmeier 2016). Hausmann's model was based on a lettristic decomposition in which the letters are isolated as the smallest elements of the written language, without reassembling them into words and sentences. In the syllabic decomposition of the Ursonate, on the other hand, the words are decomposed into syllables. Both these types of decompositions, i.e. lettristic and syllabic, can also be found after 1945 in concrete poetry and the Viennese group, which also limited the linguistic and semantic material of poems to syllables or letters—for example, in the poems of Valeri Scherstjanoi. An additional technique in concrete poetry is permutation, which is a conversion or exchange of words or parts of sentences, or a progressive combination and rearrangement of linguistic-semantic elements in a poem (Ernst 1992). This technique was originated in early modernism by Gertrude Stein. In Germany, the principle was made famous by the 'concrete poet' Eugen Gomringer, who explained it in his essay "vom vers zur konstellation" using the example of his poem 'avenidas':

“avenidas / avenidas y flores // flores / flores y mujeres // avenidas / avenidas y mujeres // avenidas y flores y mujeres y / un admirador” (Gomringer 1969). In the poem ‘irish’, quoted below, Gomringer also uses the principles of reduction and combination preceding the permutation. In the first step, Gomringer reduces the vocabulary – ‘irish’ consists of only seven different words – and syntax of the poem, insofar as the words are only linked by ‘and’. In the second step, the words in each line are combined differently than in the previous line, which in turn constitutes the permutation: the repeated words always have a different position in the poem. The following three examples by Ernst Jandl (Jandl 1966) and Eugen Gomringer illustrate these techniques:

Ernst Jandl: **schtzngrmm** (lettristic decomposition)	**Ernst Jandl:** **auf dem land** (syllabic decomposition)	**Eugen Gomringer:** **irish** (permutation)
schtzngrmm	rinininininininininDER	green and
schtzngrmm	brüllüllüllüllüllüllüllüllEN	sheep
t-t-t-t	schweineineineineineineineinE	sheep and
t-t-t-t	grunununununununununZEN	cow
grrrmmmmm	hunununununununununDE	cow and
t-t-t-t	bellellellellellellellellEN	green
s---------c---------h	katatatatatatatatZEN	green and
tzngrmm	miauiauiauiauiauiauiauiauEN	cow
tzngrmm	katatatatatatatatER	cow and
tzngrmm	schnurrurrurrurrurrurrurrurrEN	sheep
grrrmmmmm	gänänänänänänänSE	sheep and
schtzn	schnattattattattattattattattERN	green
schtzn	ziegiegiegiegiegiegiegiegEN	have been
t-t-t-t	meckeckeckeckeckeckeckeckERN	seen
…	…	

Poems in the contrasting class are also written by modern and postmodern poets, but they are based on syntactically regular sentences. In addition, the words of these poems are complete and correct, not decomposed as in the examples given above.

The basic aim of this paper is to identify the features of these techniques in concrete poetry, using the world’s largest corpus of recited poetry (*lyrikline*). In this work we developed a method to identify poetic features that are related to the delineation of rhythmical patterns in concrete poetry. This method is compared with an approach based on neural networks for the classification of concrete poetry and the contrasting class of normal poetry. The paper is organized as follows: Section 2 provides an overview of the database. The processing tools, and feature engineering (rule-based) as well as neural networks (NNs) based approaches are described in Section 3. The experimental results are given in Section 4. Finally, conclusions and future works are presented in Section 5.

2 Data

We used data from our partner *lyrikline* (http://www.lyrikline.org) in the project *Rhythmicalizer* (http://www.rhythmicalizer.net). *Lyrikline* was initiated by the Literaturwerkstatt Berlin and houses contemporary international poetry as texts (original versions and translations) and the corresponding audio files. All the poems are read by the original authors. There are 232 German-speaking poets (from Germany, Switzerland, and Austria) reading 2,571 German poems out of a total of 1,346 poets and 12,077 poems on *lyrikline*.

The philologist on our project (the second author) listened to the audio recordings of poems and classified them as belonging to to one of the three rhythmical patterns of concrete poetry (syllabic decomposition, lettristic decomposition, or permutation) or to the contrasting class. The amount of material examined in this work is small. There are a total of 133 poems (68 poems in the first group, "concrete poetry", and 65 poems in the second group, the "contrasting class" or "normal poetry"). The number of poetic lines in the concrete poetry and the contrasting class is 1,913 and 2,090, respectively. The rhythmical patterns (syllabic decomposition, lettristic decomposition, and permutation) of concrete poetry are found in 21, 17, and 30 poems as well as 422, 612, and 879 poetic lines, respectively.

3 Method

Two approaches have been developed for the task of classification. Traditional feature extraction and classification with machine learning algorithms are employed in the first approach. The second approach uses a neural network that encodes the poem into a multi-dimensional representation.

3.1 Processing tools

The following tools are utilized for the analysis and feature extraction:

- **Text-Speech Aligner**: We perform forced-alignment of text and speech for poems using a text-speech aligner (Baumann et al. 2018b) which employs a variation of the SailAlign algorithm (Katsamanis et al. 2011) implemented via Sphinx-4 (Walker et al. 2004). The line boundaries (the start of the first word and the end of the last word in each line) are detected. The forced alignment of text and audio in spoken poetry, especially in concrete poetry, is non-trivial and often individual words or lines cannot be aligned. Therefore, the automatically extracted alignment information is manually corrected by the first author more than once (rectifying alignment information as well as in some cases correcting the written text of poems and the audio file).
- **Parser**: We processed the text data of poems by using a statistical parser in order to extract syntactic features. The Stanford parser (Rafferty–Manning

2008) is used to parse the written text of poems. The parser used the Stuttgart-Tübingen-TagSet (STTS) table developed at the Institute for Natural Language Processing of the University of Stuttgart (Schiller et al. 1999) for the parsing of German poems. The main problems in poem parsing (Hussein et al. 2019) involve the absence of punctuation marks. The data in this experiment contain 44 poems in concrete poetry (syllabic decomposition: 14, lettristic decomposition: 14, and permutation: 16) as well as 2 poems in the contrasting class without sentence endings. In addition, many poems are written with special characters: sometimes the text is written in lowercase with some words in uppercase, which makes the recognition of sentence boundaries by using the parser quite difficult. Furthermore, some sentences within the poems comprising the contrasting class go beyond the line boundary and run on to the next line. Such unconnected syntactic elements result from the dissolution of poetic lines, caused by so-called enjambment.

3.2 Feature engineering-based approach

We processed every poem individually, line by line, even if there are run-on lines (enjambments) within a poem, in order to extract features for the recognition of poems in the concrete poetry class. The most important indicators for concrete poetry are the absence of a verb within a complete sentence or half-sentence and the existence of asemantic material. We used parser information that comprises abbreviations of words' Part-of-Speech (PoS). Different features are extracted. We focused on the following inflected verbs: finite verbs (VVFIN), imperative verbs (VVIMP), auxiliary verbs (VAFIN), auxiliary imperative verbs (VAIMP), and finite modal verbs (VMFIN). We identified the punctuation marks in order to differentiate between concrete poetry and the contrasting class, because complete sentences in lines can be discerned by sentence-ending punctuation (. ? ! ; :), and clauses by commas. Therefore, we found all the punctuation marks in every poetic line. We also identified the following types of nouns: normal noun (NN) and proper name (NE). Two types of conjunctions are distinguished: subordinate conjunction in a sentence (KOUS) and coordinating conjunction (KON). Foreign language material (FM) as well as non-words (XY) are categorized as asemantic material. However, parsers cannot yet distinguish between nominative and accusative, so the most important indicator for a complete sentence is the verb. The features are recorded as follows: If the poetic line contains one or more verbs, a value of one is added to the feature vector; otherwise a value of zero is added. The same process is implemented in every poetic line for noun, comma, sentence-ending punctuation, conjunction, and foreign language material as well as non-words. Four sets of features sets are used in the analysis:

- **A** (2 features): verb and sentence-ending punctuation.
- **B** (3 features): verb, comma, and sentence-ending punctuation.
- **C** (5 features): verb, noun, comma, sentence-ending punctuation, and conjunction.

- **D** (6 features): verb, noun, comma, sentence-ending punctuation, conjunction, and asemantic material.

Several machine-learning algorithms are selected from the WEKA data mining toolkit (Hall et al. 2009) in the classification process:

- **IBk**: the Instance-Based (IB) classifier with a number of (k) neighbors is the K-nearest neighbours (KNN) classifier, using the euclidean distance and 1-nearest neighbour (Aha et al. 1991);
- **LogitBoost**: This classifier performs additive logistic regression (Friedman 1998 et al.);
- **RandomForest**: The classifier of random forest consists of several uncorrelated decision trees (Breiman 2001);
- **J48**: The J48 algorithm used to generate a pruned or unpruned decision tree (Quinlan 1993).

3.3 Neural networks-based approach

The approach based on neural networks for classification of prosodic styles is described in (Baumann et al. 2018a; Baumann et al. 2018c). The model must deal effectively with *data sparsity*, since there are a broad variety and a relatively small number of poems in the experiment. Therefore, we use as few free parameters as possible that need to be optimized during training. For this reason, in textual processing we focused on character-by-character encoding of poetic lines (and using character embedding). The textual information, the spoken recitation on the line level and the information regarding pauses between lines are utilized. We use a bidirectional recurrent neural network (RNN, using gated recurrent unit (GRU) cells (Cho et al. 2014)) which encodes the sequence of characters into a multi-dimensional representation that is trained to be optimal towards differentiating the prosodic classes. Pre-training with additional data from the German Text Archive (Geyken et al. 2011) is implemented. The model is not trained using an explicit notion of words. Instead, it may implicitly encode word-level information (such as PoS) via the constituting sequences of characters. This is in line with recent work on end-to-end learning, for example, in speech recognition (Hannun et al. 2014; Graves–Jaitly 2014), which no longer explicitly models phonemes or words, but directly transfers audio features to character streams. While processing on the word level might allow our model to build a better higher-level understanding of the poem's meaning, this semantic information would likely not help in style differentiation. In addition, word representations would not capture the usage of whitespace—for example, indentation to create justified paragraphs— nor special characters. We combine the line-by-line representations using a poem-level encoder which is fed to a decision layer and a final softmax to determine the poem's class, yielding the hierarchical attention network as shown in FIG. 1.

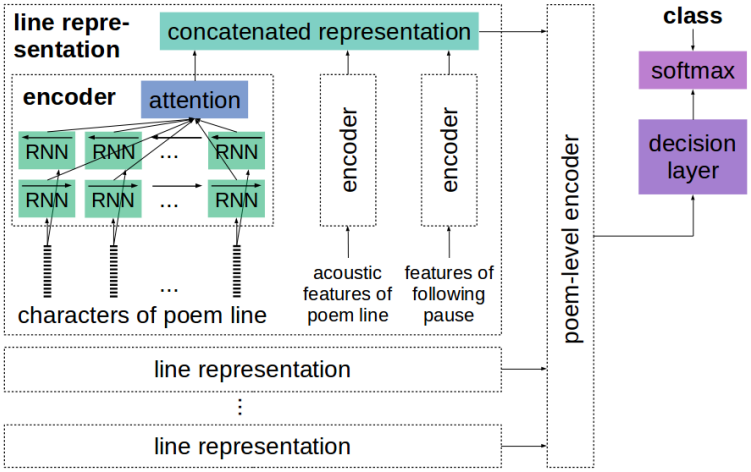


FIG. 1: Full model for poetry style detection using neural networks

4 Experimental results

Classification performance is measured with the weighted F-measure, which is the harmonic mean between precision and recall. The classification results in a 10-fold cross-validation are presented in TAB. 1. The following categories are classified together: syllabic decomposition versus lettristic decomposition versus permutation, decomposition versus permutation, permutation versus contrasting class, and concrete poetry versus contrasting class. The four classifiers used in the feature-based approach yielded mostly the same classification results for each feature vector. Therefore, there is no need to write the results of four classifiers for each feature vector. It can be seen that the increase in the number of features in the feature engineering-based approach yielded better results for the four classification pairs (the best results are provided by the feature vector (D)). The classification results of the neural networks-based approach show that the most valuable information seems to be in speech (except for the classification of permutation versus contrast class), whereas the information regarding pauses does not play an important role. The results in the table indicates that the neural network approach based on information contained in the text and audio of poems is more successful than the traditional feature-engineering approach. The weighted F-measure from the NN-based approach for the classification of decomposition versus permutation as well as of concrete poetry versus contrast class is 0.97 and 0.96, respectively. This indicates that the difference between concrete poetry and “normal” poetry can be detected by using a computational approach, and furthermore, that within concrete poetry the difference between permutation techniques and decomposition techniques are the best ones to detect automatically. We can explain this difference by the very fact that decomposition seems to be more radical in terms of its deviation from regular language than permutation.

	feature engineering & classifier				representation learning & NNs		
	A	B	C	D	text-only	text+ speech	text+speech+ pause
Syllabic vs. lettristic dec. vs. permutation	0.50	0.52	0.56	0.70	0.76	0.87	0.83
Decomposition vs. permutation	0.71	0.73	0.75	0.79	0.85	0.97	0.95
Permutation vs. contrasting class	0.56	0.65	0.68	0.68	0.74	0.68	0.70
Concrete poetry vs. contrasting class	0.62	0.70	0.78	0.79	0.85	0.96	0.96

TAB. 1: Classification results (weighted F-measure) using feature- and NNs-based approaches

5 Conclusion and future works

We present two approaches for the identification of concrete poetry in modern and postmodern free verse poetry by analyzing the *lyrikline* corpus, which is the largest corpus of spoken poetry. The first approach is based on the extraction of various features as defined in literary theory. The features are derived from a parser (based on text data only) focusing on syntactical units such as verbs, nouns, commas, sentence endings, conjunctions, and asemantic material. These features are extracted in order to measure the influence of various modeling parameters on the classification process. The second approach is based on hierarchical neural networks, using textual information and the spoken recitation of poetic lines as well as the information regarding pauses between lines. Both approaches are used to distinguish between concrete poetry and rather regular poems that use complete and correct sentences. The neural networks-based approach yielded the best results for classification of concrete poetry with the contrasting class (weighted F-measure of 0.96).

The difference in results between the first approach with all features considered (D) and the second approach with text-only features is small. This indicates that an attempt to improve the classification results can be made by integrating parser features into the neural networks approach. A further step would now be to identify in a similar manner syntactical features within modern poetry—for example, the difference between paratactical and hypotatctical line structures. Paratactical lines can be found in the famous expressionistic “Reihungsstil”; hypotactical lines can be found for example in the sonnets of Rainer Maria Rilke. Would it be possible to detect the difference between parataxis and hypotaxis in poems by using a computational approach as well?

Acknowledgements

This work has been funded by the Volkswagen Foundation through the program ‘Mixed Methods in the humanities? Funding possibilities for the combination and the interaction of qualitative hermeneutical and digital methods’ (funding code 91926 and 93255).

References

Aha, D. – Kibler, D. – Albert, M. (1991). Instance-Based Learning Algorithms. *Machine Learning* 6, 37–66.

Baumann, T. – Hussein, H. – Meyer-Sickendiek, B. (2018a). Style detection for free verse poetry from text and speech. In *Proceedings of the 27th International Conference on Computational Linguistics (COLING 2018)*, Santa Fe, New-Mexico, USA.

Baumann, T. – Köhn, A. – Hennig, F. (2018b). The Spoken Wikipedia Corpus Collection: Harvesting, Alignment and an Application to Hyperlistening. *Language Resources and Evaluation*, January, 1–27.

Baumann, T. – Hussein, H. – Meyer-Sickendiek, B. (2018c). Analysing the Focus of a Hierarchical Attention Network: the Importance of Enjambments When Classifying Post-modern Poetry. In *Proc. Interspeech 2018*, 2162–2166.

Breiman, L. (2001). Random Forests. *Machine Learning* 45(1), 5–32.

Cho, K. – van Merrienboer, B. – Gulcehre, C. – Bahdanau, D. – Bougares, F. – Schwenk, H. – Bengio, Y. (2014). Learning phrase representations using rnn encoder–decoder for statistical machine translation. In *Proceedings of the 2014 Conference on Empirical Methods in Natural Language Processing (EMNLP)* (1724–1734), Doha: Association for Computational Linguistics.

Emanuely, A. (2013). Das Gedicht à la lettre: Isidore Isou und der Lettrismus als Literatur des Widerstandes. *Zwischenwelt* 30(1), 37–41.

Ernst, U. (1992). Permutation als Prinzip in der Lyrik. *Poetica* 24(3/4), 225–269.

Friedman, J. – Hastie, T. – Tibshirani, R. (1998). Additive Logistic Regression: a Statistical View of Boosting. Technical report, Stanford University.

Geyken, A. – Haaf, S. – Jurish, B. – Schulz, M. – Steinmann, J. – Thomas, C. – Wiegand, F. (2011). Das deutsche textarchiv: Vom historischen korpus zum aktiven archiv. *Digitale Wissenschaft*, 157.

Gomringer, E. (1969). *Worte sind Schatten: die Konstellationen 1951-1968*. Rowohlt.

Graves, A. and Jaitly, N. (2014). Towards end-to-end speech recognition with recurrent neural networks. In *International Conference on Machine Learning*, 1764–1772.

Hall, M. – Frank, E. – Holmes, G. – Pfahringer, B. – Reutemann, P. – Witten, I. H. (2009). The WEKA Data Mining Software: An Update. *SIGKDD Explorations* 11(1), 10–18.

Hannun, A. – Case, C. – Casper, J. – Catanzaro, B. – Diamos, G. – Elsen, E. – Prenger, R. – Satheesh, S. – Sengupta, S. – Coates A. et al. (2014). Deep speech: Scaling up end-to-end speech recognition. *arXiv preprint arXiv:1412.5567*.

Hartung, H. (1975). *Experimentelle Literatur und Konkrete Poesie*. Göttingen: Vandenhoeck und Ruprecht.

Hussein, H. – Meyer-Sickendiek, B. – Baumann, T. (2019). How to Identify Elliptical Poems Within a Digital Corpus of Auditory Poetry. In *Proceedings of the 30th Conference on Electronic Speech Signal Processing* (ESSV 2019) (247–254), Dresden, 6–8 March 2019.

Jandl, E. (1966). Laut und Luise. Nachwort von Helmut Heißenbüttel. Olten and Freiburg: Walter-Verlag

Katsamanis, A. – Black, M. – Georgiou, P. G. – Goldstein, L. – Narayanan, S. (2011). SailAlign: Robust Long Speech-Text Alignment. In *Proc. of Workshop on New Tools and Methods for Very-Large Scale Research in Phonetic Science*. University of Pennsylvania, Philadelphia, USA, January.

Mittelmeier, M. (2016). *Dada. Eine Jahrhundertgeschichte*. München: Siedler.

Mon, F. (2012). Lettern Laute Silben Wörter: Anfänge der Konkreten und Visuellen Literatur im deutschsprachigen Raum. In *Poesie – konkret* (187–195), Köln.

Quinlan, R. (1993). *C4.5: Programs for Machine Learning*. San Mateo (CA): Morgan Kaufmann Publishers.

Rafferty, A. N. – Manning, C. D. (2008). Parsing Three German Treebanks: Lexicalized and Unlexicalized Baselines. In *Proceedings of the Workshop on Parsing German, PaGe '08* (40–46), Stroudsburg (PA): Association for Computational Linguistics.

Schiller, A. – Teufel, T. – Stöcker, C. – Thielen, C. (1999). Guidelines für das Tagging deutscher Textcorpora mit STTS (Kleines und größes Tagset). Available on http://www.ims.uni-stuttgart.de/forschung/ressourcen/lexika/TagSets/stts-1999.pdf. Last accessed at 25. January 2019.

Walker, W. – Lamere, P. – Kwok, P. – Raj, B. – Singh, R. – Gouvea, E. – Wolf, P. – Woelfel, J. (2004). Sphinx-4: A Flexible Open Source Framework for Speech Recognition. Technical report, Mountain View (CA), November.

Probability and Cognitive Models of Verse Meter

Evgeny Kazartsev
National Research University Higher School of Economics in St. Petersburg (HSE)
ekazartsev@hse.ru

Abstract

This paper deals with the study of rhythmical structure in metrical verse against the background of probability language models of meter. The various models correspond to the varying conditions in which versification occurs. Depending on the extent to which these models conform, or do not conform, to the verse parameters, we can create hypothetical reconstructions of the versification mechanisms by different poets and in different languages. This method can open a new perspective for the comparative and cognitive study of verse.

1 Introduction

In Slavic metrics, verse rhythm is frequently studied in comparison with the rhythm of prose, which acts as a linguistic counterpart to the observed verse rhythm. Samples of prose provide the basis for creating rhythmic dictionaries, which show the distribution of types of rhythmical (phonetical) words. These statistics are then used to construct probability models for a particular meter, such as the iamb. Each of these probability models is structured in accordance with a certain set of conditions for forming verse. These conditions are defined by the particular approach to creating the verse line.

The analytic system of reconstructive simulation of versification elaborated by Marina Krasnoperova comprises the cognitive and probability models of verse, which are used for a hypothetical reconstruction of the inner processes and mechanisms for generating and perceiving the verse line as they are expressed through its rhythm (Krasnoperova 2008). The main purpose of cognitive models is to describe a hypothetical complex of these processes and mechanisms. The probability models serve as a connective link between cognitive models and texts.

2 Probability models and their cognitive essence

The probability models of verse meter are created by using the rhythmic vocabularies found in prose and considering the specific type of versification. A correspondence or lack of correspondence between verse and these models provides information regarding the mechanism of versification and the language (prosaic) reservoir for the poetic rhythm. The so-called Language Probability Models (LPM or LM) of verse meter are constructed on the basis of rhythmical vocabularies of fiction prose.

A rhythmic lexicon consists of the frequency distribution of phonetic words, which are categorized according to syllabic length and the position of the stressed syllable. For example, the mean frequency of monosyllabic words in Russian prose (*d**e**n, d**o**m, s**v**et* etc.) is about 7%, that of disyllabic words with the stress on the first syllable (*d**a**ma, b**y**li, d**e**ti* etc.) is about 13%, that of disyllabic words with the stress on the second syllable (*trav**a**, ogn**i**, on vz**ia**l* etc.) is about 23%, and so on. In Russian verse these frequency distributions are different. Moreover, these frequency distributions depend on the metre and the position of the word in the verse line.

LMs are divided into two types. The first type consists of a model constructed according to the principle of the independence of rhythmical words in the realisation of a metrical line (Language Model of Independence – LMI). This model was introduced into verse theory by Andrey Kolmogorov (1968)[1] and later was interpreted by Marina Krasnoperova (2000: 77–87, 99–128; 2004: 13–89) as a special cognitive mechanism of versification. The second type of probability models is based on the principle of dependence in the choice of rhythmical words, which is determined by their position in a verse line and the preceding rhythmic context; these are the Language Models of Dependence (LMD). Associated with the LMI and LMD are quantities of "efforts" allotted for the formation of a verse line. A particular quantity comprises the number of unsuccessful attempts (waiting time) allowed for the process of selecting a word appropriate to the meter. According to the cognitive models, this quantity reflects an *a priori*, possibly unconscious, attitude on the part of the poet, which, in the case of failure, limits his search for a word at each position in the line. After the allotted "efforts" are exhausted, either the process of line formation starts again, or it stops entirely.

The distinction between LMI and LMD is that a normalized number of allotted "efforts" occurs in the models of the first type, while for models of the second type the number of "efforts" that poets can expend for the creation of a verse line is not normalized (see Krasnoperova–Kazartsev 2011: 101). It may well be that the models of independence represent a more mature system for the generation of verse rhythm—an internal standard for measuring the quantity of "efforts" expended is established in the poet's mind, so that the effort to produce the verse rhythm does not exceed a certain norm.

Conversely, in the model of dependence the amount of effort expended on the creation of a verse text is unlimited: the metrical line must by all means be formed.

1 See also Prokhorov (1984).

Among the language models of dependence there are two types which are the most productive: the symmetrical and the asymmetrical.

The symmetrical model of dependence (LMD-S) corresponds to the most "constrained" type of versification: the choice of word types is not random but depends on the metrical and syntactic context. In addition, the attention of the poet is very much focused on the beginning and end of the line. The asymmetric model (LMD-A) suggests a freer type of versification. The poet still exerts great effort in creating a verse line because the selection of word types takes place according to the principle of dependence, but the borders of the poetic line do not occupy so much of his attention. Among language models, the independence model LMI, or Kolmogorov's model, corresponds to the freest type of versification. It assumes that the poet, in trying to observe the meter, almost entirely submits to the nature of the language. In this model, the choice of rhythmical/phonetical word types is carried out in accordance with the principle of independence—i.e. the choice is random.

For these reasons, since different types of versification can be assigned to these models, this modelling method, which can provide information about the processes leading to the formation of verse and its rhythmic pattern, has been put to use in comparative prosody. This methodology represents a new stage in the development of simulation methods. It summarizes the previous experience gained by the use of probability models of verse and embraces new cognitive models, which allow for the reconstruction of deep-seated processes in versification.

3 Early iambic verse and probability models

This study deals with the establishment of iambic versification in early modern European poetry and focuses on the iambic tetrameter. The acquisition of iambic verse resulted in the creation of a rich poetic tradition in European and East European poetry (Kazartsev 2017: 134). Our study explores the development of iambic verse in Northern Europe and the Baltic area. The addition of Russia to this cultural zone after the Northern War and the reforms of Peter the Great predetermined the fate of Russian and East Slavonic poetry. This comparative research is devoted to studying the mechanisms of intercultural and inter-language communication involved in the formation of syllabotonicism in different languages.

Our findings indicate that despite the similarity of certain tendencies in the use of rhythmic structures, there are significant differences in the rhythm of early Dutch, German and Russian iambic verse. These differences likely arise from the dissimilar ways in which the verse traditions developed. This study further shows that the modelling method used for East Slavic, German and Dutch verse can open a new perspective in comparative metrics (Kazartsev 2006, 2009, 2016).

Below we analyze the typology of accentual-syllabic versification (syllabotonicism) and its formation in various languages, taking into account their differences as well as the cultural and historic circumstances of each. The similarities and differences in

the processes for forming iambic verse are noted (with examples from various kinds of material), and differences in their versification processes are described. The research shows that Dutch early iambic verse and that in German are described by different probability models. However the rhythmic structure of German and Russian iambs can be predicted by the same model.

A comparative analysis of identical types of versification in different languages allows us to view this issue from a fresh perspective. It frequently turns out that not the linguistic but the historical conditions during the creation of a new versification system have the decisive influence on the nature of the interaction between meter and language. This research allows us to suggest that language similarity does not predetermine a similarity in versification mechanisms: versification in closely related languages such as Dutch and German can be quite different, and in more distant languages, such as German and Russian, it can be similar. Dutch and German verse reflect different models, while in German and Russian verse one finds a quite similar models. Thus, difference between languages does not cause a difference in the technique of versification. The technique may be the same among quite different nations.

Indeed, the rhythm of the Dutch iamb is best described by the asymmetric model of dependence; however the German and early Russian iambic tetrameter are better described by the symmetric model (Kazartsev 2014). These different models closely predict the distribution of stresses on the strong positions in verse (FIG. 1, TAB. 1).

Thus, the rhythm of the early German and Russian iambic tetrameters is described by the same type of the language probability model, the LMD-S, despite the fact that the rhythm of the German iamb has an alternating character while the Russian iambic rhythm forms a frame.

This similarity can indicate the same versification process. Furthermore, among the models we considered, these are the most rigid in the degree of freedom they allow for forming verse. The mechanism of versification corresponding to such models is complicated and requires much effort. It suggests a direct interaction between the metrical scheme and the language.

On the whole, the rhythmic structure of early Russian iambic poems from 1739–1745 is best described by probability models of dependence, particularly by symmetric models. FIG. 2 shows that the stress profiles of dependence models (green lines) are in all cases closer to the verse (violet lines) than the data for the independence models (blue lines).

However, the data for the later Russian iambic tetrameters in the 18th century (after 1745) reveal an association with the LMI, thus with Kolmogorov's model. Indeed, in the following diagram (3) and in the table below we can see that a modified form of Kolmogorov's model of independence provides, on the whole, a good approximation of Lomonosov's late verse (FIG. 3, TAB. 3).

It is evident that after 1745 Lomonosov changes his manner of versification, which becomes freer in its realization of the meter. This change in his versification has a cognitive meaning: the poet produces a certain standard of permissible efforts aimed

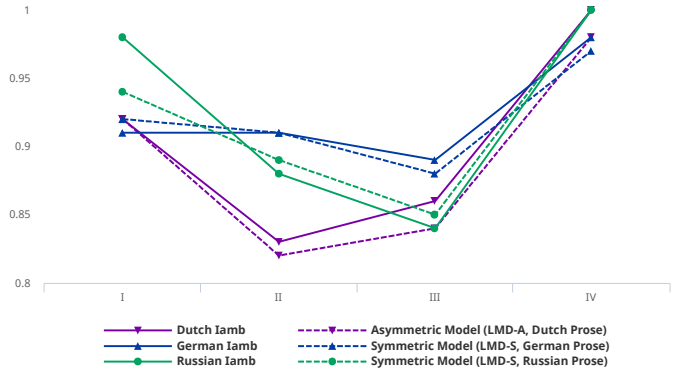


FIG. 1: Profiles of Stressing in Dutch, German and Russian Iambic Tetrameter Verse as Compared to the Models

	I	II	III	IV
Dutch Iamb	0.923	0.825	0.859	0.996
German Iamb	0.908	0.913	0.888	0.978
Russian Iamb	0.975	0.875	0.842	1.000
Symmetric Model (LMD-S, Russian Prose)	0.944	0.894	0.854	1.000
Symmetric Model (LMD-S, German Prose)	0.921	0.913	0.881	0.972
Asymmetric Model (LMD-A, Dutch Prose)	0.923	0.817	0.841	0.980

TAB. 1: Data for FIG. 1

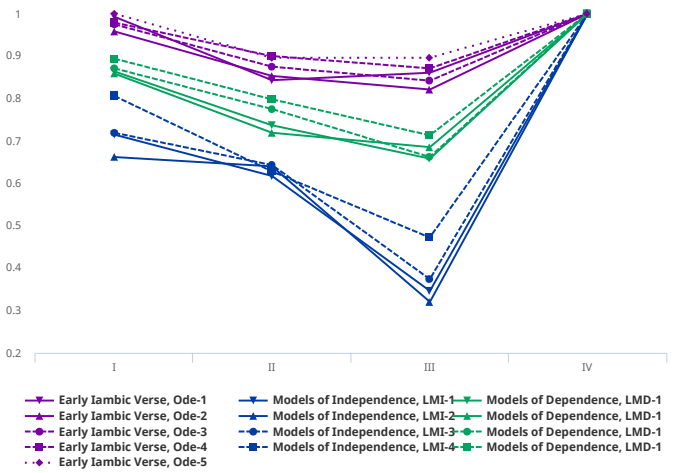


FIG. 2: Profiles of Stressing in Early Russian Iambic Tetrameter Verse as Compared to the Models

at the formation of a metrical line, and the rhythm of the Russian iamb assumes a more natural form, based on an independent distribution of rhythmic structures in the language.

		I	II	III	IV
Early Iambic Verse	Ode-1	0.993	0.843	0.861	1.000
	Ode-2	0.958	0.853	0.821	1.000
	Ode-3	0.975	0.875	0.842	1.000
	Ode-4	0.979	0.900	0.871	1.000
	Ode-5	1.000	0.896	0.896	1.000
Models of Independece	LMI-1	0.715	0.617	0.346	1.000
	LMI-2	0.662	0.640	0.320	1.000
	LMI-3	0.719	0.643	0.374	1.000
	LMI-4	0.806	0.628	0.472	1.000
Models of Dependence	LMD-1	0.864	0.737	0.658	1.000
	LMD-2	0.859	0.719	0.685	1.000
	LMD-3	0.871	0.775	0.662	1.000
	LMD-4	0.894	0.798	0.713	1.000

TAB. 2: Data for FIG. 2[2]

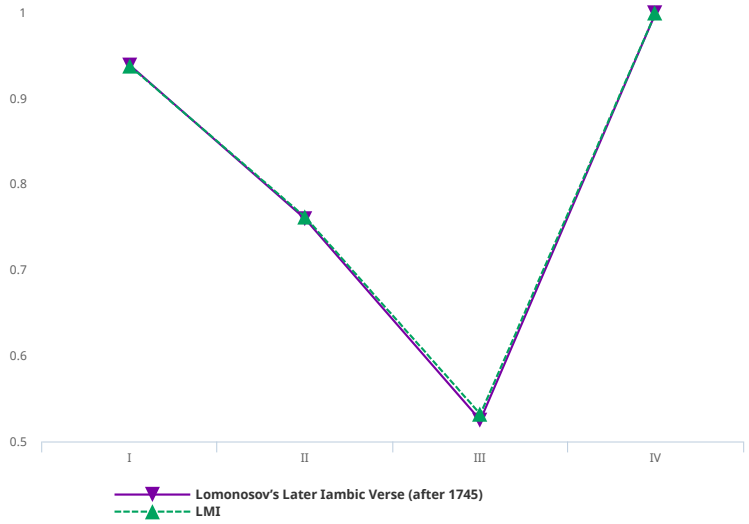


FIG. 3: Profiles of Stressing in the Russian Iambic Tetrameter after 1745 and the LMI

	I	II	III	IV
Lomonosov's Later Iambic Verse (after 1745)[3]	0.939	0.760	0.525	1.000
Modified LMI[4]	0.938	0.762	0.532	1.000

TAB. 3: Data for FIG. 3

2 Lomonosov's poetry—Ode-1: „Chotin Ode" (1739); Ode-2: „Holstein Ode" (1742) Ode-3: „Elisabeth Ode" (1742); Ode-4: „The Name-Day Ode" (1743); Ode-5: "Evening Ode". The models are constructed based on the rhythm of prose—1: Prokopovich (high style), 2: Lomonosov (high style), 3: Lomonosov (medium style), 4: Trediakovsky (low style).

3 The aggregate data for Lomonosov iambic tetrameter from 1745–1764.

4 LMI date are modified according to the average degree of stress in iambic ictuses.

4 Conclusion

In summary, it can be said that the models of dependence are better suited to describing the early stages in the development of metrical verse. Among these the symmetric model best describes German and Russian iambic verse, while the asymmetric model best describes Dutch. At the same time, the strictest type of versification corresponds to the symmetric model. The similarity of precisely this model to German and Russian verse is clearly due to the fact that German and Russian iambs arose under identical conditions—not as a result of natural evolution, as was the case with Dutch verse, but due to a substantial and quite abrupt reform. However, Russian iambic verse rather quickly switched toward a more natural realization of the meter, and so after 1745 its prosody comes to resemble the usual language model of independence.

In the system of reconstructive simulation of verse prosody, the various probability models correspond to the varying amounts of effort in forming the verse line. The results of this study show that after 1745 the amount of effort devoted to forming Russian iambic verse is significantly reduced and normalized. At the same time our previous studies have revealed that the German tetrameter long maintained the more "costly" mechanism of versification, which corresponds to the dependency model (Kazartsev 2014: 127). Furthermore, the amount of effort spent in creating German iambic verse does not become normalized for a long time.

Acknowledgements

This article was written in the framework of the Kone Fellowship at Helsinki Collegium for Advance Study. This study was also supported by the Basic Research Program at the National Research University Higher School of Economics (HSE).

References

Kazartsev, E. V. (2006). Zum Problem der Entstehung des syllabotonischen Versmaßsystems im europäischen Vers. *Glottometrics* 13, 1–22.

Kazartsev, E. V. (2009). Frühe deutsche Jamben und ihre niederländiesche Vorbilder. *Neerlandica Wartislaviensia* 18. Wrocław, 23–40.

Kazartsev, E. V. (2014). Comparative Study of Verse: Language Probability Models. *Style* 48(2), 119–139.

Kazartsev, E. V. (2016). Quantitative und vergleichende Versforschung – Ausweg aus der Krise? *Jahrbuch für Internationale Germanistik* 2016(1), 53–72.

Kazartsev, E. V. (2017). *Sravnitelnoe stikhovedenie: metrika i ritmika*. Sankt-Peterburg: Alex. Herzen University Press.

Kolmogorov, A. N. (1968). Primer izuchenija metra i ego ritmicheskikh variantov. *Teorija stikha.* Leningrad: Nauka, 145–167.

Krasnoperova, M. A. (2000). *Osnovy rekonstruktivnogo modelirovanija stikhoslozhenija (na materiale ritmiki russkogo stikha).* St. Petersburg: Izdatel'stvo Sankt-Peterburgskogo gosudarstvennogo universiteta

Krasnoperova, M. A. (2004). *Osnovy sravnitel'nogo statisticheskogo analiza ritmiki prozy i stikha.* St. Petersburg.

Krasnoperova, M. A. (2008). Cognitive aspects of probabilistic-statistical analysis in reconstructive simulation of versification. *Cognitive Modeling in Linguistics.* Proceedings of X International Conference. 2. September 6–13, 2008. Bečiči–Kazan', 110–122.

Krasnoperova, M. A. – Kazartsev, E. V. (2011). Reconstructive simulation of versification in comparative studies of texts in different languages (theoretical aspects and practice of application). *Frontiers in Comparative Metrics*. Peter Lang, 97–120.

Prokhorov, A. V. (1984). O sluchajnoj versifikatsii (k voprosu o teoreticheskikh i rechevykh modeljakh stikhotvornoj rechi. *Problemy teorii stikha.* Leningrad, 89–98.

Syntax and Pauses in a Verse Line: Statistical Analysis

Anastasia Kruglova
Russian State University for Humanities
nastel.kruglof@gmail.com

Olga Smirnova
M.V. Lomonosov Moscow State University
kisaolga@mail.ru

Tatyana Skulacheva
V.V. Vinogradov Institute of Russian Language, Russian Academy of Sciences
skulacheva@yandex.ru

Abstract

When Schwarzenegger tries to show that he is a robot or a cyborg he starts to speak with even pauses between words. In regular human speech pauses are of different lengths, and this phenomenon is based on the strength of syntactic breaks between words. This peculiarity of speech turns out to be of special importance for the structure of a poetic line, and by now this has become firmly established in a number of European languages (Russian, Spanish, French, English). It turns out that closer ties and shorter pauses normally occur close to the borders of a verse line (to form a contrast with the longest pauses and weakest syntactic ties between lines). Weak ties and long pauses within a line are concentrated in the middle of the line. This mirror-like opposition between close and loose connections between words at both the syntactic level and the corresponding phonetic one constantly occurs in verse and disappears in prose (various syllabic-accentual meters, various syllabic meters, and free verse were examined). In this article we concentrate on regularities observed in the Russian iambic tetrameter (A. S. Pushkin's "Evgeniy Onegin"), as well as comparative data from other languages.

1 Introduction

The only feature which is preserved in verse up to the border with prose is the division into lines. At present it is clear that a verse line is not simply a graphic unit but has norms in its inner structure at all linguistic levels. In this article we shall deal with syntactic norms in the organization of a verse line and their stable correlation with corresponding phonetic features (different lengths of pauses in different parts of

a line).[1] It has been shown for a number of European languages—Russian, English, French, Spanish—that there are very persistent norms present in verse, no matter the period (from the 18th through the 20th centuries), literary trend, or the individual styles (Gasparov 1981; Tarlinskaja 1984, 1987; Skulacheva 1989; Skulacheva 1996; Gasparov–Skulacheva 2004; Skulacheva 2014; Kruglova–Smirnova–Skulacheva 2017). These norms involve the words at the beginning and especially at the end of a line being connected by closer syntactic ties, while loose ties within a line concentrate in the middle of a line. The loosest syntactic connection is in the position between lines. The possible explanation for this phenomenon is that a close connection of words near the borders of a line helps to keep a line intact as an integral unit, while a loose syntactic tie between lines supports the division into lines—the most stable feature of a verse text.

2 Closer and looser syntactic ties and shorter and longer pauses at different positions of a verse line

We single out 10 types of syntactic ties derived from traditional grammar (with some minor adaptations for this type of analysis). The fact that we do not use any modern approaches (generative, the "Etap" system by Yu.D. Apresyan and others) is that so far nobody has managed to modify modern syntactic approaches in such a way that they could be instrumental for this type of work and show a good correlation between syntax and pauses. Normally, modern approaches offer very advanced and specialized tools for a completely different type of work. Traditional grammar is very simple and therefore works effectively for a much broader scope of phenomena. Still we plan to work actively with syntacticians proficient in different types of modern syntax to find out if a more formal approach may be suggested for describing this phenomenon.

Here is our classification of syntactic ties, which turned out to reveal a significant dependence between syntax and pauses. The ties are enumerated going from the closest to the loosest.

Close syntactic ties:

a – attributive tie
solitary hall…;

d – tie of a direct object
holds a sword…;

i – tie of an indirect object
gives to Lara…;

1 On syntactic norms of verse line structure see Yarkho 2006; Gasparov 1981; Tarlinskaja 1984, 1987; Skulacheva 1989; Skulacheva 1996; Gasparov–Skulacheva 1993, 2004; Skulacheva 2014; Akimova 2017; for syntax and pauses in verse: Kruglova–Smirnova–Skulacheva 2017; on prosodic boundaries in prose see Krivnova 1995, 1999, 2015, 2017; Price et al. 1991; Sanderman 1996.

m – tie of an adverbial modifier
rarely heard…;

Special types of tie:

p – predicative tie
Lara came…;

c – tie between similar, homogeneous parts of the sentence
knights and dames…;

Loose syntactic ties (loose ties are marked at both borders of the structure they introduce into the sentence, for these are the places where their pauses are normally realized):

cob – tie introducing unattached constructions
And yet they glide like happiness away;

bp – hypotactic tie between clauses of a complex sentence
The immortal lights that live along the sky…;

bc – paratactic tie between clauses of a complex sentence
The Serfs are glad through Lara's wide domain,
And slavery half forgets her feudal chain…;

f – border between sentences marked by a full period, exclamation or question mark
Why comes not Ezzelin? The hour is past…

We have also compared the data on distribution of close and loose syntactic ties within the line and between lines, as well as the distribution of longer and shorter pauses in the reading of the same text. For acoustic analysis, the text of the second and the third chapters of A. S. Pushkin's "Evgeniy Onegin" were read by a woman with higher non-linguistic education, who is a skilled public reader. The duration of the recording is 60 minutes. Pauses were measured using the Praat program (version 6.0.36) (Boersma–Weenink 2017).

The graph for syntactic ties (FIG. 1) may differ a little in details from the one presented in Skulacheva 1989 and Kruglova–Smirnova–Skulacheva 2017, because in those studies we presented syntactic data for 1000 fully stressed lines, and here we have syntactic data for 284 fully stressed lines on the sound recording (the total number of lines in the recording is 1202). This is due to the fact that to date in phonetics smaller portions of material are normally used—because of the more complicated and time-consuming type of analysis, and because the physical capacity of a reader to participate in the experiment without getting tired is limited. Still the results show the same tendencies as in Skulacheva 1989 and Kruglova–Smirnova–Skulacheva 2017. Contact ties (ties between the last word of one line and the first word of the next) are shown for 898 lines (all other lines had distant ties between them—that is, no ties between the words at the very end of one line and the very beginning of another).

In FIG. 1–2 close syntactic ties are solid violet lines, loose syntactic ties are solid green, while the blue dashed line represents special types of tie. As we can see from FIG. 1, close syntactic ties occur at the beginning (between words of the first and the second

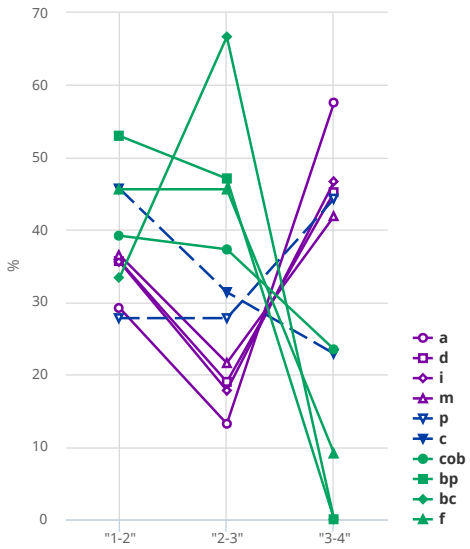


FIG. 1: Close and loose syntactic ties within a line in the iambic tetrameter of A.S. Pushkin

feet) and close to the end of a line (between the words of the third and the fourth feet). Loose syntactic ties show a mirror-like opposite distribution: they are not very numerous at the beginning, are extremely scarce near the end of a line, and they reach a maximum in the middle. We observed the same distribution in different periods of Russian (classical verse, dolnik, vers libre), English, and French verse (Skulacheva 1989, 1996). The reason for such a distribution may be the necessity to keep words of a line together as one unit. It is much easier to tear away one word at the beginning or the end of a line than to break a line at the middle by mistake. In classical verse we normally have inertia of line length: if all previous lines are iambic tetrameter we will be expecting that every subsequent line will be of approximately the same length, and if we have a loose syntactic tie in the middle of a line we still will not mistake it for the end of the line. Loose ties between lines support division into lines—the basic feature of a verse text. A long pause within a line close to the pause between lines will distract attention from the latter, which is of primary importance for verse structure.

In FIG. 2 we present the same data but also include the ties between lines (contact ties between a word in the 4th foot of one line and a word in the 1st foot of the next line). As we see, FIG. 2 shows that, as was once suggested by B. Yarkho, the position between lines may serve as a test position for the strength of a tie: loose ties reach the maximum level, while close ties go down to the minimum. This shows that division into lines is very important for verse and that syntax specially works to support it.

In FIG. 3 the pauses of different length at different positions within a line are presented. This actually is the same phenomenon as in FIG. 1, but on the phonetic level.

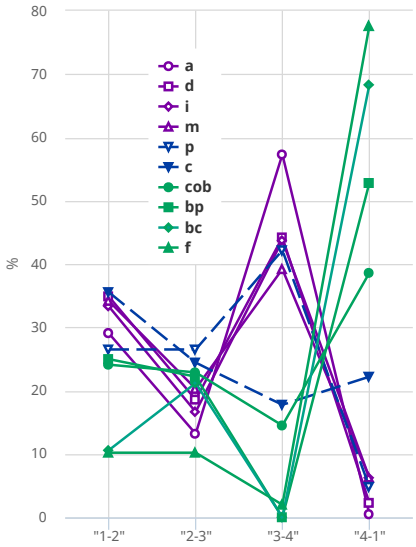


FIG. 2: Close and loose syntactic ties within a line and between lines in the iambic tetrameter of A.S. Pushkin

P0 is no pause, P1 stands for the shortest pauses, P2 pauses are a little longer and so on. P5 pauses are the longest. We will see the precise diapason of pauses a little later, when we come to the categorization of pauses by statistical methods. FIG. 3 shows that long pauses behave like the weak ties to which they correspond. The long pauses are not very numerous at the beginning, their maximum within a line occurs in the middle, and they are very infrequent closer to the end, between words in the last two feet of a line (3–4). The no pause (P0) distribution resembles that of close syntactic ties in FIG. 1. There is often no pause between words in the 1st and the 2nd feet of a fully stressed iambic tetrameter line, the absence of a pause is most typical for the position between words in the last two feet of a line (3–4), and the absence of pause falls to its minimum in the middle of a line. This shows that pauses are dependent on the strength of syntactic ties (see the statistics on their interdependence below) and that the reason for their distribution may be the same. The absence of pauses in positions close to the beginning and the end of a line helps to keep the line intact as one whole. Longer pauses are concentrated in the middle of a line, where they can not be mistaken for the end of a line because in classical poetry there is inertia of line length (a poem in iambic tetrameter maintains that meter throughout, as in “Evgeniy Onegin”). So the risk of breaking the line one word earlier is greater than that of taking the middle of a line for its end. Our previous data for Russian free verse (Skulacheva 1996) show that in verse, the length typical of a weak tie still occurs in the middle of a line, but such ties are much less numerous: the inertia of a line length disappears and using loose ties even in the middle of a line presents a greater risk to the integrity of a line.

FIG. 4 shows the same data as FIG. 3 but with the position between lines added. As with syntactic ties, the position between lines attracts the longest pauses, which reach

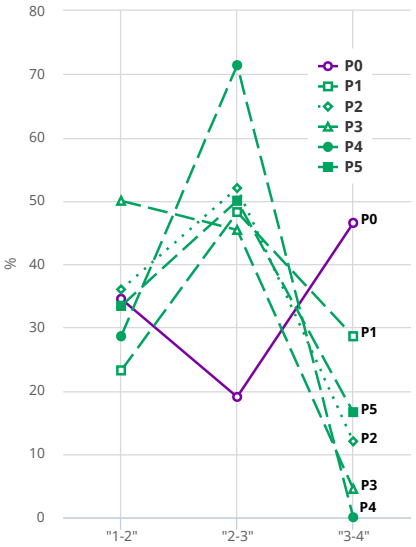


FIG. 3: Pauses of different lengths within a verse line in the iambic tetrameter of A.S. Pushkin (5 types of pauses)

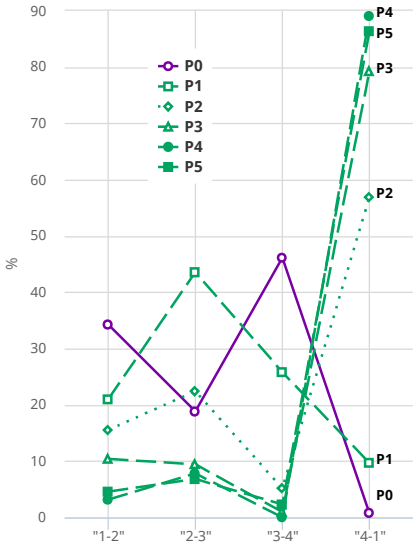


FIG. 4: Pauses of different lengths within a verse line and between lines in the iambic tetrameter of A.S. Pushkin (5 types of pauses)

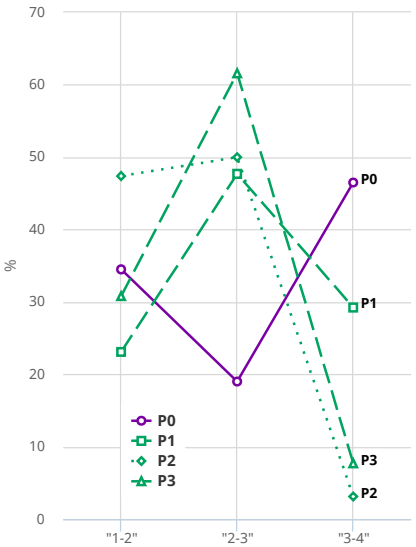


FIG. 5: Pauses of different lengths within a verse line in the iambic tetrameter of A.S. Pushkin (3 types of pauses, P0—no pause)

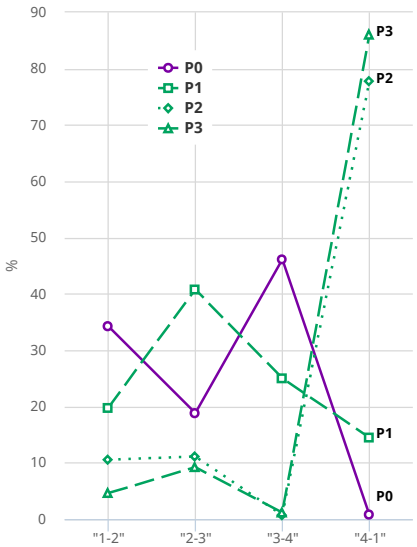


FIG. 6: Pauses of different lengths within a verse line and between lines in “Evgeniy Onegin” (3 categories of pauses, P0—no pause)

their maximum in that position. The absence of pauses falls to its minimum between lines. As for enjambment, even when it is used often—in less strictly organized verse than Pushkin's—it still exists as a stylistic device that manifests itself only against the background of the above described norm.

TAB. 1 shows cross tabulation of the type of syntactic tie and the categories of pauses by length.

	2-Way Summary Table: Observed Frequencies (Dataset "Onegin"). Include condition: fully stressed lines				
	PD3 no	**PD3 short**	**PD3 medium**	**PD3 long**	**Row Totals**
a	**214**	6	2	0	**222**
Row %	**96.40%**	2.70%	0.90%	0.00%	
d	**39**	4	0	0	43
Row %	**90.70%**	9.30%	0.00%	0.00%	
i	**43**	3	2	0	48
Row %	**89.58%**	6.25%	4.17%	0.00%	
m	**71**	5	3	0	79
Row %	**89.87%**	6.33%	3.80%	0.00%	
p	**76**	5	2	0	83
Row %	**91.57%**	6.02%	2.41%	0.00%	
c	**15**	**15**	12	3	45
Row %	**33.33%**	**33.33%**	26.67%	6.67%	
cob	**36**	11	28	8	83
Row %	**43.37%**	13.25%	33.73%	9.64%	
bp	5	7	**20**	4	36
Row %	13.89%	19.44%	**55.56%**	11.11%	
bc	6	11	**64**	23	104
Row %	5.77%	10.58%	**61.54%**	22.12%	
f	0	10	39	**49**	98
Row %	0.00%	10.20%	39.80%	**50.00%**	
Totals	**505**	77	172	87	841

TAB. 1: Contingency table (cross tabulation) of the type of syntactic tie and the categories of pauses by length (3 categories of pauses)

Statistics	**Chi-square**	**df**	**p**
Pearson Chi-square	693.2958	df = 27	p = 0,0000
M-L Chi-square	760.7673	df = 27	p = 0,0000
Cramer's V	0.5242044		
Spearman Rank R	0.7704777	t = 35.009	p = 0,0000

TAB. 2: Statistics for this cross tabulationThe hypothesis that the strength of a syntactic tie and the length of a pause are independent is rejected with the probability of a type 1 error less than 0.00005.

	Descriptive Statistics (3 pauses)				
Pauses	**Valid N**	**Mean**	**Median**	**Minimum**	**Maximum**
Short	332	161.03	147.94	33.32	302.24
Medium	828	445.13	446.74	304.37	578.95
Long	398	799.00	720.16	579.76	2555.90

TAB. 3: Descriptive statistics for the 3 classes of pauses: the result of formal classification by the K-means method

This is the rounded diapason for 3 types of pauses (P0 in the graphs is absence of a pause): short pauses—less than 300 ms with the mean value 150, medium pauses—300-600 (mean 450), long—more than 600 (mean 720). In this case we have chosen the median for mean value as providing more robust statistics that are less sensitive to outliers.

One can see that these groups correspond well with the peaks at the multimodal histogram of pause lengths (FIG. 7).

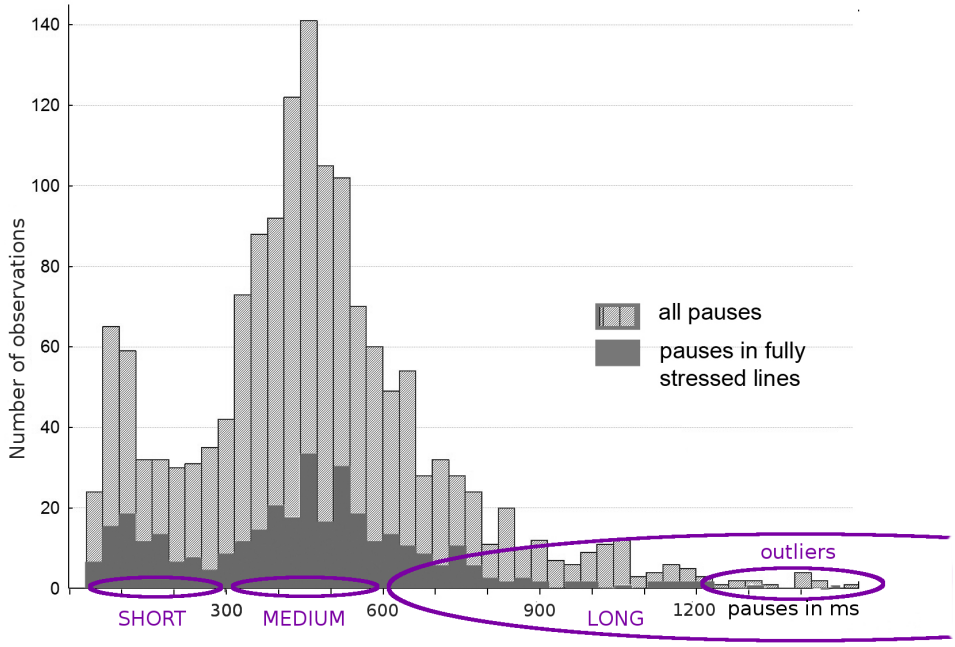


FIG. 7: The pauses length frequency histogram; 3 types of pauses are marked

The groups of pause lengths for the graphs with 5 categories of pauses are as follows (see TAB. 4).

	Descriptive Statistics (5 pauses)				
Pauses in ms	**Valid N**	**Mean**	**Median**	**Minimum**	**Maximum**
V. short	254	127.4	116.8	33.3	232.9
Short	344	341.6	349.9	235.5	408.1
Medium	507	475.5	471.6	409.3	550.3
Long	262	626.3	621.5	552.8	727,9
V. Long	191	968.7	891.1	729.7	2555.9

TAB. 4: Descriptive statistics for the 5 classes of pauses—the result of formal classification by the K-means method

Here are the rounded diapasons for 5 types of pauses: pauses shorter than 240 ms. with the mean value 130 (very short), 240–420 (350 ms, short), 420–580 (490 ms, medium), 580–820 (670 ms, long), longer than 820 with the mean 1000 ms—very long. P0—absence of pause at the particular position.

In general, categorization of pauses is very helpful in this type of analysis as it helps to neutralize differences in speech tempo between different readers. Normally there are 5 categories + P0 (no pause). So far results exhibiting these categories have been obtained for Russian verse and prose and for Spanish verse (Smirnova 2017; Krivnova–Smirnova 2018; Kruglova–Smirnova–Skulacheva 2017). In our case the reader seems to differentiate most distinctly three types of pauses, though differentiation of 5 groups is also possible.

3 Conclusion

Thus we can conclude that close syntactic ties occur at the beginning (between words of the first and the second feet) and close to the end of a line (between the words of the third and the fourth feet). Loose syntactic ties show a mirror-like opposite distribution: they are not very numerous at the beginning, are extremely few near the end of the line and they reach a maximum in the middle of the line. We observed the same distribution in different periods of Russian (classical verse, dolnik, vers libre), English, and French verse. The reason for this distribution may be the necessity to keep the words on a line together as an integral unit. Loose ties between lines support the division into lines—the basic feature of a verse text.

The length of a pause depends on the type of syntactic tie. Long pauses behave like the weak ties to which they correspond. Long pauses are not very numerous at the beginning, their maximum within a line is in the middle and they are very infrequent closer to the end, between words in the last two feet of a line (3–4). The (P0) distribution resembles that of close syntactic ties. There is often no pause between words in the 1st and the 2nd feet of a fully stressed iambic tetrameter line, an absence of pause is most typical for the position between words in the last two feet of a line (3–4), and the absence of pause falls to its minimum in the middle of the line. Absence of pauses in positions close to the beginning and the end of a line helps to keep the line intact as one whole. Longer pauses are concentrated in the middle of lines, where they can not

be mistaken for the end of a line, because in classical poetry there is consistency in line length. The longest pauses appear between lines, thus supporting the division into lines—the basic feature of verse. The position between lines in classical verse is normally the position for testing the strength of a tie: weak ties reach their maximums there, strong ties—their minimums. Also, the longer the pause, the more often it occurs between lines.

Acknowledgment

This work is supported by the grant of Russian Foundation for Basic Research N 19-012-00534 under the supervision of T.V. Skulacheva.

References

Akimova, M. V. (2017). Traditsii izucheniya russkogo stikhotvornogo sintaksisa: Yarkho, B. I. – Gasparov, M. L. [Approaches to the Analysis of Russian Poetic Syntax: B. I. Yarkho and M. L. Gasparov]. *Trudy Instituta russkogo yazyka im. V. V. Vinogradova*, 14(11), 89–112.

Boersma, P. – Weenink, D. (2017). Praat: doing phonetics by computer [Computer program]. Version 6.0.36, retrieved December 2017 from http://www.praat.org/

Gasparov, M. L. (1981). Ritm i sintaksis: proiskhozhdenie “lesenki” Mayakovskogo [Rhythm and Syntax: the Origin of Mayakovsky’s “Stepladder”]. *Problemy strukturnoi lingvistiki*, 149–168.

Gasparov, M. L. – Skulacheva, T. V. (1993). Ritm i sintaksis v svobodnom stikhe [Rhythm and Syntax in Free Verse]. *Ocherki istorii yazyka russkoi poezii XX veka.* Moscow: Nauka, 14–43.

Gasparov, M. L. – Skulacheva, T. V. (2004). *Stat'i o lingvistike stikha* [Articles on Verse Linguistics]. Moscow: Languages of the Slavic Cultures.

Krivnova, O. F. (1995). Pertseptivnaya i smyslovaya znachimost' prosodicheskikh shvov v svyaznom tekste [Perception and Semantic Relevance of Prosodic Breaks in Spoken Text]. *Problemy Fonetiki*, 2, 229–238.

Krivnova, O. F. (1999). Smyslovaya znachimost' prosodicheskikh shvov v tekste [Semantic Significance of Prosodic Breaks in Spoken text]. *Problemy Fonetiki*, 7, 247-257.

Krivnova, O. F. (2015). Glubina prosodicheskikh shvov v zvuchashchem tekste (eksperimental'nye dannye) [The Depth of Prosodic Breaks in Spoken Text (Experimental Data)]. *Komp’juternaja Lingvistika I Intellektual’nye Tehnologii*, 14, 338–351.

Krivnova, O. F. (2017). Intonatsionno-smyslovoi chlenenie v proze: ierarkhicheskaya organizatsiya i sredstva ee vyrazheniya [Prosodic Phrasing in Prose: Hierarchical Structure and Means of its Realization]. *Trudy Instituta russkogo yazyka im. V. V. Vinogradova*, 14(11), 12–26.

Krivnova O. F. – Smirnova O. S. (2018), Baza diskursivnyh priznakov slovorazdelov v ustnoj russkoj rechi: struktura, sostav i opyt primeneniya [A Database of Wordbreaks Discursive Features in Russian Oral Speech: The Structure, Composition and Application]. *Komp'yuternaya Lingvistika i Intellektual'nye Tekhnologii: Trudy Mezhdunarodnoy Konferentsii Dialog 2018*, Moscow, 17, 368–379.

Kruglova, A. V. – Smirnova, O. S. – Skulacheva T. V. (2017). Sintaksis i prosodicheskie shvy v strokakh ispanskogo odinnadtsatislozhnika [Syntax and Prosodic Breaks in Lines of Spanish Hendecasyllabic Verse]. *Trudy Instituta russkogo yazyka im. V. V. Vinogradova*, 14(11), 152–168.

Price, P. J. – Ostendorf, M. – Shattuck-Hufnagel, S. – Fong, C. (1991). The Use of Prosody in Syntactic Disambiguation. *The Journal of the Acoustical Society of America*, 90(6). 2956–2970.

Sanderman, A. A. (1996). *Prosodic Phrasing (Production, Perception, Acceptability and Comprehension)*. Eindhoven: Technische Universiteit Eindhoven. DOI: 10.6100/IR461536

Skulacheva, T. V. (1989). *Vzaimodeistvie ritmicheskoi organizatsii i sintaksicheskogo postroeniya stikhotvornogo teksta* [The correlation between rhythmic organization and syntactic structure in verse]. Unpublished doctoral dissertation. Lomonosov Moscow State University, Moscow.

Skulacheva, T. V. (1996). Lingvistika stikha: struktura stikhotvornoi stroke [Verse Linguistics: the structure of the verse line]. *Slavjanskij stih: stihovedenie, lingvistika i pojetika.* Moscow: Nauka, 18–23.

Skulacheva, T. V. (2014). Verse and Prose: A Linguistic Approach. *Poetry and poetics: A centennial tribute to Kiril Taranovsky,* Bloomington: Indiana Slavica, 239–248.

Smirnova O. S. (2017), Statisticheskiy analiz rezul'tatov pertseptivnogo otsenivaniya glubiny prosodicheskikh shvov v russkom zvuchaschem tekste [Statistical Analysis of Perceptive Estimation for Depth of Prosodic Breaks in Russian Spoken Text]. *Dialog 2017*, Moscow. http://www.dialog-21.ru/media/3980/smirnovaos.pdf

Tarlinskaja, M. (1984). Rhythm – Morphology – Syntax – Rhythm. *Style*, 18(1), 1–26.

Tarlinskaja, M. (1987). Meter and Mode: English iambic Pentameter, Hexameter, and Septameter, and their Period Variations. *Style*, 21(3), 400-426.

Yarkho, B. I. (2006). *Metodologiya tochnogo literaturovedeniya: Izbrannye trudy po teorii literaturovedeniya* [A Methodology for a Precise Science of Literature: Selected Works on the Theory of Literature]. Moscow: Languages of the Slavic Cultures.

Rhythmical Structure of Russian Iambic Tetrameter and Its Evolution

Sergei Liapin
V.V. Vinogradov Institute of Russian Language
liapin@mail.ru

Abstract

It has been considered for many years that the rhythm of Russian iambic tetrameter is formed under the influence of two tendencies: 1) stabilization of the first ictus after at least one unstressed syllable and 2) regressive accentual dissimilation, that is, that alternation of strong and weak ictuses in the direction from the end of a line towards its beginning (Taranovsky 1971). Meanwhile, the doubts expressed as early as 1973 by Miroslav Chervenka were recently confirmed. A number of studies have discovered the reality of linguistic factors (syntax as one of the main factors) that form the rhythmic structure of a verse text. We acquired statistical data for Russian longer poems of the middle and second part of the 19th century which have never been investigated before. These data seriously question the existing views regarding the logic of the development of Russian iambic tetrameter.

1 Introduction

It has been considered for many years that the rhythm of Russian iambic tetrameter is formed under the influence of two tendencies: 1) stabilization of the first ictus from the left within a line under the condition that it does not occupy the first syllable of a line; if it does the second ictus from the left undergoes stabilization; and 2) regressive accentual dissimilation, that is, the alternation of strong and weak ictuses in the direction from the end of a line towards its beginning (Taranovsky 1971). However, some scholars called the existence of these trends into question (Červenka 1973; Kholshevnikov 1973; Gasparov 2003).

Taranovsky has studied a vast amount of Russian iambic tetrameter (Taranovsky 1953, 1971). But there was one period of Russian iambic tetrameter development which at that time he didn't manage to cover in detail: it was the second half of the 19th century. At the same time data for this period, and especially concerning longer narrative poems of the second half of the 19th century in addition to shorter lyrics taken by Taranovsky, may be important for the whole picture of Russian iambus development. These data

will be provided in this article and they may help us to see the history of iambus in the second half of the 19th century differently than it was customary understood before.

2 Rhythmical structure and syntax

Let's begin with an example. In 1975, James Bailey (Bailey 1975) analyzed the iambic tetrameter of Sluchevsky. Here is Bailey's main conclusion:

> [...] The stressing of Slučevsky's narrative verse is exceptional for the middle of the nineteenth century because the second ictus has been weakened to 88.2% so that there is a near leveling of the first two ictuses.

The data presented in this article and a number of other articles by us (Liapin 2016) show that we are not dealing with an exception. One need only compare Bailey's data on Sluchevsky with our calculations for narrative verse of the nineteenth century (Nekrasov, Maykov, Polonsky, Karolina Pavlova—see TAB. 1, 2, 3).

So if we take into account our data the situation is actually the opposite: the second ictus of Sluchevsky is even more intensively stressed than in the second half of 19th century in general. The highly stressed second ictus in Taranovsky's data can be explained by the fact that in Taranovsky's data for the 19th century the second part of the 19th century is poorly represented and longer narratives are almost fully absent from the calculations. And as it is shown by the data presented below narratives in the mid-19th century and in the second half of the 19th century differ rhythmically from lyrical poems.

Why the structure of narrative verse is markedly different from that of lyrics?

Let us compare the two examples – a narrative poem and a lyrical poem by K. Sluchevsky:

Lyrical verse

***

Нет, не от всех предубеждений
Я и поныне отрешён!
Но всё свободней сердца гений
От всех обвязок и пелён.

Бледнеет всякая условность,
Мельчает смысл в любой борьбе...
В душе великая готовность
Свободной быть самой в себе;

И в этой правде — не слащавость,
Не праздный звук красивых слов,
А вольной мысли величавость
Под лязгом всех земных оков...

Narrative verse

⟨...⟩

В усадьбе шум и суматоха;
Такого в ней переполоха
Не помнят. От начала дня III
Повсюду стук и беготня;
Уж сколько раз зашли поповна
И попаадья — взглянуть на дом:
Как будет сделан в нём приём?
Одна Мария хладнокровна,
По виду, правда, но своё
Исполнила. Она решила, III
Чтобы Царя в дому ея
Былое время окружило!

⟨...⟩

We see that sentences are less uniform in length and often have a more complex structure in non-stanzaic narrative verse (than in stanzaic lyrical verse); the boundaries of sentence often do not coincide with the boundaries of a line. In this case

	Ictus				
	I	**II**	**III**	**IV**	**Lines**
Narrative Sluchevsky	84.7	**88.2**	44.4	100	3712
Narrative 19th century	81.6	**84.3**	49.9	100	3450
Tarranovsky's data	82.1	**96.8**	34.6	100	

TAB. 1: Data by J. Bailey and K. Taranovsky (Bailey 1975) in comparison with new data for the 19th century

Forms of iambic tetrameter							
i	**ii**	**iii**	**iv**	**v**	**vi**	**vii**	**Lines**
126	35	41	136	–	29	4	371
43	16	22	86	–	25	–	192
52	10	25	88	–	16	3	194
141	62	70	247	–	64	20	604
153	63	89	277	–	70	22	674
193	72	151	251	–	80	17	764
236	51	70	242	–	43	9	651
944	309	468	1327	–	327	75	3450
27.4 %	9.0 %	13.6 %	38.5 %	–	9.5 %	2.2 %	

TAB. 2: Detailed data on iambic tetrameter of the 19th century: Maykov ("Dva mira", Part 1); Nekrasov ("Tishina"), "V. G. Belinsky"; Polonsky ("Svezhee predanye", Chapters 1 and 6); Karolina Pavlova ("Kadril'"); Maykov ("Dva mira", Part 2)

I	**II**	**III**	**IV**	**Lines**
81.6	84.3	49.9	100	3450
84.7	88.2	44.4	100	3712
84.7	**78.9**	55.6	100	72
78.7	88.5	42.2	100	192
86.6	**85.6**	44.9	100	194
80.1	**78.0**	54.4	100	764

TAB. 3: Stressed ictuses (%): narrative poems of the 19th century; Sluchevsky—narrative poems; Sluchevsky—"Nyanya"; Nekrasov—"Tishina"; Nekrasov—"V. G. Belinsky"; Karolina Pavlova—"Kadril'"

the third[1] form of iambic tetrameter (with stress omitted at the second ictus) appears much more often (Liapin 2016), which, of course, lowers the number of stresses at the second ictus.

1 Here is the list of rhythmical forms as they are normally viewed in the Russian tradition. The number of a rhythmical form is determined by 1) whether stress/stresses are omitted in a line, and how many are omitted; 2) at which ictuses they are omitted. Thus a fully stressed line is the first rhythmical form, a line with a stress omitted at the first ictus is the second form, a line with a stress omitted at the second ictus is a third form and so on:

∪ ´ ∪ ´ ∪ ´ ∪ ´ (∪)	i	∪ – ∪ – ∪ ´ ∪ ´ (∪)	v
∪ – ∪ ´ ∪ ´ ∪ ´ (∪)	ii	∪ – ∪ ´ ∪ – ∪ ´ (∪)	vi
∪ ´ ∪ – ∪ ´ ∪ ´ (∪)	iii	∪ ´ ∪ – ∪ – ∪ ´ (∪)	vii
∪ ´ ∪ ´ ∪ – ∪ ´ (∪)	iv		

So, we think that there is a correlation between the increasing frequency of sentence borders within a line (often followed by enjambements) and the increasing frequency of the third form and, accordingly, the lowering number of stresses at the second foot. It may also be accompanied by an increasing frequency of syntactic pauses within a verse line (often marked with punctuation marks).

Here is a typical example. We will compare two poems by N.A. Nekrasov written in iambic tetrameter in the 50s of the 19th century: “Unfortunates” and “V.G. Belinsky”. As S.A. Matyash (Matyash 2017) showed, these poems differ significantly in the use of enjambement: “Unfortunates”—8.5%, “V.G. Belinsky”—12.9%. The frequency of the third form is in direct proportion to the frequency of enjambement: “Unfortunates”—6.9%, “V.G. Belinsky”—12.9%. FIG. 1 gives the corresponding stress profile. If we leave out the lines which contain internal punctuation marks, then the stress profiles of both poems will almost coincide with each other (FIG. 2).

The same effect is observed in the speech model of Russian iambic tetrameter. By a speech model in the Russian tradition we mean segments of prosaic texts accidentally corresponding with iambic tetrameter. As the material we took I. Goncharov's prose (“Oblomov's Dream”). If we include in the statistics all the segments of the text which correspond with iambic tetrameter, we get the stress profile of a speech model of iambic tetrameter of the period given in FIG. 3.

Let's now compare stress profiles for models with and without punctuation marks within “lines” (FIG. 4). The resulting picture is close to real verse. Here are the first ten model lines (on the left—containing punctuation marks, on the right—without).

Где мы? В какой благословенный		благословенный уголок
там моря, нет высоких гор		Оно наводит только грусть
один и тот же стон, одни		так незаметно исчезает
как осужденные, уныло		и тяжело ему смотреть
там, кажется, напротив, ближе	III	и держат в страхе и тоске

3 Conclusion

The conclusion may be as follows. Investigating stress profiles only does not provide sufficient information for the description of the structure and evolution of verse rhythm. It is also important to use information on syntax, punctuation and, where possible, even phonetic characteristics (e.g. pauses) responsible for rhythmical differences between periods and between different types of verse (e.g. lyrics vs. narratives). Doubtlessly, in the future our analysis should be continued and improved by using more advanced linguistic and statistical methods.

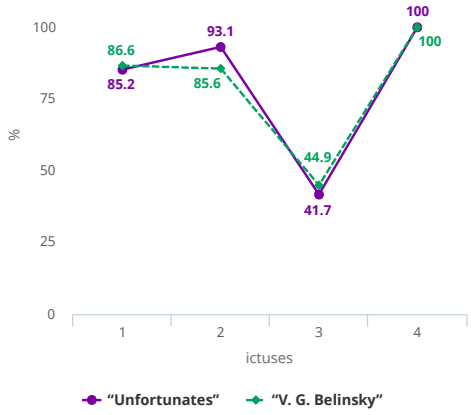


FIG. 1: Stress profile for all verse lines

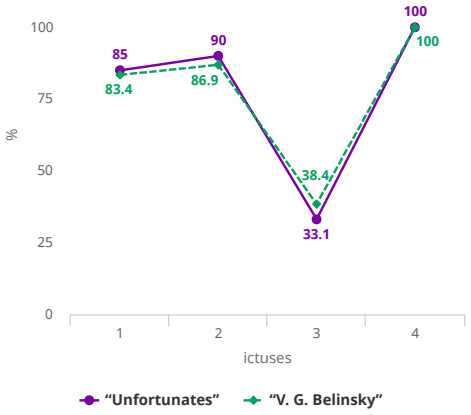


FIG. 2: Data of FIG.1 after exclusion of lines where punctuation marks are within a line

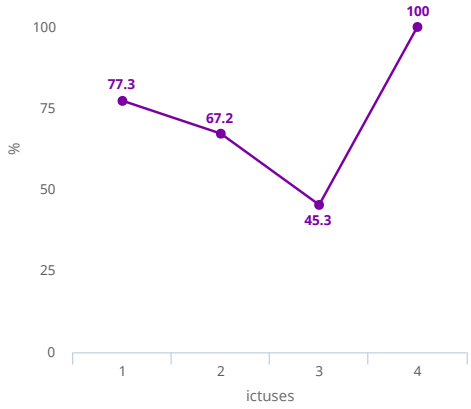


FIG. 3: A profile of a speech model of iambic tetrameter (rhythm of prosaic segments accidentally corresponding with iambic tetrameter)

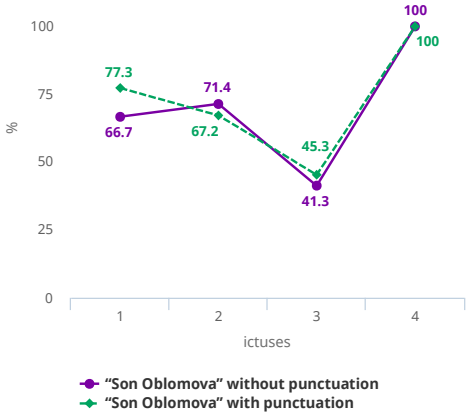


FIG. 4: Two types of a speech model – 1) all prosaic segments in Goncharov corresponding with iambic tetrameter and 2) only those segments which have got no punctuation marks within a segment

References

Bailey, J. (1975). The Metrical and rhythmical typology of K. K. Slučevskiy's poetry. *International journal of Slavic linguistics and poetics* 18, 93–117.

Červenka, M. (1973). Ritmicheskii impul's cheshskogo stikha [Rhythmic Impuls of Czech Verse]. *Slavic Poetics: Essays in honor of Kiril Taranovsky (*79–90). The Hague: Paris.

Gasparov, M. L. (2003). Perepiska K. F. Taranovskogo s V. E. Kholshevnikovym. Posleslovie [Correspondence of Taranovsky with Kholshevnikov. Afterword.]. *Acta linguistica petropolitana* 1(3), 374–378.

Kholshevnikov, V. E. (1973). Sluchainye chetyrekhstopnye yamby v russkoi proze [Accidental Iambic Tetrameters in Russian Prose]. *Slavic Poetics: Essays in honor of Kiril Taranovsky* (549–557). The Hague: Paris.

Liapin, S. (2016). The Russian iambic tetrameter: The problem of description (Prolegomena to a new paradigm). *Studia Metrica et Poetica* 3(2), 99–127.

Matyash, S. A. (2017). *Stikhotvornyi perenos (enjambement v russkoi poezii). Ocherki teorii i istorii* [Enjambement in Russian Poetry (essays about theory and history)]. Sankt-Peterburg: RGPU.

Taranovsky, K. (1953). *Ruski dvodelni ritmovi [Russian Binary Meters].* Beograd.

Taranovsky, K. (1971). O ritmicheskoi strukture russkikh dvuslozhnykh razmerov [Russian Structure of Russian Binary Meters]. *Poetika i Stilistika Russkoi Literatury.* Leningrad: Nauka, 420–429.

Lexical Diversity and Colour Hues in Russian Poetry: A Corpus-Based Study of Adjectives

Olga Lyashevskaya
National Research University Higher School of Economics; Vinogradov Institute of the Russian Language RAS (Moscow, Russia)
olesar@yandex.ru

Ekaterina Vlasova
National Research University Higher School of Economics (Moscow, Russia)
evlasova@hse.ru

Kristina Litvintseva
National Research University Higher School of Economics (Moscow, Russia)
tinalitvina@gmail.com

Abstract

This paper describes the distribution of colour adjectives in Russian poetry of the Silver Age and defines individual preferences with regard to poetic tradition, syllable structure, and metrical restrictions. The research method combines a lexico-semantic approach, formal literary analysis, and quantitative metrics obtained via the frequency database of the Russian Poetry Corpus (over 10 M words, incl. 1 M adjectives). The database allows the user to compare subcorpora and create graphs of timeline distribution, which demonstrate that the lexical diversity and relative frequencies of colour adjectives start to grow rapidly in the 1890s, as modernists employ colour adjectives to upgrade the poetic inventory. The adjectives referring to non-banal hues (e.g. fioletovyj 'violet', lazorevyj 'azur') belong to the middle part of the ranked wordlist. Correspondence analysis of the data reveals individual colour preferences and stylistic similarities among the most prominent poets of the Silver Age; for example, Anna Akhmatova and Alexander Blok are similar regarding their use of the white hues. The distribution of the selected colour hue adjectives across metrical types highlights the strong association of multi-syllabic adjectives with certain meters, although some words have a more complex distribution.

1 Introduction

Slavic quantitative corpus linguistics (Kopotev et al. 2018; Divjak et al. 2017) and formal studies of poetry in general (Dresher–Friedberg 2008) have elaborated a group of computational methods and tools applicable to Russian versification, which has always heavily relied on statistical data as the basis for generalizations regarding meter, rhyme, and other formal and linguistic features of poetic language (see Gasparov 2005; Taranovsky 2010; Jakobson 1973; Yarkho 2006, to name only a few; see also overviews in Kizhner et al. 2018).

As quantitative analysis requires processing a large collection of texts, linguists responded to this challenge by creating the Poetry Corpus as a part of the Russian National Corpus. The Russian Poetry Corpus is a digital open-access resource provided with the standard morphological and lexico-semantic tagging and a number of specific tags particularly suited for poetic language. For example, the search options offer possibilities to collect texts written in various poetic meters, genres, certain patterns of rhyme, verse forms, and even graphical shapes. For more information about the preparation of the text collection included in the Poetry Corpus and the principles of its annotation see (Grishina et al. 2009).

The Russian Poetry Corpus has proven to be an effective source for rapid extraction of the raw and normalized frequencies required for the stylistic and diachronic research of poetic language. As a digital resource it provides additional large-scale data for verification and support of traditional close-reading methods. Comprising more than ten million tokens with multilevel annotation, the Russian Poetry Corpus is already a large representative resource for quantitative studies, including digital literary studies and computational stylistics (Jacobs 2018). However, for revealing more sophisticated patterns within the data, the text collection requires additional annotation of poetic and linguistic features, as well as tagging of relevant historical background information essential for observation of cultural trends.

This article describes a new resource assembled from the data and annotation of the Russian Poetry Corpus, henceforth called a frequency database of the corpus. The new tool has been designed by an interdisciplinary research group from the Higher School of Economics (Moscow). This project aims to design a database with enhanced and elaborated annotation and create an open-access web application with statistical tools for data summarising, filtering, and pattern structuring; for more details see (Lyashevskaya et al. 2018).

This paper contains explanatory case studies of lexical diversity in the Russian poetic tradition with regard to the evolution of poetic vocabulary, as well as word syllable structure and metrical restrictions. Case 1 is a comparative study supported by a correspondence analysis with a focus on individual similarities and distinctions between the most prominent poets of the Silver Age. Case 2 examines correlations between the syllable structure of colour hue adjectives and types of meter. The combination of prosodic and lexical analysis reveals that poets' lexical choices were not random, but needed to fit the accentual-syllabic scheme of a verse line. Therefore, multi-syllabic adjectives, such as *izumrudnyi*, demonstrate a strong association with certain types of trisyllables and disyllables, producing the effect of a 'colour halo'.

2 The colour hue adjectives in Silver Age Poetry

The following example illustrates how the frequency database can be used for the analysis of lexical diversity and a poet's word choices. During the Silver Age a number of poetic groups established a new principle of aesthetics and art syncretism, trying to combine painting and poetry. By exploring colour hue adjectives, this case study aims to reveal how the aesthetic rationale influenced the poetic lexicon. This is done by applying several methods. The first method involves a small-scale diachronic analysis of word frequencies during the 19th-20th centuries. At the next stage, we apply a method of correspondence analysis (CA) to define frequency-based associations between colour hue adjectives and certain poets. The CA method also involves clustering poets based on the links between words and authors.

At the preparatory stage, we extracted a frequency list of the colour adjectives, using the lexico-semantic annotation of the frequency database. Then we compiled a list of adjectives for colour hues by filtering out the most frequent lexemes (such as красный 'red', синий 'blue') and hapax legomena (such as алмазно-рубиновый 'diamond ruby'). The middle part of the frequency list consists of the following lexemes referring to non-banal hues and subject to further analysis: фиолетовый 'violet', лиловый 'lilac', лазурный 'azure', багряный 'blood-red', пурпурный 'tyrian purple', белоснежный 'snow-white', изумрудный 'emerald', лазоревый 'azure', бирюзовый 'turquoise', златой 'golden-yellow', сумрачный 'murky'.

These lexemes occur more than 100 times each and, apart from the most frequent colour hue adjectives (белый 'white', черный 'black', темный 'dark', светлый 'light', красный 'red'), do not constitute idiomatic collocations (красная армия 'the red army', белое вино 'white wine'). The most frequent lexemes are usually distributed equally over texts regardless of individual and genre variation. The less frequent words have the potential to become a stylistic feature of a personal style as well as of an epoch.

The micro-diachronic research comprises the period from 1801 to 1970, including several decades before and after the Silver Age. The graph shows that the frequency of the adjective фиолетовый 'violet' starts to increase rapidly from the 1880s to the 1920s. During this time, its frequency increases from ~3 ipm to ~21 ipm and then remains at this rate. The first poet who brought the adjective фиолетовый 'violet' into poetry was Vasily Zhukovsky. However, the frequency of this lexeme reached its peak only in the Silver Age. Apart from Zhukovsky, фиолетовый 'violet' occurred in poetry only three times. In 1895, Valery Bryusov used the collocation фиолетовые руки 'violet hands'; later on, the adjective фиолетовый 'violet' occurs in poems of Maksimilian Voloshin, Andrei Bely, Vyacheslav Ivanov, Ivan Bunin, Aleksandr Blok and many others. This small-scale diachronic frequency analysis has demonstrated that фиолетовый 'violet' is a specific stylistic feature of the Silver Age.

Alongside the interest in the violet colour, poets employ adjectives denoting its hues. For example, the adjective лиловый 'lilac' has a similar diachronic graph as фиолетовый 'violet' (FIG. 1).

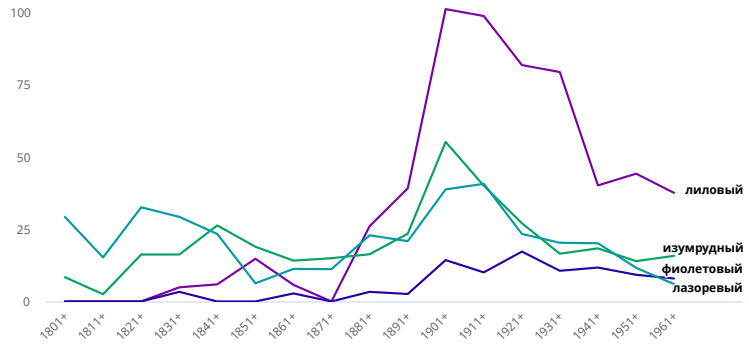


FIG. 1: Occurrences of the adjectives лиловый 'lilac', фиолетовый 'violet', изумрудный 'emerald', лазоревый 'azure' by decade, in ipm

As the Russian Poetry Corpus shows, the frequency of fluctuates at the rate from ~1 ipm to ~10 ipm. Over the 50 years from the 1870s to the 1920s, its frequency increases to ~120 ipm, stays at this rate for about 10 years, and then starts gradually declining in the 20th century.

How does this fashion for certain words emerge and do certain poets play a role in this process? Why does the frequency of some colour hue adjectives increase and decrease rapidly? The toolkit of the frequency database allows one not only to extract generalized frequency data across decades, but also to explore frequency distributions within the corpora of certain poets. For example, the search results show that лиловый 'lilac' is regularly attested in the poems of Ivan Bunin, Vyacheslav Ivanov, Mirra Lokhvitskaya, Boris Pasternak, and Igor Severyanin. These poets contribute most to the high frequencies of лиловый 'lilac' in the Silver Age.

Two other two highly frequent colour hue adjectives of the Silver Age are лазоревый 'azure' and изумрудный 'emerald'. The frequency of лазоревый 'azure' during the period of 1890-1930 does not decrease below 34 ipm, and the average frequency of this adjective is two times higher than after the Silver Age. The adjective изумрудный 'emerald' has a similar diachronic distribution. Its lowest frequency within this period is about 50 ipm, and this is twice as much as the Silver Age. At the next stage, we visualized distributional data drawn from the database using the CA method (Levshina 2015; Kassambara 2017) as applied to the use of the colour adjectives in focus by individual authors.

For a case study, we took nine subcorpora written by Valery Bryusov, Alexander Blok, Konstantin Bal'mont, Igor Severyanin, Nikolay Gumilev, Anna Akhmatova, Marina Tsvetaeva, Osip Mandel'shtam, and Boris Pasternak. Texts were chosen without regard to their date of composition. For its source data, CA takes a contingency table that shows how the linguistic units (9 adjectives of colour hues, in our case) are distributed across the subcorpora (nine authors, in our case). The distribution of each adjective across the subcorpora we call a colour profile, and the distribution of the uses of the adjectives by each author we call an author profile. First, we calculated an

average profile for both adjectives and authors. Second, we computed the distance between each pair of colour profiles and from each colour profile to the average colour profile. The distances for the author profiles are calculated the same way. In addition, a matrix of distances is plotted onto the 2D space using the method of multidimensional reduction. The closer the data points are on the horizontal or the vertical axes, the closer are their profiles. The closer they are to the origin (0,0), the closer their profiles to the average profile.

FIG. 2 illustrates the similarity among the adjectives of colour as measured by their frequency distributions in subcorpora. The profiles of белоснежный 'snow-white', лазурный 'azure', златой 'golden-yellow', изумрудный 'emerald', and самоцветный 'semiprecious' can be regarded as opposed to the profiles of пурпурный 'tyrian purple', бирюзовый 'turquoise', фиолетовый 'violet', багряный 'blood-red', сумрачный 'murky', лазоревый 'azure', and лиловый 'lilac' (top vs. bottom part of the plot); while the profiles of багряный 'blood-red', сумрачный 'murky' and the profiles of бирюзовый 'turquoise', фиолетовый 'violet' are two poles on the horizontal axis (left vs. the right part of the plot). Furthermore, the profiles of изумрудный 'emerald' and самоцветный 'semiprecious' are much closer to the origin than the profile of белоснежный 'snow-white'. This can be interpreted to mean that изумрудный 'emerald' and самоцветный 'semiprecious' are used roughly equally by the different authors, whereas белоснежный 'snow-white' is used considerably more frequently in one or several subcorpora than in others. The axis labels provide information as to the extent to which the variance in the frequency profiles is explained by the 2D visualization—in other words, how much information was lost when the multidimensional space was reduced to two dimensions (100% – 44.9% – 25.3% = 29.8%).

The authors' profiles can be plotted the same way. FIG. 3 shows a global pattern within the data (symmetric biplot), the colours' profiles (blue points) and the authors' profiles (red triangles) being plotted simultaneously.

The plots on FIG. 2 and 3 were formed using the subcorpora of nine authors (all except Pasternak). The reason is that his profile differs greatly from that of all other poets, so a user would see a dense cloud of points in the center and an outlier. The technique of supplementary points allows one to plot the outlier's point over the plot created for the rest of the data. In other words, the colour profiles of Pasternak and Severyanin are not particularly similar, but they are more similar than the profiles of Pasternak and Bryusov, or Pasternak and Tsvetaeva.

As expected, the graph shows that both Boris Pasternak and Igor Severyanin use the adjective лазоревый 'azure' and лиловый 'lilac' frequently. The visualization illustrates as well that the lexemes бирюзовый 'turquoise' and фиолетовый 'violet' also belong to their poetic lexicon. Despite the low average frequency of colour adjectives in the poetry of Nikolay Gumilev and Valery Bryusov, the graph demonstrates that their poems have similar lexical features, such as the colour terms of багряный 'blood-red', пурпурный 'tyrian purple', and сумрачный 'murky'. Anna Akhmatova stands out from the other poets, in that her poetry is imbued with colour adjectives. She also used the highest frequency words, such as белоснежный 'snow-white',

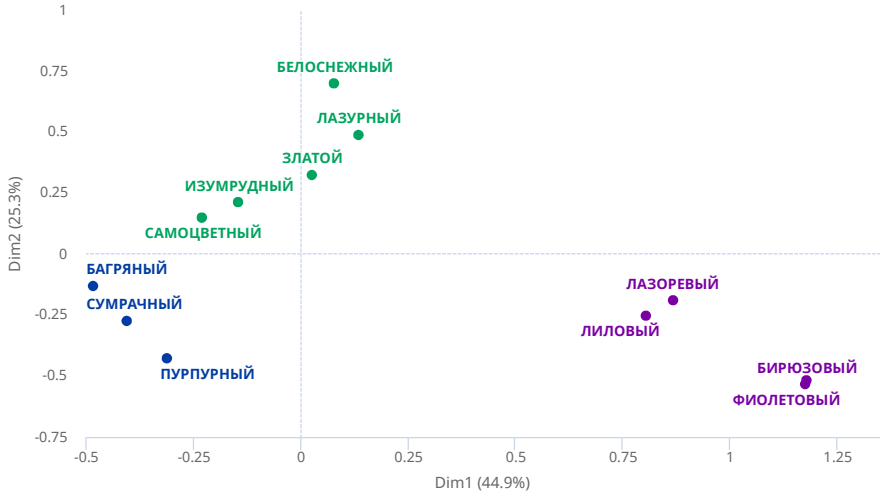


FIG. 2: Correspondence analysis plot: adjectives of colour (distances are defined by the authors' use profiles)

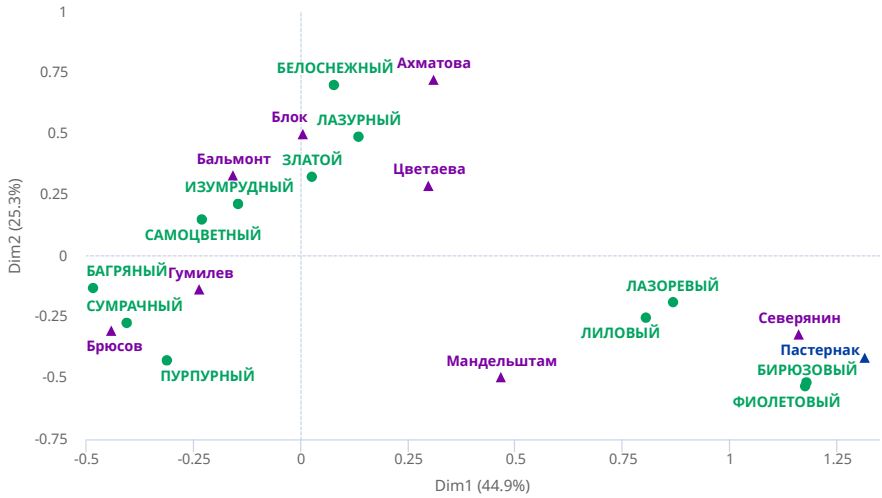


FIG. 3: Correspondence analysis plot: authors and adjectives of colour.
A supplementary point: Pasternak

лазурный 'azure' (the noun лазурь 'azure', denoting a gem, has two adjective derivative in Russian: лазурный 'azure' and later лазоревый 'azure').

The latter adjective, лазурный 'azure', alongside with златой 'golden', are a distinct feature of Aleksandr Blok and Konstantin Balmont. Meanwhile, the lexemes златой 'golden' and изумрудный 'emerald' belong to the poetic lexicon of Marina Tsvetaeva. The adjective самоцветный 'semiprecious' is included on the scale, so that it can be

attributed to the lexicon of Aleksandr Blok and Konstantin Balmont. However, this adjective is not a prominent feature of their poems.

The CA method shows that certain poets prefer different colours and hues. In some cases, their preferences are very explicit (see лиловый 'lilac' in Pasternak's poetry). Meanwhile, some poets turn out to be neutral with respect to the use of the given set of colour adjectives (as is the case with Nikolay Gumilev). It is notable that poets from the same poetic group do not necessarily favour the same colour hues. For example, although their aesthetic framework is the same, the acmeists Anna Akhmatova, Nikolay Gumilev, and Osip Mandel'shtam are rather distant from each other on the graph. Conversely, the subcorpora of authors belonging to different poetic groups can reveal a similar distribution of colour adjectives. This data supports the conclusion that, despite the internal influences within poetic groups, poets' colour preferences can be very different. However, this analysis only involves lexemes with considerable moderate frequencies. As a result, the statistical validity of our observation needs to be proven with additional tests.

3 The hue adjectives across meters

The following case study explores the associations between colour hue adjectives and the meters of texts. In Russian, most adjectives referring to non-banal colour hues are suffixed derivatives from words denoting material, such as gems: compare the noun изумруд 'emerald' (three syllables) and the adjective изумрудный 'emerald' (four syllables). For poetic texts, the syllabic length of a word is significant, as words are compelled to fit the metrical scheme of a verse line. Our analysis is focused on the multi-syllablic colour hue adjectives that we examined before. We excluded златой as the only 2/3-syllable word, and сумрачный 'murky', because its semantics is more vague than that of other colour hue words.

TAB. 1 reports the occurrences of the selected colour hue adjectives in texts containing the nine most frequent metrical types attested in our data: three-foot anapaests (An3), three- and four-foot amphibrachs (Aph3, Aph4), four- and five-foot trochees (Tr4, Tr5), three- to six-foot iambs (Ia3, Ia4, Ia5, Ia6).

TAB. 2 presents the same data via chi-grams, a metric of association which is calculated as the observed minus the expected occurrences divided by the square root of the expected occurrences. This metric underlies the use of the chi-squared statistic, which is basically the sum of the squares of the chi-grams. The values deviating the most from what is expected are highlighted. The table shows a strong association between multi-syllabic adjectives and certain metrical types. Adjectives that contain two syllables preceding the stressed one are, as expected, associated with anapaests and trochees. Adjectives with one syllable before the stress are associated with amphibrachs and neutral in regard to iambs. While this is the general tendency, a number of individual patterns can be observed. First, лазоревый 'azure' does not demonstrate any strong metrical associations. Second, the distribution of изумрудный 'emerald' is opposite that of the other words with the same syllable-stress structure.

Metric type	An3	Aph3	Aph4	Tr4	Tr5	Ia3	Ia4	Ia5	Ia6	Total
белосне́жный ‘snow-white’	23	6	3	46	9	7	40	33	4	171
бирюзо́вый ‘turquoise’	7	5	2	15	3	1	23	10		66
изумру́дный ‘emerald’	15	6	8	29	11	6	46	25	11	157
фиоле́товый ‘violet’	6	1	1	13	5	1	14	7	5	53
лазо́ревый ‘azure’	8	2	3	35	13	10	63	25	26	185
лазу́рный ‘azure’	27	24	26	60	15	14	155	88	76	485
лило́вый ‘lilac’	16	21	18	28	13	23	94	74	28	315
пурпу́рный ‘tyrian purple’	10	8	3	19	9	2	78	48	38	215
багря́ный ‘blood-red’	10	15	8	36	8	5	91	52	30	255
Total	122	88	72	281	86	69	604	362	218	1902

TAB. 1: Distribution of the color hue adjectives across metrical types

	An3 --!--!--!	Aph3 -!--!--!-	Aph4 -!--!--!--!-	Tr4 !-!-!-!-	Tr5 !-!-!-!-!-	Ia3 -!-!-!	Ia4 -!-!-!-!	Ia5 -!-!-!-!-!	Ia6 -!-!-!-!-!
белосне́жный ‘snow-white’	5,4	0,1	− 1,0	4,6	0,5	− 0,1	− 2,7	0,6	− 3,9
бирюзо́вый ‘turquoise’	2,3	1,8	− 0,1	1,9	0,0	− 1,1	− 0,1	− 0,4	− 2,9
изумру́дный ‘emerald’	− 4,7	− 3,1	− 1,6	0,1	− 2,5	2,9	4,9	− 4,4	1,8
фиоле́товый ‘violet’	2,9	0,3	1,4	1,5	1,5	− 0,3	− 1,4	− 0,4	− 2,1
лазо́ревый ‘azure’	− 0,2	− 1,7	− 1,2	1,8	1,6	0,7	− 0,4	− 1,2	0,3
лазу́рный ‘azure’	1,0	1,8	2,8	− 0,9	− 1,4	− 1,5	− 1,4	0,5	1,5
лило́вый ‘lilac’	0,4	3,1	2,6	− 2,4	− 0,3	2,6	− 1,8	2,7	− 2,1
пурпу́рный ‘tyrian purple’	0,1	0,2	− 1,4	− 2,0	− 0,2	− 2,4	0,1	1,8	1,8
багря́ный ‘blood-red’	− 1,7	− 1,7	− 1,2	− 2,1	2,7	− 0,6	− 0,1	1,6	1,7

TAB. 2: The chi-gram association of the colour hue adjectives and metrical types

One might wonder if the distribution of the colour hue words is fully powered by the syllable-stress profile of the word. TAB. 3 shows three stress patterns which occur in the Nominative singular masculine and the analogous forms (NomSgMasc-like, cf. бе-ло-сне!жны-й, бе-ло-сне!жны-х), the Genitive singular masculine and the analogous forms (GenSgMasc-like, cf. бе-ло-сне!жно-го-, бе-ло-сне!жны-ми-), and the short masculine form (ShortMasc, cf. бе-ло-сне!же-н). The stress patterns are coded according to standard (prosaic) Russian. There are two major groups of adjectives: those that have two unstressed syllables before the stressed syllable, and those that have one unstressed syllable before the stressed one. If we exclude from consideration the short masculine form, which occurs very rarely in our data, we can see that each major group has two subtypes, фиолетовый and лазоревый being one syllable longer than the other words in their groups.

TAB. 4 illustrates the association between stress patterns and metrical types calculated with regard to a sample of all stressed words (from texts created in the period 1900-1917). As one can see, adjectives that have two syllables before or after the stressed one in NomSgMasc are distributed similarly across metrical types, in contrast to the adjectives with the syllable-stress profile “– ! –”. This can explain the differences in the behaviour of лазоревый and лазурный, two adjectives that refer to the same colour hue (‘azure’) but have different suffixes and thus different syllable-

	NomSgMasc-like	GenSgMasc-like	ShortMasc
белосне́жный ‘snow-white’	– – ! –	– – ! – –	– – ! –
бирюзо́вый ‘turquoise’	– – ! –	– – ! – –	– – !
изумру́дный ‘emerald’	– – ! –	– – ! – –	– – ! –
фиоле́товый ‘violet’	– – ! – –	– – ! – – –	– – ! –
лазо́ревый ‘azure’	– ! – –	– ! – – –	– ! –
лазу́рный ‘azure’	– ! –	– ! – –	– ! –
лило́вый ‘lilac’	– ! –	– ! – –	– !
пурпу́рный ‘tyrian purple’	– ! –	– ! – –	– ! –
багря́ный ‘blood-red’	– ! –	– ! – –	– !

TAB. 3: The syllable-stress profiles of the color hue adjectives

	An3	Aph3	Aph4	Tr4	Tr5	Ia3	Ia4	Ia5	Ia6	Total
	--!--!--!	-!--!--!-	-!--!--!--!-	!-!-!-!-	!-!-!-!-!-	-!-!-!	-!-!-!-!	-!-!-!-!-!	-!-!-!-!-!	
- - ! -	45,00	45,30	37,63	31,94	22,11	−11,14	−38,96	−27,77	−19,05	3911
- - ! - -	28,15	20,44	11,85	24,57	13,15	−5,99	−20,99	−14,98	−10,25	1132
- ! - -	45,11	25,68	19,30	31,62	6,14	18,35	−29,01	−31,44	−15,76	5728
- ! -	−27,09	−20,63	−15,90	−19,69	−8,64	−1,85	20,15	17,44	10,30	70196
Total	9301	5762	4139	3506	634	2568	31500	16048	7511	80969

TAB. 4: The chi-gram association of four multi-syllabic stress patterns and metric types

stress profiles. Due to the intermediate status of лазоревый (more than three syllables in NomSgMasc, but similarity to the scheme “– ! –”), this adjective does not demonstrate any strong associations, see TAB. 2.

Although the general tendency mentioned above explains a lot about the distribution of adjectives across metrical types, one can see that adjectives with the same syllable-stress profile actually demonstrate more diverse behaviours. The prominent exception is изумрудный ‘emerald’, which we discussed above. Other explanatory factors can be suggested, especially the position of the word in the line and the phonetic characteristics of the first syllable. In sum, further qualitative analysis of particular contexts has to be carried out to study the underlying characteristics of the word use.

4 Conclusion

This paper presented two explanatory case studies on colour hue adjectives with a focus on quantitative metrics extracted via a new frequency database comprising more than 13 million tokens with several layers of linguistic, versological, and meta-textual annotation.

The study aimed to explain chronological changes, as well as similarities and differences in poetic vocabulary, with respect to quantitative metrics, semantics, syllabic structure and accentual patterns of a word.

We explored the use of colour adjectives in the Silver Age, applying the method of Correspondence Analysis, which offers visualization of multidimensional frequency

associations of lexemes and authors. This method supports contrastive stylistic analysis and identifies similarities between different poets. In this case, we defined subcorpora of authors traditionally seen as key figures of the Silver Age such as Aleksandr Blok, Konstantin Balmont, Anna Akhmatova, Nikolay Gumilev, and Marina Tsvetaeva. This study has revealed the stylistic differences in individual poetic lexicons and demonstrated that despite the internal influences within poetic schools, poets' colour preferences can be very different. Thus, by employing the annotation of the Russian Poetry corpus, one can include analysis of semantic layers in diachronic and comparative research.

We analysed the syllabic structure of the most prominent colour hue adjectives of the Silver Age and classified them into four groups according to their stress-syllable type and the number of unstressed syllables before and after the stressed syllable. The distribution of the selected colour hue adjectives across metrical types highlights strong associations of multi-syllabic adjectives with certain meters, although some words have a more complex distribution.

Acknowledgment

The research was prepared within the framework of the Academic Fund Program at the National Research University Higher School of Economics (HSE) in 2018 (grant #18-05-0047) and by the Russian Academic Excellence Project "5-100".

References

Divjak, D. – Sharoff, S. – Erjavec, T. (2017). Slavic Corpus and Computational Linguistics. *Journal of Slavic Linguistics* 25(2).

Dresher, B. – Friedberg, N. (2008). *Formal Approaches to Poetry. Recent Developments in Metrics.* Berlin, Boston: De Gruyter Mouton.

Gasparov, M. (2005). *Sovremennyj russkij stikh: metrika i ritmika* [Contemporary Russian Verse: Metrics and Rhythmics]. Moscow: Nauka.

Grishina, E. – Korchagin, K. – Plungian, V. – Sichinava, D. (2009). Poeticheskij korpus v ramkakh Natsional'nogo korpusa russkogo yazyka: obshchaya struktura i perspektivy ispol'zovaniya [The corpus of poetry within the Russian National Corpus: a general outline and perspectives of use]. In *Natsional'nyj korpus russkogo yazyka: 2006–2008. Novye rezul'taty i perspektivy* [The Russian National Corpus: 2006–2008. New results and prospects]. St. Petersburg: Nestor-Istoriya Publ.

Jacobs, A. M. (2018). The Gutenberg English Poetry Corpus: Exemplary Quantitative Narrative Analyses. *Frontiers in Digital Humanities* (5). Retrieved from https://www.frontiersin.org/articles/10.3389/fdigh.2018.00005/full

Jakobson, R. (1973). *Questions de poétique*. Paris: Seuil.

Kassambara, A. (2017). *Practical Guide to Cluster Analysis in R: Unsupervised Machine Learning*. STHDA.

Kizhner, I. – Terras, M. – Manovich, L. – Orekhov, B. – Bonch-Osmolovskaya, A. – Rumyantsev, M. (2018). The history and context of the Digital Humanities in Russia. In *Proceedings of DH 2018*, Mexico City, June 26–29, 2018, 416–419.

Kopotev, M. – Lyashevskaya, O. – Mustajoki, A. (2018). *Quantitative Approaches to the Russian Language*. Routledge.

Levshina, N. (2015). *How to do Linguistics with R: Data exploration and statistical analysis*. Amsterdam: John Benjamins.

Lyashevskaya, O. – Vlasova, E. – Litvintseva, K. – Sechina, E. (2018). Data Analysis Tool for the Corpus of Russian Poetry / *NRU HSE*. *Series WP BRP "Linguistics"*. No. 77. Retrieved from https://wp.hse.ru/data/2018/12/29/1143017363/77LNG2018.pdf

Russian National Corpus. Available at http://ruscorpora.ru/en/index.html

Taranovsky, K. F. (2010). *Russkie dvuslozhnye razmery. Stati o stixe.* [Russian binary meters. Articles about verse]. Bailey, J. (Ed.). Moscow: Yazyki slav. kultur.

Yarkho, B. I. (2006). *Metodologiya tochnogo literaturovedeniya: Izbrannye trudy po teorii literatury* [Methodology of literary studies: Selected works in the theory of literature]. Shapir, M.I. (Ed.). Moscow: Yazyki slav. kultur.

Rhythmical-Syntactic Formulas among Enjambements in Russian Narrative Poems

Svetlana Matyash
Orenburg State University
klklsb@yandex.ru

Abstract

The term “rhythmical-syntactic formulas”, introduced by M.L. Gasparov, refers to different lines by one or more authors where rhythmical structure, syntactic structure and one or more words fully coincide. We believe that this term is useful for describing certain types of enjambement. This article deals with enjambement formulas that contain identical final words of a line (in some cases with the addition of a preceding link word or a preceding notional word not connected with it syntactically). The enjambement formula in this case contains an important feature: its very quality of enjambement, when a syntactic complex runs on from one line into another, crossing the end of a line.

The repertoire of formulas, their frequency and their structure are described against the background of data on all enjambements of a particular period, author or poem.

The material studied is iambic tetrameter narrative verse of the 19th–20th centuries—from V. Zhukovsky to A. Tvardovsky. The texts are divided into six groups (a total of 48 long poems, containing 43,584 lines).

The frequency of enjambement formulas has been calculated as a percentage of all enjambements. Their structure was analyzed using our methods for examining enjambement: 1) by the type of enjambement (contre-rejet, double-rejet); 2) by the type of ending in the initial line; 3) by the type of word boundary after the formula in the subsequent line; 4) by how many words there are between the syntactically connected words of the initial and subsequent lines; 5) by the type of syntactic tie crossing the end of a line (and the frequency of such syntactic ties for a poem, author or period); 6) by whether and how the initial line participates in a rhyme. The analysis of syntactic ties is based on the hierarchy of syntactic ties developed by M.L. Gasparov and T.V. Skulacheva.

1 Introduction

The term “rhythmic-syntactic formulas” in the title of the paper has been suggested by M.L. Gasparov (Gasparov 2012). He worked out a classification of constructions with similar rhythm and syntax (rhythmical-syntactic clichés) repeated in texts by the same or different authors. Among such constructions Gasparov singled out a special group of “rhythmical-syntactic formulas”—that is, constructions where similar rhythm and syntax is accompanied by one or more completely identical words (Gasparov 2012: 274, 294). We found that this notion can also be useful when describing some types of enjambement (enjambement with similar rhythm, syntax and lexical coincidences), and we have used it for analyzing a relatively large number of enjambements.

Vsem zheniham otkaz – i vot Za ney sam Getman svatov *shlet*	Pushkin “Poltava”
Tak mnit uzh devitsa, i vot S odra tihihon’ko *vstaet*	Baratynsky “Eda”
Letim, Moskva letit – i vot K znakomym devkam *priskakali*	Polezhaev “Sashka”
Ya vyshel iz lesu. I vot *Prosnulsya* den’, i horovod Svetil naputstvennyh ischez…	Lermontov “Mtsyri”
<…> i vot – (Son ili yav’): chudesnyy *flot* <…>	Blok “Vozmezdie”
Dver’ otvorilas’; pered nim *Yavilsya* voin neizvestnyy,	Pushkin “Ruslan i Lyudmila”
Ochnulsya russkiy. Pered nim, S privetom nezhnym i nemym *Stoit* cherkeshenka mladaya.	Pushkin “Kavkazskiy plennik”
<…> i pered nim Uchastiem ispolnennyy zhivym, *Stoyal* cherkes, soratnika lishennyy;	Lermontov “Ismail-Bey”
On vhodit, smotrit – pered nim Poslannik raya, heruvim, Hranitel’ greshnitsy prekrasnoy, *Stoit* s blistayuschim chelom <…>	Lermontov “Demon”
Polyubite vy snova: no… *Uchites’ vlastvovat’* soboyu	Pushkin “Evgeniy Onegin”
Sidit i sam ispravnik – no *Ob nem uzh ya skazal* davno…	Lermontov “Tambovskaya kaznacheysha”
Ee, sebya terzal ya… no – *Mne bylo stydno* i smeshno	Turgenev “Razgovor”

Kurilsya rosnyy ladan... No –
On klal drugoy *rukoy* kostlyavoy
Zhivye dushi pod sukno. Blok “Vozmezdie”

As one can observe in the above examples, we consider the precise repetition of the final word of a line (sometimes with the addition of a preceding link word or notion word not connected with the final word syntactically) as the most important parameter. Rhythmical-syntactic similarity is provided by the very fact of enjambement in a similar meter and the fact that there is a syntactic tie reaching from the initial line into the subsequent one. The enjambements of the type shown above can be called “enjambement formulas”. Further we will label such enjambements by one or two characteristic words (“i vot”, “pered nim”, “no” and so on). A word immediately before enjambement is underlined; a word in the next line, with which it is syntactically connected, is printed in italics.

2 Enjambement formulas

In this article data on enjambement formulas are compared with the data on all enjambements (of a particular poem, author or period). The main issues in the use of enjambement formulas are as follows:

(1) What is the repertoire of enjambement formulas and does it change chronologically?

(2) How does the frequency of enjambement in general influence the frequency of enjambement formulas?

(3) Does the structure of enjambement formulas change, and if so, do the tendencies of this change coincide with the changes in enjambement in general?

(4) Does the number of formulas correlate with the general aesthetic quality of a poem as it has been generally regarded in the history of literature?

(5) By which structural devices can enjambement formulas be modified?

(6) What are the reasons for the use of enjambement formulas?

To answer these questions we found it most sensible to analyze enjambement formulas using the same corpus that we previously employed to study enjambement in general (Matyash 2017: 35–65, 95–119), with the addition of four other poems. These works are narrative (longer) poems from the 19th–20th centuries written in iambic tetrameter. Six groups of texts were studied: 1) Shil’onskiy uznik” (1821–1822) by V. Zhukovsky; 2) the novel in verse “Evgenyi Onegin” and 11 longer poems by Pushkin: “Ruslan i Lyudmila” (1817–1820); “Kavkazskiy plennik” (1820–1821), “Brat’ya-razboyniki” (1821–1822), “Vadim” (1821–1822); “Bakhchisarayskiy fontan” (1821–1823), “Tsygany” (1824), “Graf Nulin” (1825), “Poltava” (1828–1829), “Tazit” (1829–1830); “Ezerskiy” (1832), and “Mednyi vsadnik” (1833); 3) 9 narrative poems from Pushkin’s era: “Voynarovskiy” (1824–1825) by K. Ryleev; “Chernets” (1824–1825) by I. Kozlov; “Eda” (1824–1825), “Bal” (1825–1828) and “Tsyganka” (1829–1831, 1842) by

E. Baratynsky; “Sashka” (1825–1826), “Erpeli” (1830) and “Chir-Yurt” (1832) by A. Polezhaev; “Nishchiy” (1830) by A. Podolinsky; 4) 15 longer poems by M. Lermontov: “Cherkesy” (1828), “Kavkazskiy plennik” (1828), “Korsar” (1828), “Prestupnik” (1829), “Posledniy syn vol’nosti” (1830–1831), “Kally” (1830–1831), “Angel smerti” (1831), “Ispoved’” (1831), “Izmail-Bey” (1832), “Moryak” (1832), “Hadzhi Abrek” (1833), “Boyarin Orsha” (1835–1836), “Tambovskaya kaznacheysha” (1834–1838), “Mtsyri” (1839) and “Demon” (1829–1841); 5) 9 poems from the middle of the 19th century: “Olimpiy Radin” (1845), “Vstrecha” (1846) and “Predsmertnaya ispoved’” (1846) by Ap. Grigoryev; “Razgovor” (1844–1845) and “Pomeshchik” (1845) by I. Turgenev; “Zimniy put’” (1854-1855) and “Matvey Radaev” (1856-1858) by N. Ogarev; “V.G. Belinsky” and “Neschastnye” (1856–1858) by N. Nekrasov; 6) two poems from the 20th century: “Vozmezdie” (1910–1911) by A. Blok and “Za dal’yu – dal’” (1950–1960) by A. Tvardovsky. Thus, 48 narrative (longer) poems (containing 43,584 lines) have been analyzed.

To clarify certain points in our study (the genesis of formulas, the role of rhyme in the occurrence of enjambement formulas, etc.) older texts belonging to well-developed genres of Russian poetry were also investigated: fables from the 18th—first half of the 19th century, Zhukovsky’s ballads from the first two periods (1808–1822), as well as the narrative poem “Domik v Kolomne” and the play “Boris Godunov” by Pushkin.

Calculations take into account an author’s self-repetitions in the same poem (when repeated two or more times) and in other poems (by the same author or another) if they are written at the same time or earlier than the poem being studied. Repetitions of names in enjambement (Evgeniy in Pushkin, Zoraim in Lermontov’s “Angel smerti”) were not included in the calculations.

Let’s start by concisely describing the repertoire and frequency of enjambement formulas in the six groups of texts. We will: 1) calculate the number of formulas; 2) show those that occur not less than thrice from the most frequent to the less frequent ones; 3) show the percentage of enjambement formulas among all enjambements in a particular group.

In the first group—“Shil’onsky uznik” by Zhukovsky—there are no enjambement formulas. There is only one enjambement, *i one*…, which will be later intensively used by other poets. Enjambement formulas in Russian longer narrative poems start with the second group (Pushkin’s), beginning with “Ruslan i Lyudmila” and then appearing frequently in all 11 poems and “Evgeniy Onegin”. In Pushkin’s iambic tetrameter longer poems there are 22 formulas. Those occurring frequently are *ona, on, vot, nakonets, vdrug, poroy, ty, tam*. It is possible that some of the formulas were suggested to Pushkin by the texts of fables (*ona, potom, nakonets*) and by Zhukovsky’s ballads (*potom, nakonets, vdrug*). Among Zhukovsky’s enjambements there is a very noticeable enjambement from “Zamok Smal’gol’m” (“I syuda s vysoty ne soshel by… no ty / *Zaklinala* Ivanovym dnem…”), which was repeated by Pushkin in “Evgeniy Onegin”: “Zabudet mir menya; no ty / *Pridesh’* li, deva krasoty…”). The enjambement formula with *no* is not found in Russian poetry before Pushkin.

The frequency of enjambement formulas in Pushkin's poems is 10.1% in narrative poems and 9.2% in "Onegin". Comparative data for "Domik v Kolomne" and "Boris Godunov" show that in the rhymed iambic pentameter of "Domik v Kolomne" results are close to those mentioned above, while in the blank iambic pentameter verse of "Boris Godunov" the percentage is half as high. This shows the role of rhyme in generating enjambement formulas, though the presence of the same formulas in blank verse (*i vot, ona, nakonets, takov, etc.*) shows that formulas may occur even without being produced by rhyme.

Other poets of Pushkin's era (group 3), probably striving to attain their individual style, employ enjambement more sparingly than Pushkin. They use neither Pushkin's exotic *no*, nor the common "nakonets". The number of formulas is 18; the most frequent are: *ona, ya, vot, poroy, potom, gotov, on.* The most intensive user of formulas is Podolinsky. His "Nishchiy" brings the frequency of enjambement formulas in this group close to Pushkin's: 10.4%.

Lermontov (group 4) shows demonstrative use of Pushkin's formulas. In "Tambovskaya kaznacheysha", written in the *Onegin measure* ("Onegina razmerom") there appears Pushkin's unconventional *no*, never repeated even by Pushkin himself or his followers, as well as others of Pushkin's enjambements. Lermontov also uses *ya, nazad, konechno,* which do not occur in Pushkin. There are 28 formulas; the most frequent are *on, potom, poroy, tam, ona, vdrug, peredo mnoy.* The freqency of enjambement formulas in Lermontov poems is 13.2%. Noticeably, formulas are equally frequent in both his early (12.9%) and in his mature period (13.8%). For example, in the poetic masterpiece, "Mtsyri", they rise to 14.7%.

Poets from the middle of the 19th century (group 5) use enjambement formulas even more intensively. There are 29 formulas, the most frequent are: *ya, ona, potom, togda, on, vot, nakonets, gotov, ne raz, byla, vdrug, mozhet byt'.* Many formulas occurred in poems of earlier authors, while some (*byla, opyat', mozhet byt'*) are introduced in Ap. Grigoryev's poems. The growth of *ya* is due to Turgenev's "Razgovor". The frequency is 12.4%—somewhat lower than in Lermontov, mainly because of Nekrasov's poems, where enjambement formulas are only 4–5%.

Two poems from the 20th century (group 6) show that there is no tendency toward permanent growth in the frequency of enjambement formulas. Blok's "Vozmezdie" has only eight formulas, Tvardovsky's "Za dal'yu – dal'"—four. The frequency of enjambement formulas in "Vozmezdie" is 8.7%, in "Za dal'yu – dal'" it is 2.3%. In addition to the noticeable drop in the number of enjambement formulas another two points should be mentioned. First, in Blok's verse, *ona, vot, no* (!) signify a conscious attachment to the tradition of Pushkin. Second, Tvardovsky shows the possibility of making an old device unrecognizable by means of modern verse (graphics):

I vozrazit', kazalos', nechem,
Kogda vzdohnul on tiho:
    - No ... -
V tylu, mol, *delo obespechit'*
Uzhe *ne vsyakomu dano*.

We take into account six parameters when analyzing enjambement structure: 1) the type of enjambement: rejet (not in this type of study), contre-rejet, double-rejet; 2) the clausula of the upper line (for all types of enjambement); 3) the word boundary type in the subsequent line (for rejet and double-rejet); 4) the number of words between syntactically connected words of the previous and the subsequent lines; 5) the types of ties and their frequency; 6) rhyming of the upper line (for all types of enjambement).

The first parameter (the type of enjambement) is traditional for verse-study; all the other parameters have been proposed by us. Let's illustrate our method of analysis by examples and describe the most important results.

Types of enjambement. All verse experts (including the author of this paper) traditionally divide enjambement into three types: rejet, contre-rejet, double-rejet. We believe that formulas in enjambement occur in the initial line; formulas in the subsequent line are very rare. Therefore in this type of analysis we have two types of enjambement instead of three: contre-rejet ("Hotel ya vstat' – peredo mnoy / vse *zakruzhilos*' s bystrotoy) and double-rejet (nepronitsaemoy stenoy / Okruzhena, peredo mnoy / *Byla polyana*. <…>"). Both examples are from "Mtsyri". In enjambement formulas contre-rejets prevail. This prevalence differs considerably from their frequency among all enjambements in general, where it is about 50% (with some fluctuations during the century). In the enjambement formulas of Pushkin and his contemporaries contre-rejets comprise about 85%. In the verse of Lermontov and poets from the middle of the 19th century the frequency decreased by 10%, but in poems of the 20th century the rate of occurrence returned to Pushkin's 85%.

The clausula of the upper line can be masculine (**M**): "I chto-to shepchet, i poroy / Goryuchi slezy *l'et* rekoi" ("Bakhchisarayskiy fontan") or feminine (**F**): "Nikto ne proydet – lish' poroyu / Chut' kolokol'chik *prozvenit*" (I. Kozlov "Chernets"). According to our data, at the earlier stage of Russian narrative verse enjambement in general is marked by a masculine ending in 60–70% of cases. In the process of its development the prevalence of masculine endings became less consistent. In enjambement formulas the situation is different: there is a consistent prevalence of masculine endings throughout the evolution of enjambement (in the majority of poems 100% of the endings in formulas are masculine).

Word boundary in a subsequent line (at the end of a syntactic group which runs on from one line into another). Obviously this parameter refers only to the double-rejets in our material. A word boundary can be masculine (**m**): "I krasota – i vse, chto ya / *Tak obozh**al***, – ischezlo vse"), feminine (**f**): "<…> ya / *Vse **pomnyu*** <…>" (both examples from "Razgovor" by Turgenev), or dactylic (**d**): "Gotov byl cheln – i nakonets / *Dostig* on b**erega** <…>" ("Mednyi vsadnik" by Pushkin). In our material only 7% of the word boundaries are dactylic (a single enjambement formula in "Kavkazskiy plennik" with the dactylic word boundary *padaet*, which repeats a well known non-formulaic enjambement in Pushkin; one case in Podolinsky and two in Apollon Grigoryev). In contrast to clausulas in the initial line, words boundaries are more often feminine: they are one and a half times more frequent than masculine. Thus a masculine ending characterizes the part of the phrase left in the initial line, but not the part transferred to the next line.

The interval between words of the initial and the subsequent line, where the syntactic tie runs over the border of a line, providing a vertical connection between lines. We determine the number of metrical words between these two words. By a metrical word M.L. Gasparov meant a word bearing metrical stress along with any preceding or following unstressed words that are attached to it when reading. This interval may be zero (the words are in contact): "Ego zovut Aleko; on / *Gotov idti* za mnoyu vsyudu", or it can contain one or two words ("Uzh ya… no tishe! Slyshish'? On / Drugoe imya *proiznosit*"). Both examples are from Pushkin's "Tsygany". In the first example the syntactic tie is a contact (**c**, between adjacent words), in the second—distant (**d**). The ratio of contact and distant syntactic ties differs considerably in different periods of the development of Russian narrative poetry.

In Pushkin's enjambement formulas distant syntactic ties prevail (60.5%), especially because of earlier poems (before "Graf Nulin), where distant ties occur 75% of the time (in later poems and "Evgeniy Onegin" they are at 57.8%). Pushkin's contemporaries have an almost equal proportion of contact and distant ties. The same is true for Lermontov. Poets from the middle of the 19th century have more contact ties (57.3%). A slight prevalence of contact ties can also be observed among 20th-century poets (53.8%). The general tendency in the development of enjambement formulas from the point of view of this parameter coincides with the evolution of enjambement in general (from a prevalence of distant ties to a prevalence of contact ties).

The analysis of this parameter helped us to discover for the first time in verse study the existence of what we call "prolonged" enjambements, where the interval between syntactically connected words in the enjambement increases to three or more words and the whole enjambement construction covers not two but three or more lines.

The mechanism of prolonged enjambement normally presupposes that the syntactic tie which actually forms enjambement is interrupted by an inserted construction or some other syntactic structure (described in detail in Matyash 2017) which makes us wait for the enjambement construction to terminate a line or two later than in regular enjambement (in cases of contre-rejet), or we have to look for the beginning of enjambement a line or two earlier than normally (in cases of rejet or double-rejet).

Prolonged enjambements in iambic tetrameter narrative poems of the 19th–20th centuries comprise 5–10% of all enjambements: "Akh, russkiy, russkiy, dlya chego / Ne znaya serdtsa tvoego, / Tebe navek *ya predalasya*! ("Kavkazskiy plennik" by Pushkin); "Akh, Eda, Eda! Dlya chego / Takoe dolgoe mgnoven'e / Vo vlazhnom plameni ego / *Pila* ty strastnoe zabven'e" (Baratynsky "Eda"); "Pevets Gyul'pary! Dlya chego / V izbytke serdtsa moego, / v poryve sil'nyh vpechatleniy / Nazlo prirode i sud'be, zachem *ne raven* ya tebe <…>" (Polezhaev "Chir-yurt"). In our examples the prolonged structures contain 3-4-5 lines, with 5-6-10 metrical words between the words forming the syntactic tie in the enjambement. The large proportion (10–25%) of prolonged enjambements within enjambement formulas was unexpected.

Types and frequency of syntactic ties in enjambement are analyzed using the hierarchy of closer and looser syntactic ties (stronger and weaker syntactic and prosodic breaks between words), suggested by Gasparov and Skulacheva, using the abbreviations

of these scholars (see Gasparov–Skulacheva 2004: 182–183). The set of ties used in formulas is predictably more limited than in enjambements of iambic tetrameter narrative poems in general. There are no ties with a direct object, no borders between paratactic clauses, no ties between similar parts of the sentence. There are extremely close ties between parts of a compound predicate ("<…> Ya gotov / Za eto *otvechat'*"—"Olimpiy Radin" by Apollon Grigoryev); enjambement with *no* we also considered to be extremely strong. There are also easily noticeable enjambements with a direct object (see examples with *pered nim* at the beginning of this article) and—unexpectedly—with unattached phrases ("<…> gde ona, / *Bog znaet kem okruzhena*, / rvalas' i plakala snachala" ("Evgeniy Onegin"); "No budet vremya – mozhet byt', / *V ney mozhno chuvstvo probudit'*…" ("Nishchiy" by Podolinsky). Even borders between hypotactic clauses were found: "On takzhe dumal, mozhet byt', / *Chto, s zhizn'yu konchivshi raschet,* / Spokoyney, krepche on usnet." ("Predsmertnaya ispoved'" by Grigoryev). The broadest repertoire of syntactic ties is used by Lermontov in "Tambovskaya kaznacheysha". Even enjambement with an attributive tie occurs ("Kakuyu / nazvat' *prichinu* poverney?") and is later repeated by Tvardovsky ("Kakuyu / Naznachat *pensiyu* emu…". The most intensively used ties are ties of an adverbial modifier ("<…> i vmig / *Poverzhen* Lenskiy <…>" ("Evgeniy Onegin") and predicative ties (see earlier in this article examples with *on* and numerous cases with *ona*). The evolution of their frequency toward lowering the number of adverbial modifier enjambements (from 55.8% in Pushkin to 38.4% in poets of 20th century) corresponds to the same tendency in enjambements in general. Still, the number of adverbial modifier enjambements (especially in Pushkin) is significantly higher in formulas, because for enjambement in general it was no more than 30%.

Rhyming in the initial line of enjambement. This parameter presupposes the answer to two questions: 1) in what kind of stanza does the formula word occur (couplet? quatrain with enclosing or alternating rhyme?); second—whether the formula word is the initial or the subsequent word in a rhyming pair. The analysis of formulas has shown that the formula words in initial lines of enjambement may be:

(1) the first member of the rhyming pair in a couplet: "Upryamo smotrit on: o**na** / *Sidit* spokoyna i vol'**na**" ("Evgeniy Onegin");

(2) the second member of a rhyming pair in a couplet: "V tishi na lozhe s**na** / Kak nekiy duh, emu o**na** / O mshchen'e *shepchet* <…>" ("Poltava");

(3) the first member of a rhyming pair in a couplet within an enclosing rhyme: "Pleski, kliki / Ego privetstvuyut. O**na** / Pevtsu prisest' *prinuzhde**na***; / Poet zhe skromnyy, khot' velikiy <…>" ("Evgeniy Onegin");

(4) the second member of a rhyming pair in a couplet within an enclosing rhyme: "Tak neozhidanno surova / i vechnyh peremen pol**na**; / Kak veshnyaya reka, o**na** / Vnezapno *tronut'sya gotova*" (Blok "Vozmezdie").

(5) the first member of a rhyming pair in a quatrain with alternating rhyme: "Stareyut zheny. Mezhdu nimi / Davno gruzinki net; o**na** / Garema strazhami nemymi / V puchinu vod *opushche**na***" ("Bakhchisarayskiy fontan");

(6) the second member of a rhyming pair in a quatrain with alternating rhyme: “Lunoyu chut’ ozare**na**, / S ulybkoy zhalosti otradnoy / Kolena prekloniv, o**na** / K ego ustam kumys prohladnyi / *Podnosit* tihoyu rukoy” (“Kavkazskiy plennik” by Pushkin);

(7) the first member of a rhyming pair in quatrains with enclosing rhyme: “Chto budet s ney, kogda o**na** / *Uslyshit* slovo rokovoe? / Dosel’ ona eshche v pokoe – / No tayna byt’ sohrane**na** / Ne mozhet dolee. <…>” (“Poltava”);

(8) the second member of a rhyming pair in quatrains with enclosing rhyme: “Do utra yunaya knyazh**na** / Lezhala, tyagostnym zabven’em, kak budto strashnym snoviden’em, / Ob”yata – nakonets o**na** / *Ochnulas*’ <…>” (“Ruslan i Lyudmila”)

Formulas in longer stanzas were not taken into account because of their very small number.

Enjambement formulas stand out most prominently in adjacent rhymes (both in a separate couplet and within an enclosing rhyme), they are the least prominent in an enclosing rhyme.

When a formula is the first member of a rhyme pair, the rhyme and syntax unfold in the same direction, creating a cumulative effect. In the opposite case the syntactic and rhyme movements contradict each other. The majority of formula words are the first members of a rhyme pair (44.9%), and only a small percentage (2.5%) are the second. The general tendency for this parameter is an increase in the number of types used by a particular poet. The maximum (7 out of 8 types) appears in the poems of Ap. Grigoryev.

3 Conclusion

Thus we can make the following conclusions.

(1) The repertoire of enjambement formulas is rather stable and has a tendency to broaden.

(2) Enjambement formulas of Russian narrative poems occur as a result of borrowing, imitation, and indicating adherence to a certain tradition.

(3) The occurrence of enjambement formulas is often stimulated by the search for a rhyme, but the fact of the very presence of formulas in blank verse shows that the role of rhyme should not be overemphasized.

(4) The number of formulas does not depend on the number of enjambements in general in a particular poem and does not correlate with the prominence of a poet in the history of literature.

(5) The rather complex structure of enjambement formulas makes it possible to bring new features into common formulas by changes in rhyme, word boundaries in subsequent lines, graphic representation, or the use of prolonged enjambements.

(6) The structure of enjambement formulas evolves largely in correspondence with the evolution of enjambement in general, but this process also has some features of its own: an increased number of contre-rejets, masculine clausulas, adverbial modifier ties and so on. This demonstrates the existence of complex mechanisms for the memory of forms in the history of verse and also—as Gasparov mentioned once on a different occasion—the complex interaction of rational and intuitive factors in the creative process.

References

Gasparov, M. L. (2012). *Izbrannye trudy*. vol. IV: *Lingvistika stiha. Analizy i interpretatsii*. Moskva: Yazyki slavyanskoy kul'tury, 240–274, 290–304.

Gasparov, M. L. – Skulacheva, T. V. (2004). *Stat'i o lingvistike stiha*. Moskva: Yazyki slavyanskoy kul'tury, 202–225.

Matyash, S. A. (2017). *Stikhotvornyy perenos (enjambement) v russkoy poezii: ocherki teorii i istorii*. Sankt-Petersburg: RGPU.

What Rhythmic Signature Says About Poetic Corpora

Adiel Mittmann
Universidade Federal de Santa Catarina
Florianópolis, Brazil
adiel@mittmann.net.br

Paulo Henrique Pergher
Universidade Federal de Santa Catarina
Florianópolis, Brazil
paulopergher@gmail.com

Alckmar Luiz dos Santos
Universidade Federal de Santa Catarina
Florianópolis, Brazil
alckmar@gmail.com

Abstract

The distribution of stressed syllables within a verse are fairly varied in Portuguese and Spanish, which allows poets to use rhythmic patterns in specific ways. Longer verses do tend to impose constraints on which syllables are allowed to carry stress, but there is still room for variation; for instance, verses with 10 syllables can belong to one of 22 standard patterns. In this article, we analyze various sets of verses in order to establish their relative frequency distribution of rhythmic patterns, which we term the rhythmic signature, and to understand how such signatures relate to each other. We also provide recommendations for using two different methods of comparing them: the Gini coefficient and dendrograms. Three experiments are conducted on a corpus with more than 250,000 verses: first, we compare poets who wrote in Portuguese; then, we study several books written by a single author; finally, we compare poets from two languages, Portuguese and Spanish. Our results show that many authors have a distinguishable rhythmic signature, to the point of being fairly unique. It is also clear from our results that, with deliberate intention, a poet can mimic the rhythmic style of another. Finally, the third experiment indicates that verses in Portuguese and Spanish are rhythmically similar and that differences in style can mostly be ascribed to the authors. Overall, our results show that the rhythmic signature aids in characterizing the style of verses, which gives experts objective, reliable information from which deeper insights can be obtained.

1 Introduction

In Portuguese, Spanish and other languages, the placement of stressed syllables within a verse can vary widely, and most of the variation is a choice, conscious or unconscious, made by the poet. Longer verses tend to impose certain restrictions, but usually there is ample room left for the poet to choose different rhythmic patterns of strong and weak syllables.

Automatic scansion tools are able to scan a large body of verses quickly, which allows us to analyze from a distance (Moretti 2013) the different rhythmic patterns used by poets. Instead of looking at the rhythmic pattern of a few verses, we can instead look at the broad strokes painted by poems, poets, languages, periods of time: which patterns are favored, with which variety they are used, how different sets of verses can be hierarchically grouped, and so on. In the past, such efforts were very limited in their scope due to the prohibitive cost of manually scanning thousands of verses, though they do exist (Chociay 1994).

In this article, we explore the relative frequency distribution of rhythmic patterns, which we call the rhythmic signature. We define it, establish some ways to deal with the uncertainty inherent to such distributions and provide recommendations on using two ways of comparing signatures: the Gini coefficient and dendrograms. In order to provide an answer to this article's title, we use rhythmic signatures to examine three different scenarios: verses written by many different poets in one language, Portuguese; verses written by a single poet over a stretch of 54 years; and verses written in Portuguese and Spanish by several poets.

The rhythmic signatures used in this article, as well as many tables and figures, were computed by Aoidos (Mittmann–von Wangenheim–Luiz dos Santos 2016), our automatic scansion system capable of scanning verses in Portuguese and Spanish. Aoidos takes as input files in the TEI XML format and produces several analyses, from scansion itself to tables of rhythmic signatures and metaplasm usage. It is available online at https://aoidos.ufsc.br/. We have already used Aoidos in order to compare automatic results to those published by experts in the field of versification (Mittmann–Maia 2017) and to analyze epic verse in Portuguese (Mittmann–Luiz dos Santos 2018), when we used for the first time rhythmic signatures. Similar systems exist for Spanish (Navarro-Colorado 2016) and other close languages, such as French (Beaudouin–Yvon 1996; Delente–Renault 2015).

The remainder of this article is structured as follows. Sect. 2 provides information on the corpus used both for the experiments and for the analyses carried out in the next section; Sect. 3 defines the rhythmic signature and its properties; Sect. 4 presents three different experiments based on the rhythmic signature; in Sect. 5, we discuss some insights that emerged from the experiments; and finally, Sect. 6 contains our concluding remarks.

2 Corpus

The corpus used in this article is composed of 286,388 verses, as summarized in TAB. 1. The majority of verses (76.9%) are 10 syllables long, with a sizable minority (15.5%) of verses with 7 syllables. Only these two meters are considered in this article; the remaining verses (7.6%) are not used. Almost all (99.91%) of Spanish verses are 10-syllable long; the remaining ones (0.09%) are mostly 6-syllable verses that introduce *estrambotes*.

In this article, we measure the number of syllables in a verse according to the scheme currently prevalent in Portuguese versification studies—even when we are considering verses in Spanish. Syllables in a verse are thus only counted up until the last stressed one, so that a verse whose last stressed syllable is the 10th (hence in Portuguese they are called *decassílabos*) is said to have 10 syllables, even though it most often contains a further unstressed syllable (hence in Spanish they are called *endecasílabos*).

TAB. 2 presents details on the verses written in Portuguese. There are 116,912 verses with 10 syllables and 44,400 verses with 7 syllables. Of those with 10 syllables, 52.8% belong to ten epic poems, which are long and typically written in this meter. Of those with 7 syllables, 64.6% were written by only one poet, Gregório de Matos—this high proportion should not taint our analyses, as long as we take the necessary precautions. Poet Bastos Tigre, who wrote 16.7% of the verses in Portuguese, originally had an additional 6,106 verses in the corpus, which were subsequently removed from all analyses due to being repeated and are not counted anywhere in this article. The complete works of Bastos Tigre does not include another copy of *Bromilíadas*, which appears separately in the table; furthermore, there is at least one small book that is not included here. One item in the corpus was written by two authors: that is the book *Pimentões*, written by Olavo Bilac and Guimarães Passos; the rhythmic signature derived from this book must be interpreted as an amalgam to which two authors contributed. There is one translation in the corpus: that is Dante's *Divine Comedy*, as translated by Xavier Pinheiro.

TAB. 3 summarizes the verses in Spanish. There are two epic poems, *La Araucana* by Alonso de Ercilla and *La Argentina* by Martín del Barco Centenera, which together make up 44.7% of the corpus. The remaining verses are sonnets from the Spanish Golden Age, which were collected and published in XML form by Navarro-Colorado–Lafoz–Sánchez (2016); this collection of sonnets is referred to as the Siglo de Oro corpus in our article. Most sonnets in the Siglo de Oro corpus are written in Spanish, but there are two written in Portuguese, by Quevedo and Borja, which were included in TAB. 2 for the sake of completion. Although poet Gregório de Matos wrote most of his poems in Portuguese, some of them he wrote in Spanish; our own versions of his poems in Spanish are not included in the corpus because the archaic spelling has not been updated yet, but the Siglo de Oro corpus does include at least some of his sonnets written in Spanish.

Verses with a length other than 7 or 10 are included in TAB. 2 and TAB. 3, though they are not used in our analyses, for two reasons. First, so that the general picture of

	7	10	Other	Total
Portuguese	44,400	116,912	21,692	183,004
Spanish	4	102,825	92	102,921
Total	44,404	219,737	21,784	285,925

TAB. 1: Number of verses in the corpus, by language and meter

Poet(s)	Birth	Works	7	10	Other	Total
L. de Camões	1524	**(L)** Epic: *Os Lusíadas*		8,816		8,816
F. de Quevedo	1580	Sonnet		13	1	14
F. de Borja	1581	Sonnet		14		14
Sá de Meneses	1600	**(M)** Epic: *Malaca Conquistada*		10,635	21	10,656
G. de Matos	1636	Complete works	28,692	4,070	1,385	34,147
S. R. Durão	1722	**(C)** Epic: *Caramuru*		6,672		6,672
C. M. da Costa	1729	**(V)** Epic: *Vila Rica*		2,717	1	2,718
		Misc. Book: *Obras Poéticas*	231	5,736	1,715	7,682
B. da Gama	1741	**(U)** Epic: *O Uraguai*		1,377		1,377
T. A. Gonzaga	1744	Satirical: *Cartas Chilenas*		4,172	12	4,184
G. de Magalhães	1811	Misc. Book: *Suspiros Poéticos*	540	3,790	1,307	5,637
X. Pinheiro	1822	Narrative: *Divina Comédia*		14,226	7	14,233
G. Dias	1823	**(T)** Epic: *Os Timbiras*		2,004	28	2,032
F. Varela	1841	**(A)** Epic: *Anchieta*		8,480	22	8,502
D. Silveira	1854	Complete works	4,082	4,490	3,139	11,711
A. Figueredo	1864	Several books	1,022	2,760	4,451	8,233
Bilac, Passos	1865	Satire: *Pimentões*	1,502			1,502
B. Tigre	1882	**(R)** Epic: *Bromilíadas*		3,308	2	3,310
		Complete works	8,055	10,014	9,117	27,186
A. dos Anjos	1884	Complete works	276	5,842	476	6,594
C. A. Nunes	1897	**(B)** Epic: *Os Brasileidas*		8,503	1	8,504
J. Teixeira	19??	**(F)** Epic: *Famagusta*		9,273	7	9,280
Total			44,400	116,912	21,692	183,004

TAB. 2: Number of verses in Portuguese, by poet and meter

Poet/Group	Birth	Works	7	10	Other	Total
A. de Ercilla	1533	Epic: *La Araucana*		21,072		21,072
M. de Centenera	1535	Epic: *La Argentina*		10,727	17	10,744
Siglo de Oro	1398-1672	Sonnets	4	71,026	75	71,105
Total			4	102,825	92	102,921

TAB. 3: Number of verses in Spanish, by poet or group of poets and meter

which meters a work employs is still visible; thus, Gonçalves Dias' *Os Timbiras*, though an epic poem with mostly 10-syllable verses, does contain verses of other types. Second, so that scansion errors due to underlying problems in the text itself do not interfere in the total amount of verses in a work: such is the case with Sá de Meneses' *Malaca Conquistada*, which contains 10,656 verses, even if 21 could not be scanned in 10 syllables.

3 Rhythmic signature

3.1 Definition

The rhythmic signature of a set of same-length verses is the relative frequency distribution of the rhythmic patterns of the verses in the set. The rhythmic pattern of a verse describes the position of stressed syllables within it. For instance, these are the five verses that begin Carlos Alberto Nunes' *Os Brasileidas* and their respective rhythmic patterns:

1-3-6-10	*Musa, canta-me a régia poranduba*
3-6-10	*Das bandeiras, os feitos sublimados*
3-6-8-10	*Dos heróis que o Brasil plasmar souberam*
2-6-10	*Través do Pindorama, demarcando*
3-6-10	*Nos sertões a conquista e as esperanças.*

The rhythmic signature of this set of verses is simply the frequency with which each rhythmic pattern occurs:

1-3-6-10	**3-6-10**	**3-6-8-10**	**2-6-10**
16.7%	33.3%	16.7%	16.7%

The exact manner in which one determines the rhythmic pattern of a verse is not entirely absolute. Some experts would argue that the stress of certain words would become weak before a stronger word, even if the two stressed syllables are not next to each other. Drawing arguments from phonological features of Portuguese, others would claim that a rhythmic pattern like 6-10 is impossible, because a secondary stress will invariably become dominant in one of the first four unstressed syllables. In any case, Aoidos computes rhythmic patterns by following a few simple rules, like "a stressed syllable cannot follow a stressed syllable". Unless any such rule would be broken, a word is always stressed in the same way and no secondary stress is ever taken into account; phenomena like systoles and diastoles are treated in a way that it does not affect the computing of rhythmic patterns.

3.2 Uncertainty

The rhythmic signature can be calculated for sets of any size, but the smaller the set, the less trustworthy the information is. In the example above, the rhythmic signature was calculated for only 5 verses; one can hardly expect that this signature is capable of representing the whole epic poem or even one of its cantos. One way of dealing with this uncertainty is by using statistical confidence intervals, which, in this case, are given by

$$p \pm z \sqrt{\frac{p(1-p)}{n}},$$

where p is the proportion of verses that follow a given rhythmic pattern, n is the total number of verses in the set and z selects the desired confidence level (so that, for instance, for 95% confidence one would have $z = 1.960$). Aoidos, when presenting results to users, currently calculates confidence intervals and then employs a mix of different font sizes and colors to communicate how reliable the figures in a rhythmic signature are.

There are situations, however, when one would like to go beyond looking at the numbers; that is the case when clustering techniques are employed. In order to estimate how much a rhythmic signature can be trusted given the quantity of verses it was based on, an analysis was undertaken: we considered all 10- and 7-syllable verses from books or poems written in Portuguese in our corpus. We then established a set of eight sample sizes, ranging from 10 to 5,000. For each sample size, each book or poem was considered in turn: 100 random samples were taken and the Euclidean distance was calculated between the rhythmic signature of the random sample and the rhythmic signature of the book or poem as a whole. Sample sizes larger than 50% of the whole book or poem were not considered. The whole procedure was then repeated for several minimum file sizes, again ranging from 10 to 5,000 verses. TAB. 4 shows the *maximum* distance between a random sample and the book it was taken from, according to different sample sizes. TAB. 5 does the same, but shows *mean* distances instead.

According to TAB. 4 and TAB. 5, if we consider a set of 1,000 verses, then we can expect that the distance from its rhythmic signature to that of the whole should be below 0.03 on average and not much larger than 0.05 in the worst case. They also alert us to the fact that small sets of verses should be handled with care: given 100 verses, on average a distance of almost 0.10 is to be expected from the rhythmic signature of the sample to that of the whole, and, in the worst case, this distance could reach to almost 0.20.

In practice, we will not be calculating rhythmic signatures from random samples extracted from a larger set; we will always use the entire set that we wish to analyze. In such cases, we can consider that our entire set is indeed a sample size of all the (infinite) verses that the poet could have written when that specific poem was being written.

When using rhythmic signatures, it is also important to consider which specific rhythmic patterns can be usefully analyzed. When one considers smaller verses, typically up to 7 syllables, the internal distribution of stressed syllables is completely up to the poet: there are no restrictions. Larger verses, typically from 8 to 12 syllables, on the other hand, usually coordinate smaller units. TAB. 6 shows the number of theoretical and actual rhythmic patterns for meters from 1 to 12. It is evident that deviations can occur, and poets have been exploiting them for centuries; therefore, the actual number of rhythmic patterns refers only to the most commonly found rhythms. One notices that many sizes allow enough patterns that a meaningful rhythmic signature can be computed and analyzed.

	10	100	250	500	750	1,000	2,500	5,000
7	0.630	0.183	0.108	0.078	0.056	0.048	0.022	
10	0.627	0.180	0.111	0.074	0.066	0.052	0.029	0.017

TAB. 4: Maximum distance between a random sample size and the book or poem it was taken from

	10	100	250	500	750	1,000	2,500	5,000
7	0.286	0.085	0.051	0.034	0.027	0.024	0.014	
10	0.297	0.091	0.057	0.039	0.032	0.027	0.016	0.010

TAB. 5: Mean distance between a random sample size and the book or poem it was taken from

	1	2	3	4	5	6	7	8	9	10	11	12
Theoretical	1	1	2	3	5	8	13	21	34	55	89	144
Actual	1	1	2	3	5	8	13	6	11	22	25	52

TAB. 6: Theoretical and actual number of possible rhythmic patterns, according to meter

Of particular interest to this article is the actual number of rhythmic patterns that 10-syllable verses may adopt: 22, instead of the theoretical 55. In practice, therefore, we can expect to find 22 more common, "allowed" rhythmic patterns, and 33 less important patterns. The latter group will always exist due to problems in the text, scansion errors produced by Aoidos, intentional "breaking of the rules" by poets, etc. In fact, in our corpus, 51 of the 55 theoretical types can be found.

Considering which rhythmic patterns are theoretical and which actually occur commonly in practice is important because certain statistical indices, such as the Gini index introduced in the next section, will be skewed when additional patterns are included in the signature. It must be noted that this is not the case, e.g., when clustering techniques are used, because the distance between signatures remain mostly unaffected (the addition of an extra dimension which has a zero value for all rhythmic signatures changes nothing).

3.3 The Gini coefficient

The Gini coefficient or index was originally proposed in order to measure inequality of income. It can, however, measure the inequality among any values in a frequency distribution—such as a rhythmic signature. One advantage it has over statistical measures such as standard deviation is that it varies from 0 (complete equality) to 1 (complete inequality). Whereas in its usual application the values are the incomes of citizens, in our case the values are the quantity of verses (or their proportion) that belong to each rhythmic pattern. As the discussion in the previous section warns, care must be taken to select which rhythmic patterns can be considered true members of the population.

For our purposes, we can interpret high Gini coefficients to mean that a few rhythmic patterns dominate the poet's writing: there is a strong preference for a small number of rhythms. A low Gini coefficient, on the other hand, indicates that the poet uses a wider variety of rhythms, perhaps employing rarer rhythms with a greater frequency.

The calculation of the Gini index is simple. It is given by

$$G = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} \left| x_i - x_j \right|}{2n \sum_{i=1}^{n} x_i},$$

where n is the number of rhythmic patterns and x_i is the frequency (or absolute number) of verses that adopt that rhythmic pattern.

3.4 Dendrograms

One way of exploring the relationships among different rhythmic signatures is building a dendrogram, a traditional hierarchical clustering technique. When using dendrograms, there is no need to exclude the theoretical rhythmic patterns, since they, by definition, are rare and will not significantly affect the clusterization algorithm. For the sake of simplicity, this section will assume that each rhythmic signature is calculated from the verses of a single poet, so that we can talk about the more concrete "poets", rather than "verse sets".

The dendrogram algorithm takes an important parameter, which is the linkage method. It specifies how the similarity between two groups of poets (which could be groups of just one poet) is calculated. There are three methods of particular interest here:

- Single linkage. In order to compare two groups of poets, this method selects the two poets (one from each group) that look the most similar, and then considers that the two groups as a whole are as similar to each other as those two poets.
- Complete linkage. This method is similar to single linkage, but it takes the two poets (one from each group) that are the most different from each other.
- Average linkage. This method does not select any poets; it instead creates an average poet for each group, made by averaging all rhythmic signatures. The two average poets are then compared.

Each method has its advantages and disadvantages. Single linkage is very intuitive, since it chooses the two most similar poets in order to compare groups; but the end result usually looks like one group of poets, to which all poets are added, one by one, until one big group remains. This means that usually there is no cut that can be made to compare different groups of poets; any one such cut ends up dividing the poets into one big group and several one-poet groups. Complete linkage is not as intuitive, since

it considers the two most *different* poets in order to assess how *similar* the two groups are. The final dendrogram, however, usually does look like poets get split into several groups, and cuts can be meaningfully made. Finally, average linkage lacks the advantage that two actual poets are being compared; on the other hand, in our particular case, it does make sense to consider that the average of the group represents the group. Furthermore, the groups generated by average linkage are as interesting as those generated by complete linkage, but are easier to interpret. In the rest of this article, we will only consider average linkage.

4 Experiments

4.1 One language, many poets

TAB. 7 shows the rhythmic signature for 10-syllable verses in Portuguese, according to the poet who wrote them. Only poets with at least 2,500 such verses in our corpus were included; there were 15 poets that met this condition. By establishing this minimum amount, TAB. 5 tells us we can expect figures to be off by about 1.6%, so that care must be taken when interpreting smaller proportions.

A few figures immediately stand out from TAB. 7. Tomás Antônio Gonzaga employs pattern 2-6-8-10 with a much higher frequency, 24.2%, than any other poet; in fact, he uses them at more than twice the frequency of the second poet, José Teixeira, who uses it with a frequency of 10.6%. Looking at patterns with a stressed 4th syllable and unstressed 6th syllable (the so-called pure Sapphic type), we can see how this type is not much favored by Camões and it is consistently avoided by José Teixeira. Pattern 2-4-6-10 is the most common among 10 poets out of the total 15; pattern 3-6-10 was preferred by 3 poets; José Teixeira is alone in favoring 2-6-10; and Gonzaga, as already stated, has a strong penchant for 2-6-8-10 verses.

The Gini index of the 15 poets is given by TAB. 8. Poet Augusto dos Anjos has the lowest coefficient, at 0.374, and Gonzaga the highest, at 0.642. This means that the frequency of usage of the different rhythmic patterns is more evenly distributed in the case of Augusto dos Anjos, whereas Gonzaga uses a few meters with a high frequency; which can indeed be ascertained by manually examining TAB. 7. It is also worth noting that proximity in the table does not at all imply temporal proximity; in fact, both the oldest poet, Camões, and the youngest, José Teixeira, follow each other in the table, with coefficients of 0.524 and 0.580. Sá de Meneses, who follows Camões temporally and whose style was largely based on that of Camões, is far from his master in the table, with an index of 0.482.

FIG. 1 shows a dendrogram created from the rhythmic signatures. By following the labels placed on the dendrogram, one can derive interpretations for the groupings generated. At **A**, there is a split between Gonzaga, with his peculiar usage of the 2-6-8-10 rhythm. At **B**, the group of three poets have higher usages of patterns 3-6-10 and 2-6-10; in fact, the lowest usage of such patterns among the three poets is still higher than among the poets in the other group. At **C**, one can tell Teixeira apart by

	L. de Camões	Sá de Meneses	G. de Matos	S. R. Durão	C. M. da Costa	T. A. Gonzaga	G. de Magalhães	X. Pinheiro	F. Varela	D. Silveira	A. Figueredo	B. Tigre	A. dos Anjos	C. A. Nunes	J. Teixeira
2-4-6-10	15.2	12.3	13.4	11.2	12.7	9.0	8.2	16.5	7.3	15.3	12.8	11.3	10.1	7.7	11.8
3-6-10	10.3	12.0	12.2	10.3	9.6	6.5	11.9	9.7	14.5	5.9	8.8	9.6	9.9	14.1	13.9
2-6-10	9.0	9.7	9.9	7.1	8.7	13.1	8.4	6.8	11.3	5.2	4.6	5.6	8.8	13.2	16.3
2-4-6-8-10	11.1	9.6	8.5	9.1	10.3	13.4	7.2	11.3	4.1	9.8	8.6	9.7	6.9	5.1	8.1
2-6-8-10	7.8	7.1	5.9	7.6	8.1	24.2	7.1	5.3	9.4	3.2	2.5	5.2	3.6	9.6	10.6
3-6-8-10	7.7	8.2	7.7	8.5	8.9	10.4	8.2	6.1	9.0	4.3	4.2	7.2	3.4	7.3	9.1
1-3-6-10	6.2	5.2	8.5	7.7	6.5	2.9	10.2	7.2	6.1	6.1	7.9	7.9	7.0	6.8	7.0
1-4-6-10	7.9	5.8	7.7	6.1	6.3	1.9	6.7	7.5	7.3	11.4	10.7	8.3	7.5	5.1	4.0
2-4-8-10	1.1	6.6	3.5	8.1	5.9	3.8	5.8	6.7	6.5	11.8	9.3	6.9	7.8	4.6	0.2
1-3-6-8-10	4.5	3.9	6.4	5.8	5.3	6.5	7.8	4.8	4.2	3.4	4.0	6.0	2.8	3.5	4.4
1-4-6-8-10	5.0	3.9	4.2	4.6	4.9	2.2	5.1	5.3	3.3	5.9	6.8	6.5	4.7	2.7	3.1
4-6-10	6.2	5.5	4.8	3.6	4.2	1.8	3.1	4.4	5.5	4.6	4.8	4.1	4.8	5.3	4.6
1-4-8-10	0.5	2.3	1.6	3.6	3.1	1.1	4.6	3.6	4.6	7.5	6.3	4.3	6.2	3.5	0.1
4-6-8-10	4.2	3.6	2.3	2.9	2.7	1.8	2.9	3.1	2.5	2.2	2.6	2.7	2.7	3.5	2.7
4-8-10	0.4	1.9	0.8	2.2	1.0	0.3	0.8	1.0	1.3	1.7	3.1	1.8	3.7	3.1	0.1
1-6-10	1.3	1.1	1.2	0.4	0.7	0.5	0.7	0.3	1.7	0.7	0.8	0.7	3.9	2.1	1.8
1-6-8-10	1.0	0.8	1.0	0.8	0.9	0.5	1.1	0.2	1.3	0.4	0.3	0.6	1.3	1.4	1.2
6-10	0.3	0.3	0.2	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	2.3	0.5	0.5
2-4-10	0.0	0.1	0.1	0.1	0.0			0.0	0.0	0.2	0.8	0.7	0.9	0.2	0.0
6-8-10	0.3	0.2	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.0	0.1	0.1	0.6	0.2	0.5
1-4-10	0.0	0.0	0.1	0.0				0.1		0.2	0.7	0.4	0.6	0.2	0.0
4-10	0.0	0.0	0.0	0.0				0.0		0.0	0.2	0.2	0.7	0.2	0.0

TAB. 7: Rhythmic signatures for poets who wrote at least 2,500 10-syllable verses in Portuguese

A. dos Anjos	B. Tigre	S. R. Durão	C. A. Nunes	G. de Magalhães	A. Figueredo	Sá de Meneses	C. M. da Costa	F. Varela	G. de Matos	X. Pinheiro	D. Silveira	L. de Camões	J. Teixeira	T. A. Gonzaga
0.374	0.442	0.461	0.462	0.464	0.467	0.482	0.483	0.487	0.506	0.506	0.515	0.524	0.580	0.642

TAB. 8: Gini coefficients for rhythmic signatures in TAB. 7, from lowest to highest

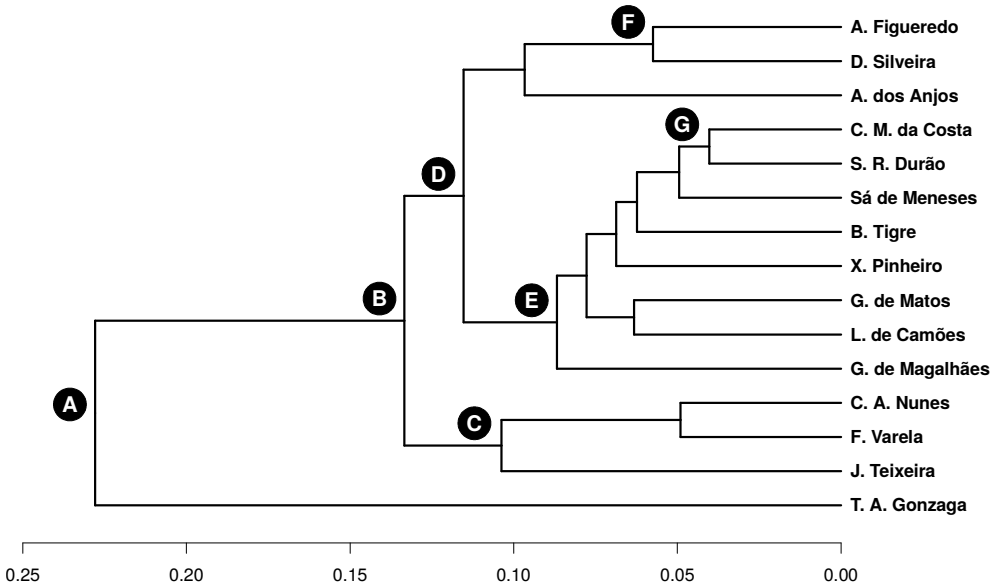


FIG. 1: Dendrogram for rhythmic signatures of TAB. 7

his extremely low usage of patterns such as 2-4-8-10 and 1-4-8-10 (pure Sapphic patterns). At **D**, we can separate the three poets by looking at the patterns 2-6-8-10 and 3-6-8-10: the three poets use them with a lower frequency than the other group, such that their maximum frequency is still lower than the other group's minimum frequency. At **E**, one can easily tell Magalhães apart by his low usage of the pattern 2-4-6-10. Similar reasonings can usually be found for all such decision points in dendrograms.

One cannot interpret the clusters in the dendrogram in terms of the times the poets lived in. While one can find groups such as **F**, which contains two poets that were born ten years apart and lived in the same town, and **G**, which contains two poets born seven years apart, these are exceptions. A poet's rhythmic signature does not depend on a place and time, but rather on style.

FIG. 2 shows a dendrogram created from 10-syllable verses collected from individual cantos of all eight epic poems written in Portuguese. Only cantos with at least 250 verses were included. This figure shows that the rhythmic signature of a poet remains more or less constant in a given epic poem. There are whole works that are completely contained in their own branch; such is the case of *Os Lusíadas*, *Bromilíadas*, *Anchieta*, *Os Timbiras, Malaca Conquistada*. *Famagusta* is contained in its own branch, except that the second canto of *Os Brasileidas* ends up in the mix. The remaining three epics, *Vila Rica*, *Caramuru* and *O Uraguai* are not well separated, although certain patterns can be spotted; indeed, the authors of the first two epics can be seen close together in FIG. 1, marked with label G. The third poet is not found in that figure because his epic poem fell short of the 2,500-verse threshold.

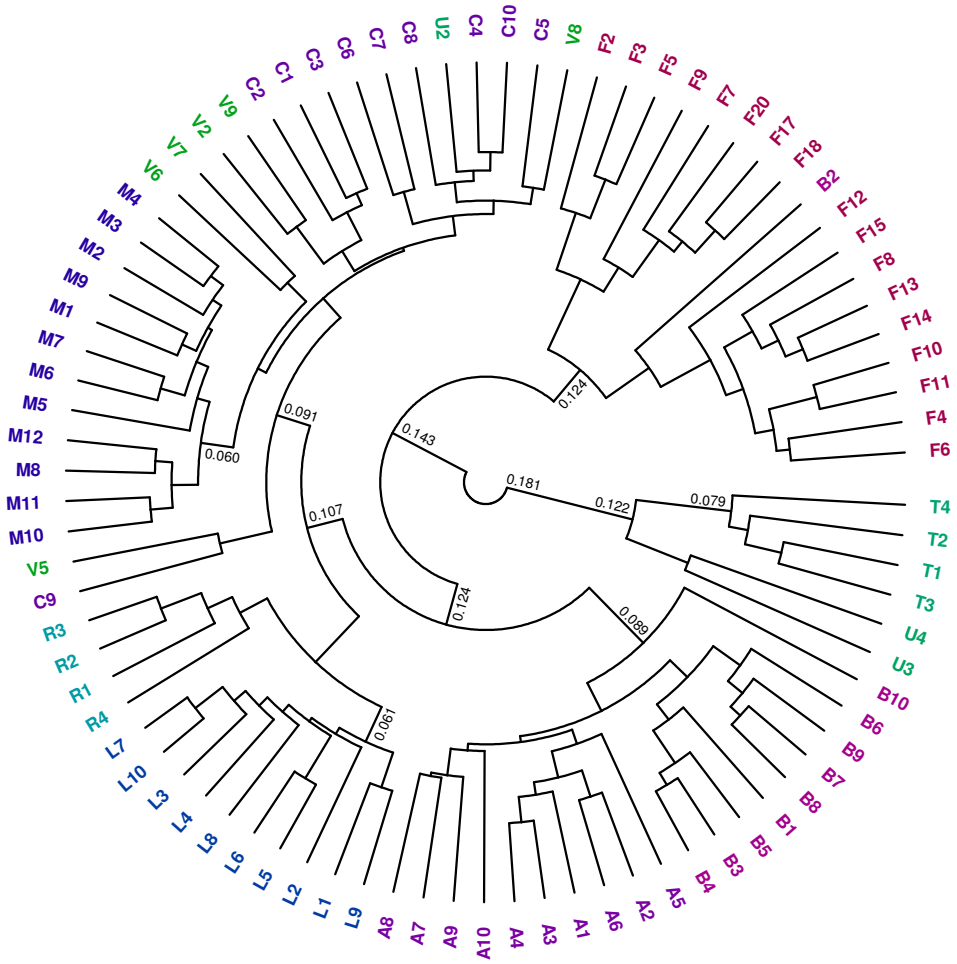


FIG. 2: Dendrogram for the rhythmic signatures of the individual cantos of 10 epic poems in Portuguese

TAB. 9 shows the rhythmic signature of poets with at least 1,000 7-syllable verses. TAB. 10 shows their Gini index and FIG. 3 shows the corresponding dendrogram. By comparing these results with those obtained with 10-syllable verses, we can immediately see that proximity in the dendrogram for one meter does not necessarily imply proximity in another meter: whereas FIG. 1 shows Delminda Silveira and Araújo Figueredo close together, that is no longer the case in FIG. 3. By examining TAB. 9, it becomes clear that Delminda Silveira has her own style when it comes to 7-syllable verses: pattern 2-4-7 is preferred among all poets, but she uses it with a far higher frequency (31.4%) than other poets, who use it at most with 21.4% frequency. By looking at the Gini coefficients of TAB. 10, it seems that the inequality of usage of patterns does not transfer among meters; there does not seem to be any relation between the Gini indices of TAB. 8 and TAB. 10.

	2-4-7	2-5-7	1-4-7	3-7	3-5-7	1-3-7	4-7	1-3-5-7	2-7	1-5-7	5-7	1-7	7
G. de Matos	18.8	12.8	12.0	11.8	9.8	8.1	8.3	6.6	6.0	3.3	1.7	0.7	0.1
D. Silveira	31.4	12.2	13.5	7.4	5.3	10.0	7.0	6.1	4.9	1.6	0.7	0.1	
A. Figueredo	17.1	13.3	9.5	12.6	10.1	11.4	9.8	9.1	3.9	2.1	1.0	0.1	
Bilac, Passos	21.4	15.0	13.4	7.7	8.3	9.3	5.5	9.1	5.8	2.8	1.1	0.7	0.1
B. Tigre	21.0	16.3	13.4	7.8	9.1	8.7	7.2	8.5	4.3	2.5	1.2	0.1	0.0

TAB. 9: Rhythmic signatures for poets who wrote at least 1,000 7-syllable verses in Portuguese

Poet	Gini index
G. de Matos	0.383
A. Figueredo	0.395
Bilac, Passos	0.428
B. Tigre	0.439
D. Silveira	0.513

TAB. 10: Gini coefficients for rhythmic signatures in TAB. 9, from lowest to highest

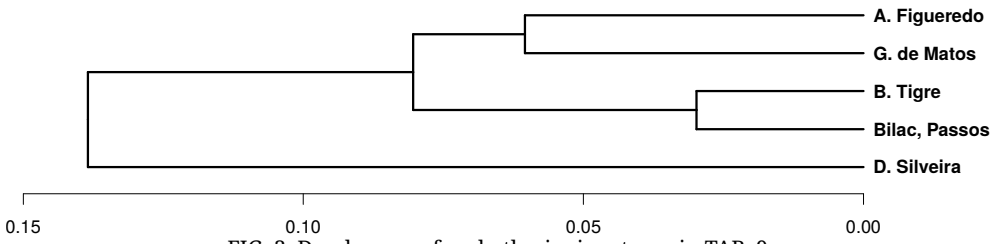


FIG. 3: Dendrogram for rhythmic signatures in TAB. 9

4.2 One poet, many books

Here we examine the 10-syllable verses contained in many works published by Brazilian poet Bastos Tigre, between 1902 and 1955. This writer has produced mainly humorous verses, for only 5 in a set of 22 books could be considered as non-humorous works (nevertheless, some poems in these five books are still clearly humorous). In fact, the analysis we propose here would allow us to compare this genre of poetry to the so-called serious poems which were (and always are) the mainstream of Brazilian poetry. Only works with at least 500 such verses were considered, so not allow too much uncertainty to leak into the results. FIG. 4 shows the dendrogram produced from the rhythmic signatures, and TAB. 11 the Gini indices.

It should first be noted that the poem *Bromilíadas* is a parody of Camões' *Os Lusíadas*. This was already clear in FIG. 2, and here also it is apparent that this work by Bastos Tigre is not like the remainder of his works: he was successful in imitating Camões in his style, to the point that even his rhythmic signature became much like that of the

older poet. Thus, in FIG. 4 *Bromilíadas* is set apart from the rest of his work, and the Gini index of this epic is also clearly distinct from the others in TAB. 11.

FIG. 4 does seem to imply certain temporal connections, such as the group that contains books published between 1913 and 1922. In general, however, Bastos' style seems to be disconnected from time: there are probably other variables (such as theme and tone) or even randomness influencing the results. His later works often include large portions of already published material—which were excluded from our analyses; it remains to be understood how his tendency towards reuse has affected, if it all, his rhythmic signatures.

Year	Work	Gini index
1905	Versos Perversos	0.408
1922	Fonte da Carioca	0.431
1902	Saguão da Posteridade	0.434
1919	Bolhas de Sabão	0.446
1955	Sol de Inverno	0.447
1913	Moinhos de Vento	0.452
1935	Entardecer	0.459
1922	Bromilíadas	0.525

TAB. 11: Gini coefficients for books published by Bastos Tigre, from lowest to highest; only books or poems with at least 500 10-syllable verses are included

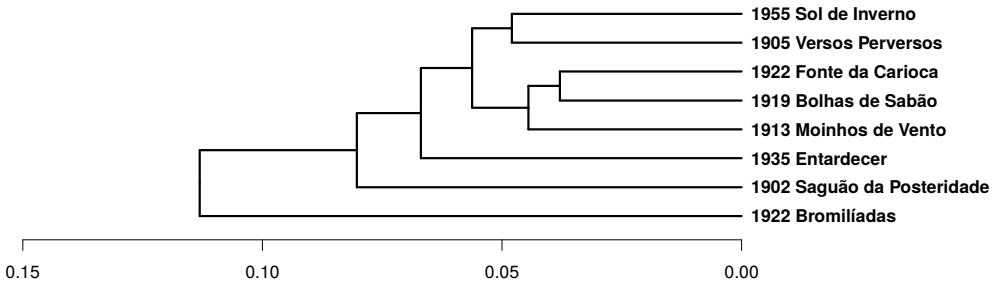


FIG. 4: Dendrogram for the rhythmic signatures of Bastos Tigre's works with at least 500 10-syllable verses

4.3 Two languages, many poets

TAB. 12 shows the rhythmic signatures calculated from all 10-syllable verses in Portuguese and Spanish. In general, they look similar, although clear differences do exist, such as the Spanish preference for pattern 2-6-10 (13.5% versus 9.2%) and the preference of Portuguese for pattern 2-4-6-8-10 (9.1% versus 6.7%). The Gini indices are very similar: 0.460 for Portuguese, 0.465 for Spanish.

	2-4-6-10	3-6-10	2-6-10	2-4-6-8-10	2-6-8-10	1-4-6-10	2-4-8-10	3-6-8-10	1-3-6-10	4-6-10	1-4-6-8-10	1-3-6-8-10	1-4-8-10	4-6-8-10	4-8-10	1-6-10	1-6-8-10	6-10	6-8-10	2-4-10	1-4-10	4-10
Pt.	11.9	10.8	9.2	9.1	7.7	6.7	5.9	7.5	6.7	4.5	4.6	4.8	3.3	2.9	1.5	1.1	0.8	0.3	0.2	0.2	0.1	0.1
Sp.	11.3	11.9	13.5	6.7	6.6	6.5	7.1	5.2	5.4	5.9	3.5	2.7	4.2	2.7	2.5	2.0	1.0	0.5	0.3	0.2	0.1	0.1

TAB. 12: Rhythmic signatures for Portuguese and Spanish; all 10-syllable verses are included

Language	Gini index
Portuguese	0.460
Spanish	0.465

TAB. 13: Gini coefficients for the rhythmic signatures of TAB. 12

Things are also interesting when we look at individual poets. We now consider all poets who wrote at least 1,000 10-syllable verses: 19 who wrote in Spanish, 17 who wrote in Portuguese. Tables for the rhythmic signatures and the Gini coefficients are not shown due to size constraints, but a few numbers are worth mentioning.

Gonzaga has found a match to his single-mindedness: Centenera, the author of the epic *La Argentina*, uses pattern 2-6-10 in a whopping 27.1% of his verses and his Gini coefficient is 0.706; compare these figures to Gonzaga's 24.2% usage of pattern 2-6-8-10 and Gini coefficient of 0.642. Like Teixeira, it seems Centenera's intention was to avoid Sapphic verses altogether: patterns that include the 4th (but not the 6th) syllable are very infrequent in both poets, with a maximum of 0.2% in Centenera for pattern 2-4-8-10, against the global average of 7.6%. Augusto dos Anjos still holds the lowest Gini index: 0.374.

The dendrogram for the 36 poets can be seen in FIG. 5. It is clear that rhythmic signatures cannot distinguish between Portuguese and Spanish, but some patterns are nonetheless visible. First, all poets not included in group **A** have something peculiar about their rhythmic signature, regardless of language. Centenera has by far the highest frequency of 2-6-10 verses: 27.1%. Gonzaga, by far that of 2-6-8-10 verses: 24.2%. Francisco de Borja uses the pattern 2-4-8-10 with a frequency of 24.6%, far above the second highest usage, 16.0%. Luis de Ulloa Pereira has simultaneously the highest usage of 3-6-10 verses, 16.9%, and the lowest of 2-4-6-10, 6.2%. Gonçalves Dias stands apart for the highest frequency of pattern 2-4-6-8-10, at 14.5%, and the lowest of pattern 3-6-10, at 4.4%. Finally, José Teixeira has the lowest frequency of 2-4-8-10 verses, along with Centenera; but, unlike the latter, his Gini index is not as high: while Centenera tops the list with a coefficient of 0.706, Teixeira's coefficient is 0.580.

In general, group **B** contains mostly (80%) poets who wrote in Portuguese. Group **C**, on the other hand, has predominantly (79%) poets who wrote in Spanish. Group **D** is mixed. As with previous experiments, time does not seem to be of paramount importance for rhythmic signatures.

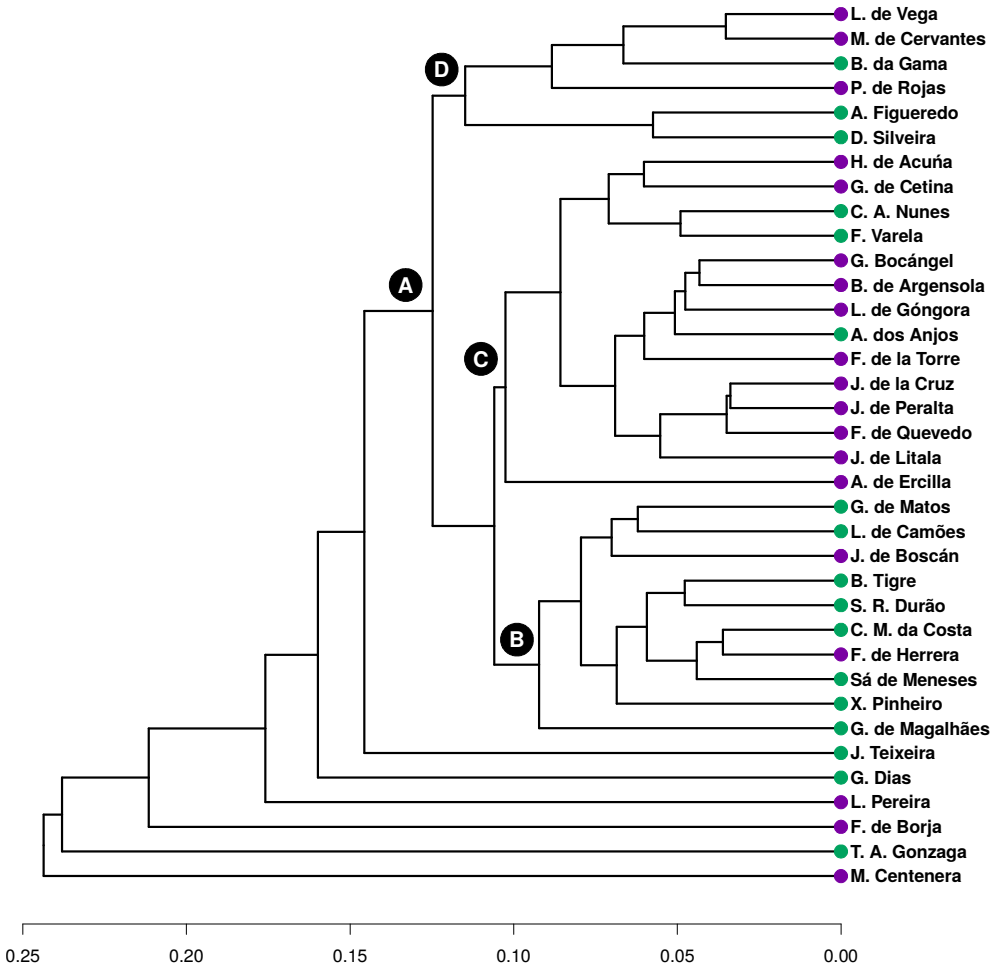


FIG. 5: Dendrogram for the rhythmic signatures of poets who wrote at least 1,000 10-syllable verses. ● = Portuguese, ● = Spanish

5 Discussion

It is, above all else, clear that, even though the rhythmic variability of a certain poet does depend partially on the times he lived in, we cannot distinguish rhythmic trends that would take us from one generation of poets to the next. There is no such progression in the usage of metric and rhythmic elements in poetry. In our case, the fact that 20th century poet Augusto dos Anjos presents more variation in rhythmic patterns that 18th century Tomás Antônio Gonzaga is nothing but a coincidence. Camões (16th century) and José Teixeira (21st century) present similar Gini coefficients, although they have published their works more than four centuries apart. Rhythmic richness depends primarily on a set of elements, such as the literary genre, the subject matter

of the poem, and, perhaps more importantly, the poet's own style. This last one—the style—establishes a sort of dialectical relationship with the habits of a literary period: an author's particular style and the period's general literary style set up some sort of mutual influence, such as can be seen in the almost exclusive usage of the 4-7-10 rhythmic pattern in Provence (verses with this pattern, not coincidentally, are called *decassílabos provençais* in Portuguese). That is why we can propose a rhythmic signature, an element which poets use, likely unconsciously, when making their verses.

Some interesting questions arise when we focus on the differences among the rhythmic signatures of the poets we analyzed. In the dendrogram shown in FIG. 1, there are manifest and unsurprising proximities, such as that between Araújo Figueredo and Delminda Silveira: they are both from the same Brazilian region (State of Santa Catarina) and belong to the same literary generation, two conditions that would explain their proximity. On the other hand, Bastos Tigre (early 20th century), is close to romantic poet and translator Xavier Pinheiro (early 19th) and to a group that includes baroque poet Sá de Meneses (17th century). If we had also analyzed Brazilian Parnassians, then probably Bastos Tigre would be much closer to them.

When we examine the cantos of epic poems, we can find an evident homogeneity in the case of Camões' *Os Lusíadas*, Bastos Tigre's *Bromilíadas*, Varela's *Anchieta,* Gonçalves Dias' *Os Timbiras* and José Teixeira's *Famagusta.* This could mean that it did not take very long for these poets to write their epics, which made their style more uniform throughout all cantos. Some differences might appear when cantos were written over a longer period of time, or if they were modified a long time after the original composition. Thus, analyzing style variations over a period of time could bring about important information concerning the change of an author's style, which would be useful in determining when a work whose time of composition is unknown was written.

It is important, however, to highlight the case of Bastos Tigre's *Bromilíadas*: it is a direct parody, which means that he followed very closely Camões' epic poem. It makes sense that, if there is no large rhythmic variation in the original, the same thing will happen to the parody. Furthermore, as one may observe in FIG. 2, FIG. 4 and TAB. 11, the style of the *Bromilíadas* is much closer to the work of Camões than any other book by Bastos Tigre, which demonstrates the poet's very accurate effort in following *Os Lusíadas*.

It is also relevant to investigate the rhythmic signatures of TAB. 9, which were calculated from the 7-syllable verses of five Brazilian poets. The fourth "poet" is, actually, a hybrid, for it was a duo (Olavo Bilac and Guimarães Passos) who wrote the book, *Pimentões,* where the 7-syllable verses were taken from; in this case, evidently, one does not obtain the style of an actual poet, but something like a mixed style, though it is certainly close to Bilac's style—especially true when we consider the enormous influence he had on his literary generation, including Guimarães Passos himself. It is also important to stress that 7-syllable verses permit a good amount of variation in the set of actual (not theoretical) rhythmic patterns: 13 possibilities, which is not as small as the number of patterns in 4-, 5- or 6-syllable verses. The result is expressed by the simple dendrogram of FIG. 3. One would expect that both Bastos Tigre and

Bilac–Passos were closer to Gregório de Matos, since all of them wrote satirical poems; however, the poet who is closer to Matos is 19th century poet Araújo Figueredo, who did not write satirical verses. Probably the usage of popular versification was, in this case, a more important factor in determining the resemblance of style than the subject matter or the strategy of the poems.

TAB. 12 shows the rhythmic signatures calculated from a large number of verses for two languages, Portuguese and Spanish. Comparing the numbers, we can readily see that some rhythmic patterns are used in very close proportions: 2-4-6-10, 1-4-6-10, 4-6-8-10, 1-6-8-10, 6-8-10, 2-4-10, 1-4-10, 6-10, 4-10. Hence, among 22 rhythmic patterns, 9 (41%) are very similarly used by poets of both groups. This means that there is some difference in the usage of almost 60% of the rhythmic patterns. However, not all rhythmic patterns have the same importance, for they present very different frequencies; the more frequently used patterns are more important when examining a rhythmic signature. If we establish that the difference between two frequencies are relevant if they both are at least 5% and the ratio of the smaller to the larger is at most 0.75, then we are left with three pattern whose frequencies are relevantly different:

- 2-6-10: Portuguese 9.2%, Spanish 13.5%, ratio of 0.68;
- 2-4-6-8-10: Portuguese 9.1%, Spanish 6.7%, ratio of 0.74;
- 3-6-8-10: Portuguese 7.5%, Spanish 5.2%, ratio of 0.69.

Taken individually, poets present clear differences concerning their rhythmic signatures. As we said earlier, the fact that a poet writes in Portuguese or Spanish does not entail a major rhythmic distinction between them, just as their times do not either. Brazilian poet Augusto dos Anjos, for instance, is closer to Spanish poets from the 16th and 17th centuries than to his contemporary Bastos Tigre, according to FIG. 5. Not coincidentally, many literary scholars say that Augusto dos Anjos' poetry is similar to that of the... baroque! It is also interesting that, in the same figure, baroque poets Góngora and Lope de Vega are distant from one another. To put it succinctly, individual style is much more important than other elements, and this fact allows us to compare poets from all ages. We can claim that their styles, translated into their preferences for rhythmic patterns, build up a veritable rhythmic signature.

6 Conclusion

Rhythmic signature aids in characterizing the style of a poet or, more generally, of a set of verses. The role of automatic scansion tools, in this context, is paramount: in this article we examined more than 250,000 verses, which would take a prohibitively long time to scan and annotate manually. Aoidos, our scansion tool, is capable of providing rhythmic signatures for arbitrary sets of verses, and was used for producing the results shown in this article.

We believe that automatic analysis of poetry in general and automatically-calculated rhythmic signatures in particular are a useful tool for providing objective information to experts. We hope that this sort of information can foster discussion and pro-

mote a more in-depth understanding of poetry, both past and present. The kind of discussion contained in Sect. 5 is a sample of what can now be achieved when the rhythmic patterns of thousands of verses and dozens of poets are analyzed, tabulated and graphically viewed.

There is still plenty of work ahead. As one example, the analyses produced by Navarro-Colorado (2016) on his Siglo de Oro corpus are different from the one presented here. The results are more or less compatible, but are different in the details. In particular, the way rhythmic patterns are computed by Navarro-Colorado is not the same as ours: whereas he talks about patterns such as 2-3-6-10, our tool never produces such patterns. Indeed, research is needed in order to quantify and understand how both humans and machines see rhythmic patterns.

Acknowledgment

We thank Samanta Maia for producing and sharing the digital editions of the works of Bastos Tigre. Dendrograms in this article were produced with R; packages `dendextend` (Galili 2015) and `circlize` (Gu et al. 2014) have been used.

References

Beaudouin, V. – Yvon, F. (1996). The metrometer: A tool for analysing French verse. *Literary and Linguistic Computing*, *11* (1), 23–31.

Chociay, R. (1994). A identidade formal do decassílabo em “O Uraguai”. *Revista de Letras*, *34*, 229–243.

Delente, É. – Renault, R. (2015). Projet anamètre: Le calcul du mètre des vers complexes. *Langages*, *3* (199), 125–148.

Galili, T. (2015). dendextend: An R package for visualizing, adjusting and comparing trees of hierarchical clustering. *Bioinformatics*, *31*, 3718–3720.

Gu, Z. – Gu, L. – Eils, R. – Schlesner, M. – Brors, B. (2014). *circlize* implements and enhances circular visualization in R. *Bioinformatics*, *30*, 2811–2812.

Mittmann, A. – Luiz dos Santos, A. (2018). The rhythm of epic verse in Portuguese from the 16th to the 21st century. In *14èmes Journées Internationales d’Analyse Statistique des Données Textuelles* (514–521).

Mittmann, A. – Maia, S. R. (2017). Análise comparativa entre escansões manual e automática dos versos de Gregório de Matos. *Texto Digital*, *13* (1), 157–179.

Mittmann, A. – von Wangenheim, A. – Luiz dos Santos, A. (2016). Aoidos: A system for the automatic scansion of poetry written in Portuguese, 2016. In *17th International Conference on Intelligent Text Processing and Computational Linguistics*, *2*, 611–628.

Moretti, F. (2013). *Distant reading*. London: Verso.

Navarro-Colorado, B. (2016). Hacia un análisis distante del endecasílabo áureo: Patrones métricos, frecuencias y evolución histórica. *Rhythmica*, (14), 89–118.

Navarro-Colorado, B. – Lafoz, M. R. – Sánchez, N. (2016). Metrical annotation of a large corpus of Spanish sonnets: Representation, scansion and evaluation. In *9th International Conference on Language Resources and Evaluation*, 4360–4364.

The Most Ancient Verse in the World (Sumerian, Akkadian, Hittite): Quantitative Analysis

Rim Nurullin
Institute of Linguistics, Russian Academy of Sciences, National Research University Higher School of Economics (Moscow)
rmnurullin@hse.ru

Nadezhda Roudik
Georg-August-Universität (Göttingen)
bunene.ru@gmail.com

Maria Molina
Institute of Linguistics,
Russian Academy of Sciences (Moscow)
maria.lakhuti@gmail.com

Andrei Sideltsev
Institute of Linguistics,
Russian Academy of Sciences (Moscow)
acidelcev@gmail.com

Tatyana Skulacheva
Institute of Linguistics, Institute of Russian Language,
Russian Academy of Sciences (Moscow)
skulacheva@yandex.ru

Abstract

Though there are many hypotheses as to the system of versification for proto-Indo-European or even all-world verse at its initial stage of development, the most ancient examples of verse have not yet been thoroughly studied. In this article we examine Sumerian, Akkadian, and Hittite texts. (some of which were written in 23rd–13th centuries B.C., before the much better known Ancient Greek). We discuss methods suitable for analyzing such verse, which is not strictly organized, as well as the results of quantitative analysis of verse in these three languages. We studied the number of syllables, number of stresses, number and distribution of long vowels (and where relevant the distribution of heavy syllables within a line). The presence or absence of rhyme, type of rhyme, and the presence or absence of well-formed stanzaic schemes were also taken into account. Comparing quantitative data for the three languages enables us to suggest that both syllabic (Sumerian) and accentual (Akkadian, Hittite) systems have existed since the first preserved examples of verse and that the choice for the system of versification was highly dependent on peculiarities of the particular language.

1 Introduction

A common area of discussion in verse study concerns the source of proto-Indo-European and even all-world verse and its system of versification. Truly valuable material that has been preserved from the oldest verse systems in the world (Sumerian, Akkadian, and Hittite) remains understudied from the point of view of modern verse study. We studied the number of syllables, number of stresses, number and distribution of long vowels (and where relevant the distribution of heavy syllables within a line). The presence or absence of rhyme, type of rhyme, and the presence or absence of well-formed stanzaic schemes have also been taken into account. We shall describe the general picture as we see it now, and the main topic of this particular article will be the rules for marking stresses in these languages—mainly in Akkadian, where tablets with the division of lines into four segments in accordance with four stresses per line have been preserved and present invaluable material for judging about how stresses were calculated in Akkadian accentual verse by Akkadians themselves.

There are a few ways of forming the rules for marking stress in the verse of a particular language if they do not yet exist.

1. We can judge by the structure of verse if its system is regular: accentual or (in a much later period) syllabic-accentual. M.G. Tarlinskaja (1976) suggested a method for English syllabic-accentual verse: different parts of speech are calculated separately at strong and at weak positions of syllabic-accentual verse, and thus a conclusion can be drawn as to which parts of speech are stressed/unstressed on 1) strong and on 2) weak positions. Thus we can see which parts of speech are 1) always stressed, 2) always unstressed, or 3) conditionally stressed (stressed on the strong, unstressed on the weak positions). Of course, certain other regularities—for example, for certain parts of speech in particular syntactic positions, in preposition/postposition to their main word, etc.—can also be found.
2. But what to do if the verse system is not regular and we cannot distinguish positions with confidence? If the language is a living one, T.V. Skulacheva has suggested the phonetic method: the text is read by a native speaker and recorded. Ideally it is better to record a few native readers. A person should preferably be educated but not a professional reader (not an actor, who is often taught to read in a particular way, depending on the principals of the particular actors' school). As for folklore, we of course use actual recordings from folklore expeditions or recording collections. Then the analysis takes place through perception—the recording is played to a group of native speakers (when possible, to a group of professional phoneticians), and the rules of stressing are derived from the model text: stresses are marked when the majority of phoneticians perceive a syllable as stressed. This method has so far been used for Russian folklore (in collaboration with A.M. Petrov) and for English free verse (in collaboration with G. Martynova). This method turned out to be effective: for example, the rules for Russian folklore almost 100%

corresponded to the rules that V.M. Zhirmunsky (1975) formulated for Russian non-folklore verse and that are generally accepted by Russian verse scholars.

3. But what are we supposed to do in the case of dead languages—such as Sumerian, Akkadian, and Hittite, which we deal with in this article—where the verse is irregular or not fully regular, because the systems of versification were just being formed? Various approaches can be suggested, but in this case we were extremely fortunate, since certain tablets in Akkadian have been preserved with words grouped into four segments (sometimes even with vertical lines between them) in accordance with four stresses per line. It turns out that there is a certain invariant behind rules for marking stresses in different languages, explained by physiological factors (a person needs to breathe and thus really long sequences of unstressed vowels are avoided in all languages), and by peculiarities in the way the brain processes language (secondary parts of speech are less emphasized and thus remain unstressed until the point where their length reaches the number of syllables which make a word always stressed in a particular language). As we shall see below, in Akkadian that length is three syllables, pretty much the same as in some long-word modern European languages—for example, Russian. In some other modern languages—where words are shorter or reduction of unstressed vowels is less than in Russian—obligatorily stressed words are those of two syllables or more. These almost similar limits for the length of unstressed words which we observe in completely different groups of languages in very different historical periods suggest that this is actually connected with the necessity to breathe or other physiological characteristics of speech. This also causes serious doubts in the methods of stress marking sometimes applied to, for example, Hittite, when really long 4- or 5-syllable words are sometimes marked as unstressed to achieve a 4-stressed pattern by analogy with Akkadian.

2 The database

The material for our study comes from the Sumerian, Akkadian and Hittite literary traditions.

In the Sumerian corpus, 500 lines of verse and 500 clauses of prose were assessed. The following three well-preserved Sumerian poems about Gilgamesh were selected for the study: 1) Gilgamesh and Agga (Römer 1980; Katz 1993); 2) Gilgamesh and Huwawa (Edzard 1990, 1991); 3) Gilgamesh, Enkidu and the Netherworld (Gadotti 2014). Besides these we have also made use of the Oxford database of Sumerian literary texts: “The Electronic Text Corpus of Sumerian Literature” (http://etcsl.orinst.ox.ac.uk/). For comparative prose material we chose so-called royal letters. Up to now we have assessed 19 literary royal letters published in (Michalowski 2011). As a control we have also turned to the letters in the database “The Electronic Text Corpus of Sumerian Literature” (http://etcsl.orinst.ox.ac.uk/).

For Akkadian we have analyzed circa 500 lines of poetic texts as well as 500 clauses of prose. At this stage of research we have mainly concentrated on literary texts of the Old Babylonian period (19th–16th cc. B.C.). The following works belonging to various literary genres of Akkadian literature were selected for study: an Old Babylonian tablet of the Gilgamesh Epic (George 2003: 224–240, 2009: 29–36; Nurullin 2016), "Song of Bazi" (George 2009, 1–15), and an Old Babylonian hymn to Ishtar (Thureau–Dangin 1925). We have also analyzed several love incantations (Wilcke 1985). The Standard Babylonian literary corpus (1 mill. B.C.) is represented at present by the first tablet of the "Babylonian Poem of the Righteous Sufferer" (Oshima 2014: 78–85) and some excerpts from the "Babylonian Theodicy" (Oshima 2014: 150–167). In our future work this corpus is to be made more representative. As for prose, we have selected 500 finite clauses from the Laws of Hammurapi (Old Babylonian period). Standard Babylonian prose texts will be examined at later stages of our research.

For Hittite we have studied 500 lines of poetic texts (primarily, "Song of Ullikummi" (Rieken et al. 2009)) and 500 clauses of prose, mostly instructions and letters.

3 Analysis

In the course of our study we compared Sumerian, Akkadian and Hittite verse with prose from these languages. We came to the conclusion that the widespread idea in verse study publications that all-Indo-European and even broader all-world versification had only one system of versification as its initial source is not necessarily correct.

3.1 Sumerian

All the Sumerian texts chosen for study have come to us in multiple copies. Line division is roughly identical in all the manuscripts (with minor and insignificant deviations). Some manuscripts differ from the rest by introducing additional lines and fragments. For the analysis we have used composite texts compiled by considering all the manuscripts of the texts studied. Analyses of the collected material show that Sumerian verse is likely to be loosely organized syllabic poetry: syllabic regularity is most consistently observed, and quantitative data show a single peak on lines containing from 8 to 11 syllables (77.1% of the lines)—precisely the lengths of lines that will be the most commonly employed in verse of the modern era. Nonetheless, after expanding the data to 1000 lines of verse and 1000 clauses of prose we will again test the hypothesis on the larger dataset and employ statistical methods to check that syllabic regularity is the key characteristic. The most interesting result at this stage of research is the discovery of assonance rhyme in Sumerian verse: lines are arranged as long sequences of variable length, and in each sequence the vowels in the last syllable of the line are identical. These data indirectly support the existing hypothesis of word final stress in Sumerian (since these vowels appear in the final syllable of a line) as well as the preferable reading in *-e* (when there is a choice between reading in *-e* and reading in *-i*), since so far corresponding vowels enter rhythmic chains in *-e*, and

not in *-i*. The data testifying to rhyme push the date when rhyme appeared in verse from the Middle Ages to the verse of 23rd–22nd cc. B.C., i.e. nearly thirty centuries earlier.

3.2 Akkadian

Akkadian verse is known to be accentual, with the end of the line marked by a penultimate syllable consisting of two moras (*clausula accadica*). The most striking property of Akkadian verse is that, in contrast to Sumerian and Hittite, there are surviving Akkadian texts that are not only divided into lines, but that also include additional marking of the poetic line explicating its rhythmical structure. Thus, in some manuscripts of the "Babylonian Theodicy" the line is divided into four parts, which correspond to the four stresses in four-stress lines of accentual verse. This marking of the text, virtually identical to that by specialists in verse study, was carried out by native speakers of Akkadian (possibly by the author of the text himself) and is extremely important for establishing the rules for marking stress in that language. It can also provide invaluable comparative information about the verse in other languages from the same period and region—that is, about the world's earliest verse systems that have been preserved to the present.

This explains the particular importance of Akkadian for the present study.

We calculated which words are stressed and which are not, dividing them into groups in accordance with those parameters that are known to influence the presence or absence of stress in well-studied present-day systems of versification. Thus we classified words by: 1) the length of each word (its number of syllables), and 2) the part of speech. We present our data in absolute numbers so that one is not misled by huge percentages in instances when there are just one or two occurrences.

We can observe from TAB. 1–6 that the number of syllables at which a word becomes stressed, irrespective of the part of speech to which it belongs, is three syllables. Almost 100% (99.995%) of **trisyllabic words** in Akkadian are stressed. The same can be said about all longer words—containing **4, 5 or 6 syllables**. Thus we need detailed rules of stressing only for monosyllabic and disyllabic words (the same as in Russian, for example).

Disyllabic words display a dichotomy known to us from many languages of modern Europe: parts of speech with strong semantic meaning of their own (nouns, verbs, adjectives, non-auxiliary verbs) are mainly stressed, while functional words (prepositions, conjunctions, particles) are unstressed. Here, though, an important peculiarity of the Akkadian language should be mentioned immediately. Constructions for expressing a genitival relationship—consisting of the governing noun (*nomen regens*) and the governed noun (*nomen rectum*) directly juxtaposed to each other—may have a single stress. The stress appears to fall on the second noun in the chain (*nomen rectum*), whereas the first noun (*nomen regens*) usually undergoes reduction, losing its case marker (for some preliminary observations concerning possible stress patterns of the Akkadian genitive chain see von Soden 1995, § 38k where a provisional distinction

	Stressed	**Unstressed**
Nouns	0	13
Adjectives	0	1
Adverbs (non-pronominal)		
Verbs (non-auxiliary)	1	0
Pronouns	0	16
Pronominal adverbs		
Conjunctions	0	6
Prepositions	1	6
Particles	0	28

TAB. 1: Monosyllabic words.

	Stressed	**Unstressed**
Nouns	108	26
Adjectives	21	1
Adverbs (non-pronominal)	11	1
Verbs (non-auxiliary)	49	3
Pronouns	4	1
Pronominal adverbs	1	0
Conjunctions	1	0
Prepositions	0	15
Particles	2	0

TAB. 2: Disyllabic words

Always stressed	**Stressed**	**Unstressed**
Nouns	102	1
Adjectives	17	0
Adverbs (non-pronominal)	9	0
Verbs (non-auxiliary)	62	0
Pronouns	3	0
Pronominal adverbs		
Conjunctions		
Prepositions	2	0
Particles		

TAB. 3: Trisyllabic words

Always stressed	**Stressed**	**Unstressed**
Nouns	11	0
Adjectives	3	0
Adverbs (non-pronominal)	0	0
Verbs (non-auxiliary)	26	1
Pronouns		
Pronominal adverbs		
Conjunctions		
Prepositions		
Particles		

TAB. 4: Tetrasyllabic words

Always stressed	Stressed	Unstressed
Nouns	2	0
Adjectives	0	0
Adverbs (non-pronominal)		
Verbs (non-auxiliary)	2	0
Pronouns		
Pronominal adverbs		
Conjunctions		
Prepositions		
Particles		

TAB. 5: 5-syllable words

Always stressed	Stressed	Unstressed
Nouns	0	0
Adjectives		
Adverbs (non-pronominal)		
Verbs (non-auxiliary)	2	0
Pronouns		
Pronominal adverbs		
Conjunctions		
Prepositions		
Particles		

TAB. 6: 6-syllable words.

between “Hauptton” and “Nebenton” is proposed). Thus genitive phrases consisting of 3 to 4 syllables are always treated as one stress unit in Theodicy. Cf., e.g., *bēl pakki* (l. 5) “wise man” (lit. “master of counsel”), *lumun libbi* (l. 8) “sorrow” (lit. “evil of the heart”). Almost all the unstressed nouns in the tables above are head nouns in genitive phrases. There is a condition, though, when both parts of a genitive phrase are stressed: if the whole phrase reaches 5 or more syllables, its two members are usually placed into separate sections on the tablet, which indicates that each of them has its own stress. Cf. e.g., *uruḫ dumqimma* (l. 208) “the path of goodness”, *kāriṣ ṭiṭṭašin* (l. 277) “the one who pinched off their clay”.

As for pronouns and pronominal adverbs, which in thoroughly studied languages of modern Europe form the group of conditionally-stressed words that can be either stressed or unstressed to help the line fit the rhythmical pattern of a poem, they are too scarcely attested in Theodicy to make conclusions. This is largely due to the fact that instead of personal and possessive pronouns Akkadian normally uses a set of grammatical morphemes and pronominal suffixes.

Monosyllabic words are rare in Akkadian. In Theodicy they are almost always unstressed, irrespective of the part of speech to which they belong. Monosyllabic nouns are mainly represented by reduced head nouns in genitive phrases; monosyllabic pronouns consist of only one connective word *ša*, ‘which’.

3.3 Hittite

Hittite verse is considerably more difficult to analyze than Sumerian and Akkadian because the division into lines is not explicitly available in the preserved texts. Currently (starting from the classic paper of H. Güterbock of 1951) in Hittitology it is common practice to divide the text into lines, based on the hypothetical suggestion that in ancient verse line and clause were identical. This is the position of A. Kloekhorst, C. Melchert and many others). Nonetheless, the data of M.G. Tarlinskaja, M.L. Gasparov, and T.V. Skulacheva, as well as our own data on Akkadian verse suggest, that the line need not be always identical to a clause.

Hittite presents a problem which is extremely interesting and fundamental for verse study. The texts are not divided into lines, and supposedly not all texts written in verse are explicitly marked as verse texts. So the study of Hittite raises two very basic issues for verse study: 1) what is verse, do we know enough about it to distinguish it from prose if we are not told which is which; and 2) what is a verse line - the main unit of a verse text? Do we know enough about lines to recognize one when we are not told in advance where its borders are? These questions are among the most important in verse study, but normally we do not see the gaps in our knowledge, because often the question is academic: we are dealing with material for which we know whether it is verse and where the borders between lines are. Hittite tests our actual knowledge of the matter—we really need to tell verse from prose and find borders between lines, while relying only on formal features. After trying many different approaches, we have discerned two which seem to be useful. The first serviceable feature may be word order. As has been shown by A.V. Sideltsev (2002, 2017), Hittite texts fall into 1) those explicitly marked SÍR (‘song’), 2) those, which are not specially marked as songs but have more inversions than a prosaic text in a language with strict word order, and 3) texts with almost no inversions. Since looser word order and an increased number of inversions are often mentioned as features of verse in various languages, and since texts with inversions comprise religious ritual texts, which are very often verse in many languages it is reasonable to suggest that texts with inversions as well as those marked “song” may be verse. Still we need to work out more detailed and formal methods to differentiate verse from prose. Another serviceable feature turned out to be the marking of the end of a verse line. We chose for analysis those tablets from Ullikummi where we had sequences of rather long clauses of more or less even length and where it was most probable that these clauses could actually be lines. It turned out that in this case plene spelling (marking either a long vowel or a stressed one) occurred at the penultimate syllable of such lines/clauses 4 times more often than at the end of prosaic clauses taken for comparison. At this time O.M. Anshakov is developing a program in order to find regularities in the distribution of plene spelling throughout the text. So far this seems the most promising way of dividing the text into lines. Some lines/clauses showed no syllabic regularities but loose accentual tendencies to a 4–5 stressed line.

4 Conclusion

The data obtained from the study of the three traditions sketched above suggest that the most ancient verse texts of the world already contain different systems of versification (both a syllabic system and an accentual one), and that a particular language's phonetic and grammatical characteristics determine the system of versification that it selects. Thus Sumerian verse consists of a loosely organized syllabic verse while Akkadian shows obvious accentual tendencies. Hittite also seems to have loosely organized accentual verse and shows no signs of syllabic regularity.

None of the languages analyzed have exhibited any quantitative regularities, except for the heavy penultimate syllable on a line in Akkadian and a long vowel (or a heavy syllable) at the penultimate syllable in Hittite. No signs of an accentual system have been found, - as is well known, the syllabic-accentual system is much more recent and we can easily observe the process of its formation in medieval verse texts that have been preserved.

Our analysis has shown that almost all meters have a marker of the end of a verse line, which is quite logical for emerging verse systems: the marker forms the basis of a verse line—the main unit of a verse text. In Sumerian we see end stress and correspondence of vowels at the ends of lines, in Akkadian and Hittite—long vowels (or, in Akkadian, "heavy" syllables, consisting of two moras, that is open syllables with a long vowel or closed syllables) at the penultimate syllables of a line.

It is interesting that rhyme in verse, as our recent investigations have shown, emerged much earlier than had been believed: not in the Middle Ages, but already in Sumerian verse of the 23rd–22nd cc. B.C. It is assonance rhyme—with correspondence of vowels but not consonants in the rhyming elements. It is amusing that when rhyme returns into verse in the Middle Ages it also starts to form, according to M. L. Gasparov, with assonance rhyme.

It is important to mention that Sumerian verse shows the emergence of rhyme but not stanzas—rhymes form long sequences of uneven length though not yet precise schemes of alternation. Akkadian has no signs of rhyme; Hittite, taking into account its smaller number of vowels which we can reliably differentiate and a rather limited number of verb inflexions in a SOV language (where verbal inflexions occur at the end of a line or clause) requires further study to decide if rhyme is really present.

Acknowledgment

The work has been done under the grant of the Russian Science Foundation N 18-18-00503 (supervisor Dr. A.V. Sideltsev).

References

Edzard, D. O. (1990). Gilgameš und Huwawa A. I. Teil. *Zeitschrift für Assyriologie* 80(2), 165–203.

Edzard, D. O. (1991). Gilgameš und Huwawa A. II. Teil. *Zeitschrift für Assyriologie* 81(2), 165–233.

Gadotti, A. (2014). "Gilgamesh, Enkidu and the Netherworld" and the Sumerian Gilgamesh Cycle. *Untersuchungen zur Assyriologie und Vorderasiatischen Archäologie* 10. Boston, Berlin.

George, A. R. (2003). *The Babylonian Gilgamesh Epic: Introduction, Critical Edition and Cuneiform Texts*. Oxford.

George, A. R. (2009). *Babylonian Literary Texts in the Schøyen Collection*. Bethesda.

Güterbock, H.G. (1951) The Song of Ullikummi. Revised Text of the Hittite Version of a Hurrian Myth. *Journal of Cuneiform Studies* 5(4), 135–161.

Katz, D. (1993). *Gilgamesh and Akka.* Groningen: Styx.

Michalowski, P. (2011). *The Correspondence of the Kings of Ur: An Epistolary History of an Ancient Mesopotamian Kingdom.* Winona Lake: Eisenbrauns.

Nurullin, R. M. (2016). Rannije versii eposa o Gilgameshe: tablitsa Skjejena (Early Versions of the Epic of Gilgamesh: A Tablet from the Schøyen Collection). *Vestnik drevnej istorii (Journal of Ancient History)* 76(2), 264–285.

Oshima, T. (2014). *Babylonian Poems of Pious Sufferers. Ludlul Bēl Nēmeqi and the Babylonian Theodicy*. Tübingen.

Rieken, E. et al. (eds.) (2009). hethiter.net/: CTH 345.I.1 (TX 2009-08-31)

Römer, W. H. Ph. (1980). Das sumerische Kurzepos "Gilgamesh and Akka". *Alter Orient und Altes Testament 290, I.* Neukirchen-Vluyn: Neukirchener Verlag.

Tarlinskaja, M.G. (1976). *English verse: Theory and History*. The Hague: Mouton,

Thureau-Dangin, F. (1925). *Un hymne à Ištar de la haute époque babylonienne*. RA 22, 169–177.

Sideltsev, A. V. (2002). Inverted word order in Middle Hittie. In V. V. Shevoroshkin – P. J. Sidwell (eds.), *Anatolian Languages (Association for the History of Language Studies in the Science & History of Language 6)* (pp. 137–188). Canberra: Association for the History of Language.

Sideltsev, A. V. (2017). *Sintaksis prostogo predlozhenya v hettskom yazyke*. Moscow.

Soden, W. von. (1995). *Grundriss der Akkadischen Grammatik*. 3. Aufl. Roma.

Wilcke, C. (1985). Liebesbeschwörungen aus Isin. *Wasserman, N. Akkadian Love Literature of the Third and Second Millennium BCE*, 188–209. Wiesbaden.

Zhirmunsky, V. M. (1975). *Teoriya stikha*. Leningrad.

Metrical Types of *Bylinas* (Russian Epic Folk Songs) in the Collection of the Institute of Linguistics, Literature and History at the Karelian Research Center of the Russian Academy of Sciences

Alexander M. Petrov
Institute of Linguistics, Literature and History at the Karelian Research Center of the Russian Academy of Sciences, Dept. of Folklore and Audio Archive
hermitage2005@yandex.ru

Abstract

The problem of analyzing folklore verse is among the most important problems in metrical studies today. There have been some developments in this area (works by A. Vostokov, F. Korsh, V. Zhirmunsky, M. Shtokmar, M. Gasparov, J. Bailey, etc.); however, folk verse has not been fully examined. There are two reasons for this: 1) until recently, audio recordings of folklore texts were not available to researchers; 2) metrical studies lacked a developed method for the analysis of folk verse. At its present stage of development, metrical studies have been equipped to analyze folklore verse with precise methods. Also, the digitization of audio recordings of folk songs provides the possibility of using audio files that display the accentuation of folklore texts, their syllabic composition, etc.

This paper deals with the problem of the typology of epic verse in the material stored in the Audio Archive of the Institute of Linguistics, Literature and History at the Karelian Research Center of the Russian Academy of Sciences (Petrozavodsk). The paper demonstrates the potential of the M.L. Gasparov–T.V. Skulacheva method for analyzing folklore texts. A total of 25 texts (and fragments) with classic Russian epic stories (about Duke Stepanovich, Ilya of Murom, Dobrynya, Vol'ga, etc.) collected from the Russian traditional singer Fyodor Andreyevich Konashkov (1860–1941) have been analyzed.

1 Introduction

The history of the study of *bylina* verse goes back more than 200 years, but there is as yet no satisfactory scientific description of it.

Why? In my opinion, the study of folk verse is complicated by the fact that it is almost always, with some exceptions, sung; it exists in unity with the melody and versification occurs in conjunction with the melody. The existence of folk verse through musical expression has two main consequences:

1. The process of singing can increase the number of syllables in a line, or, in some cases, an entire musical phrase can be performed on a single syllable.
2. The usual linguistic norms of accentuation can be changed, transferring the stress in a word from one syllable to another, which is often attributable to a difference in local dialect but may also be owing to the influence of melody and musical rhythm.

Folk verse has been studied in the framework of the three main theories: the *"foot"* theory (V. Trediakovsky, A. Hilferding, P. Golokhvastov and others), *accentual* theory (A. Vostokov and others) and *musical* theory (F. Korsh and others) (Gasparov 1978: 8–9). However, none of these theories can be considered satisfactory for its description.

The *"foot"* theory was developed at a time when non-classical metrical types of Russian verse (*dol'nik*, *taktovik*, *accentual verse*) had not yet been identified.

The *accentual* theory does not stand up to testing against empirical data: the rule of the accentual equality of the lines is always broken. This theory was proposed at a time when researchers were not able to use authentic audio recordings of folklore and studied epic verse through published texts in which the norms of folk song accentuation were not represented.

The *musical* theory brings to the fore the musical rhythm of a folklore work and does not take into account the linguistic basis of the verse. However, as M.P. Shtokmar indicates, the source of the folk verse system is not the music, but the language itself (Shtokmar 1952: 227). The inseparability of the text from the melody was convincingly refuted by M.P. Shtokmar when he showed examples of texts and melodies "migrating" (a single text being performed with different melodies; the same melody being used for different texts) (Shtokmar 1952: 155–176). To identify the exact linguistic, structural parameters of a folk verse, it is necessary to separate the text from the melody (Shtokmar 1952: 214). The mechanism for separating the text (textual analogue) from the melody was demonstrated in a work by J. Bailey (Bailey 2001: 30–36). This is a difficult task, which apparently does not have a universal solution: different approaches are needed for lyrical and epic genres. Concrete work with each text is required, and a high-quality audio recording of the epic song being performed becomes essential.

Today, we have certain advantages compared to earlier researchers. Firstly, we have the opportunity to listen to authentic audio recordings of folklore texts stored in scientific archives. This allows us to judge the norms of folk song accentuation more adequately. Secondly, the scientific method of studying verse has made advances.

2 Method of study

For this study I have used materials stored in the Audio Archive of the Institute of Linguistics, Literature and History at the Karelian Research Center of the Russian Academy of Sciences. Recordings of many genres are housed here, including those of *bylina*-epics made during the first half of the 20th century in the territory of the Russian North. In order to demonstrate my method of studying folklore verse I use the recordings collected in 1938 and 1940 by A.D. Soymonov from the well-known North-Russian singer and storyteller Fyodor Andreyevich Konashkov (1860–1941). Konashkov was known as an excellent performer: folklore works of many genres were recorded from him, such as *fairy tales*, *epics*, *spiritual verses*, etc. The epic songs used for this research work include: "Duke Stepanovich", "Volkh Vseslavyevich and the Indian kingdom", "Ilya of Murom and Tsar Kalin", "Dobrynya and Marinka", "Sukhman Rekhmantyevich" and many others.

A.D. Soymonov did not make audio recordings of complete epics, only short samples, owing to the technical limitations of that time. Usually he recorded the start (the first 1–2 minutes at the beginning of an epic). Transcribing these recordings is difficult because of the poor sound quality: they contain a lot of noise, hissing, etc. This is due to both the old age of the recording and the features of recording technologies in the 1930s–40s. In addition, the singing of F.A. Konashkov contains features of the North Russian dialect (of the Pudozhsky district of Karelia), and some features of his phonetics, vocabulary and grammar are not necessarily familiar to native speakers of the modern Russian literary language. In the event that the transcription of a line was not possible, I have indicated this by marking it "illegible".

The study of texts is carried out according to the method of M.L. Gasparov–T.V. Skulacheva (Skulacheva 2012, 2014). I use the following *five* parameters for analyzing epic verse (epic line):

1) metrical structure
2) anacrusis
3) ending
4) number of stresses
5) number of syllables

First, I repeatedly listened to the audio recording of the text. This is necessary to identify the exact sound image of all word forms (place of stress in each word, the presence of vocables, syncope or apocope, etc.). I did not use special computer programs for phonetic analysis. Next, I made a transcription of the audio text. The transcription was made in the form of a table in accordance with the M.L. Gasparov–T.V. Skulacheva method. Next, the text was marked up: stresses were indicated; the place of the caesura was shown (if present); the schemes of the intervals were given; metrical types of the lines, anacruses and endings were identified and calculated; syllabic and accentual tendency was tested. To identify the unifying meter of the whole text, a numeric parameter of 75% was used (Skulacheva 2012).

The table with the markup of the text is as follows (TAB. 1, stressed syllables in italics):

	Text	Interval Scheme	Coincidence with the meters	Number of Syllables	Number of Stresses
1	Как по м*а*тушки да по Во*л*ге рек*и*	2.42.0	Acc	11	3
	А е*д*ет тр*и*дцать тр*и* корабл*я* да роскрашёны*и*,	1.1123.2	Tk	15	5
	А как од*и*н кора*б*лик ид*е*т да ё*н* получше вс*е*х,	3.12111.0	Dk	15	6
	А ё*н* получше вс*е*х и да поба*с*че вс*и*х,	1.1131.0	I6	12	5
5	А по нос*у* кора*б* как л*ю*ты звер*и*,	3.121.0	Dk	11	4
	А по корм*ы* кора*б* то да чисты зме*и*,	3.131.0	I6	12	4
	А на кора*б*лике м*а*чты золочёны*и*,	3.23.2	Tk	13	3
	А кан*а*тики вс*е* шелк*о*вы*и*,	2.21.2	Dk	10	3
	А парус*а* все ш*и*ты-бра*н*ы*и* да полотня*н*ы*и*,	3.115.2	I7	16	4
10	А на боку-то на кора*б*лики да нап*и*сано,	3.34.2	Acc	15	3
	А ведь т*а*к сидят-то да д*о*бры м*о*лодцы,	2.121.2	Dk	12	4
	А на друг*о*м боку нарис*о*вано,	3.12.2	Dk	11	3
	А сидят-то ведь да кр*а*сны*и* д*е*вушки,	2.32.2	Tk	12	3
	А кора*б*лик-то ведь на в*о*душки да колыблетсе,	2.44.2	Acc	15	3
15	А м*о*лодцы вс*е* с дев*и*цами об*о*ймутсе да поцел*у*ютсе	1.2135.2	Acc	19	5

TAB. 1: Markup of the text

Lines in total: 15 (=100%)

Trochee (T) = 0 (0%)
Iamb (I) = 3 (20%)
Dactyl (D) = 0 (0%)
Amphibrach (Amph) = 0 (0%)
Anapaest (An) = 0 (0%)
Dol'nik (Dk) = 5 (33.3%)
Taktovik (Tk) = 3 (20%)
Accentual verse (Acc) = 4 (26.7%)
1-word lines (1-w) = 0 (0%)

The threshold of 75% is exceeded by accentual verse: 100% = Accentual verse. Consequently, the meter of the presented text is *accentual verse*.

In TAB. 1, line No. 8 is a type often designated by researchers of folklore verse as *5+5*: "А кан*а*тики || вс*е* шелк*о*вы*и*" (Bailey 2010: 219). Following M.L. Gasparov, I define the metrical scheme of this line as *dol'nik* (Gasparov 1984: 127–129). At this stage of my work, I adhere to the terminology of M.L. Gasparov for two reasons: 1) the *5+5* meter is found in epics in isolated cases and does not affect the calculations, 2) using terminology from other methods will lead to methodological eclecticism, which is unacceptable at any stage of research.

Note that there are some difficulties here: F.A. Konashkov does not pronounce this line very clearly: it is either “А кан*а*тики вс*е* шелк*о*выи” (2.21.2) or “А кан*а*тики ведь шелк*о*выи” (2.4.2). In the second case, there would be an *accentual verse* scheme (the particle *ведь* is always unstressed). In this instance, it is necessary to accept some uncertainty concerning the verse structure.

The *syllabic composition* of the text is given in TAB. 2:

Number of Syllables	Number of Lines
10	1 (6.7%)
11	3 (20%)
12	4 (26.6%)
13	1 (6.7%)
15	4 (26.6%)
16	1 (6.7%)
19	1 (6.7%)

TAB. 2: Syllabic Composition

Data on the *accentual structure* of the verse is given in TAB 3:

Number of Stresses	Number of Lines
3	7 (46.7%)
4	4 (26.7%)
5	3 (20%)
6	1 (6.7%)

TAB. 3: Accentual Structure

Typology of anacruses is presented in TAB. 4:

	Number	Percentage
Monosyllabic anacrusis	3	20%
Disyllabic anacrusis	5	33.3%
Trisyllabic anacrusis	7	46.7%
Total	**15**	**100%**

TAB. 4: Anacrusis

Typology of the endings is given in TAB. 5:

	Number	Percentage
Dactylic ending	10	66.7%
Masculine rhyme	5	33.3%
Total	**15**	**100%**

TAB. 5: Ending

At the beginning of the 19th century, it was discovered that a distinctive attribute of the *bylina*-epic is a dactylic ending. However, audio recordings of sung texts provide a new perspective on this claim. In the epic I analyze, there are such phrases as: *no*

*Во**и**лге-рек**и**, пол**у**чше вс**е**х, поб**а**сче вс**и**х, люты звер**и**, чисты змеи*. Traditionally, these are considered as enclitic phrases with a primary stress on the first word: *по Во**и**лге-реке, пол**у**чше всех, поб**а**сче всих, люты звери, чисты змеи*. Scanning the line in this way, the so-called "dactylic ending" appears. These folklore combinations drew the special attention of M.P. Shtokmar, who illustrated his observations with a multitude of examples from epic texts: *за родн**а** сына, дорог**а** госьтя, кован**ы** замки*, etc. (Shtokmar 1952: 242). Judging by the audio recordings of epics collected from F.A. Konashkov, there is no empirical basis to interpret the second word as unstressed. The narrator clearly sings the line with a strong emphasis on each word, including the words *рек**и**, вс**е**х, звер**и**, змеи*, etc. The presence of two stresses in these and some other formulas is also recorded in published collections of folk songs, as indicated by J. Bailey (Bailey 2001: 391). Even the last syllable of the hyper-dactylic ending gets an additional stress: *пон**у**киваёт, споскр**и**пываёт, спочиркив**аю**т* (Bailey 2012: 15). It is obvious that the interpretation of phrases exhibiting this pattern as enclitic phrases does not quite correlate with their true nature, and, at a minimum, requires special commentary and good audio recordings. Let me clarify that I am talking about phrases that consist of *two* words: *люты звер**и***, etc. In the event that only *one* word is placed at the end of a line (*роскрашёныи, золочёныи*, etc.), the "dactylic ending" rule has no exceptions. Apparently, the last syllable in such a word may acquire some additional emphasis due to the influence of the musical rhythm. However, this emphasis cannot be called *stress* in the linguistic sense of the term.

The rest of the corpus of texts is analyzed in the same way. Currently, 25 texts, with a total of 441 lines, have been analyzed. This data is not sufficient for reliable statistical calculations, but it is quite enough to test and demonstrate the method of analysis. Since it is customary in metrical studies to work with large arrays of texts, my first priority is to enlarge the database. Currently, I have recordings of 100 epics (texts or fragments) that require making transcriptions and doing the markup. I also intend to include in the database texts of spiritual verses, historical songs, laments and other genres of verse folklore. The Audio Archive of the Institute of Linguistics, Literature and History at the Karelian Research Center has a sufficient number of such recordings, including, among other things, recordings of so-called *fakelore*—late imitations in the epic style, telling about Soviet political figures.

3 Conclusion

The main results obtained from these materials are as follows.

1. The repertoire of the epic singer F.A. Konashkov includes texts of different metrical types, such as *dol'nik*, *taktovik*, *accentual verse*, and *disyllabic meters with alternating anacrusis*. There is a tendency for *taktovik* to prevail. Some quantitative data is presented in TAB. 6:

	Number	Percentage
Disyllabic meter with alternating anacrusis	5	20%
Dol'nik	7	28%
Taktovik	10	40%
Accentual verse	3	12%
Total	**25**	**100%**

TAB. 6: Metrical types of *bylinas* by F.A. Konashkov

2. *Syllabic composition* of the texts is given in TAB. 7:

	Number	Percentage
9-syllable line	8	1.8%
10-syllable line	24	5.4%
11-syllable line	68	15.4%
12-syllable line	112	25.4%
13-syllable line	74	16.8%
14-syllable line	77	17.5%
15-syllable line	43	9.7%
16-syllable line	17	3.8%
17-syllable line	10	2.3%
18-syllable line	2	0.5%
19-syllable line	3	0.7%
20-syllable line	2	0.5%
21-syllable line	0	0%
22-syllable line	1	0.2%
Total	**441**	**100%**

TAB. 7: Syllabic composition

3. Data on the *accentual structure* of the texts are given in TAB. 8:

	Number	Percentage
2 stresses per line	47	10.7%
3 stresses per line	154	34.9%
4 stresses per line	164	37.2%
5 stresses per line	64	14.5%
6 stresses per line	9	2%
7 stresses per line	2	0.5%
8 stresses per line	1	0.2%
Total	**441**	**100%**

TAB. 8: Accentual structure

4. The *typology of anacruses* is presented in TAB. 9:

	Number	Percentage
No syllables in anacrusis	7	1.6%
Monosyllabic anacrusis	96	21.8%
Disyllabic anacrusis	183	41.5%
Trisyllabic anacrusis	141	31.9%
Quadrisyllabic anacrusis	14	3.2%
Total	**441**	**100%**

TAB. 9: Typology of anacruses

5. The *typology of the endings* is given in TAB. 10:

	Number	Percentage
Dactylic ending	334	75.7%
Masculine rhyme	98	22.2%
Hyper-dactylic ending	9	2.1%
Total	**441**	**100%**

TAB. 10: Endings of the lines

6. As can be seen from the above tables, F.A. Konashkov's manner of singing is strictly in line with the classical view of epic metrics. The narrator uses a variety of meters, but gives preference to the *taktovik* (this statement requires additional statistical verification). Despite the fact that Russian epic verse is not syllabic, it seems that the narrator tries not to go far beyond the range of 11–14 syllables in a verse, with a preference for 12-syllables lines. The widespread notion of three stresses in the *taktovik* lines of *bylina* verse requires some modification. As follows from my calculations based on audio recordings, lines with four stresses are slightly predominant in epic verse, although statistically the difference between the number of lines with three or four stresses is minimal. In general, epic verse is created with 3 or 4 stresses in each line (sometimes accentual models based on two or five stresses in the line are used). A striking typological feature of epic verse is the dactylic ending—the texts collected from F.A. Konashkov confirm this propensity (75.7%). The dactylic ending disappears when a *two-word* formula is placed at the end of a line: *лют**ы*** *зве**ри***, *по**л**у**ч**ше вс**е**х*. Audio recordings refute the widespread view that the second component in this type of phrase is unstressed.

7. The method I use for analyzing epic verse is based on three principles: 1) the obligatory use of an audio recording of the folklore text, 2) separation of the text from the music, 3) tabulation in accordance with the algorithm proposed by M.L. Gasparov and T.V. Skulacheva for the analysis of non-classical verse (involving five features: metrical structure, anacrusis, endings, number of stresses, and number of syllables). As I have tried to show in the paper, this approach takes into account many structural features of folklore verse and allows us to describe it with precise definitions.

This research needs to be extended to a wider range of material.

Acknowledgements

The paper was written within the collective planned project “Folklore Traditions and Hand-Written Booklore of the European North: Source Study, Textual Criticism, Poetics, and Ethnographic Context”, no. AAAA-A18-118030190094-6

I would like to pay special thanks and appreciation to the persons below who helped me at every step of my research work:

Tatyana Skulacheva, who kindly agreed to supervise my course of study at the Institute of Russian Language, Russian Academy of Sciences, in 2017,

Vladimir Plungian, for the happy opportunity to attend his lectures on Russian metrics at Moscow State University in 2017,

James Bailey for a number of valuable consultations on the problems of Russian verse,

Also, I would like to express my special gratitude to *Eila Stepanova* (University of Helsinki) and to *Mr. Frog* (University of Helsinki) for their friendly linguistic support and for the proofreading the manuscript of this paper before the publication.

References

Bailey, J. (2001) *Izbrannye raboty po russkomu narodnomu stihu*. Moskva.

Bailey, J. (2010) *Tri russkih narodnyh liricheskih razmera*. Moskva.

Bailey, J. (2012) Epicheskij stih chetyrekh pokolenij skazitelej v sem’e Ryabininyh. II. Trekhudarnyj akcentnyj stih v byline “Vol’ga i Mikula”. In *Slavyanskij stih*. Moskva, 11–25.

Gasparov, M.L. (1978). Russkij bylinnyj stih. In *Issledovaniya po teorii stiha*. Leningrad, 3–47.

Gasparov, M.L. (1984). *Ocherk istorii russkogo stiha*. Moskva.

Shtokmar, M.P. (1952). *Issledovaniya v oblasti russkogo narodnogo stihoslozheniya*. Moskva.

Skulacheva, T.V. (2012). Metody opredeleniya metra v neklassicheskom stihe. In *Izvestiya RAN. Seriya literatury i yazyka*. 71, (2), 45–54.

Skulacheva, T.V. (2014). Metody analiza stiha pri neizvestnoj sisteme stihoslozheniya. In *Vestnik Orenburgskogo gosudarstvennogo universiteta*, 11, 41–46.

Rhythmically Ambiguous Words or Rhythmically Ambiguous Lines? In Search of New Approaches to an Analysis of the Rhythmical Varieties of Syllabic-Accentual Meters

Igor Pilshchikov
UCLA – TLU – MSU
pilshch@tlu.ee

Abstract

The statistical analysis of the rhythm of Russian syllabic-accentual verse confronts a problem: how to accentuate words whose natural-language stress is weaker than that of fully-stressed words. Zhirmunsky called such words "ambiguous" and formulated a rule: they should be considered stressed in "strong" (ictic) positions and unstressed in "weak" (non-ictic) positions. Gasparov, who accepted and elaborated on Zhirmunsky's rule, pointed out that "this difference in the quality of stress in strong positions [...] has a significant impact on the rhythm of verse, especially that of ternary meters." The main point of the present paper is that this ambiguity equally impacts Russian binary meters. In the case of iambic tetrameter, for example, fully-stressed lines that contain rhythmically ambiguous words are often isomorphic with the predominating rhythmical form. In the present paper, this phenomenon is explored in connection with Jakobson's hypothesis that rhythmically ambiguous words gravitate toward "weak" (i.e. less frequently stressed) ictuses. Although Jakobson's view of accentual ambiguity was different from Zhirmunsky's, and Jakobson's calculation was, in fact, methodologically inaccurate, a cross-pollination of their approaches may prove fruitful.

1 The problem

The statistical analysis of the rhythm of Russian syllabic-accentual verse confronts a specific problem: how to accentuate words whose natural-language stress is weaker than that of fully-stressed words. This group includes monosyllabic pronouns, monosyllabic verbal copulas, disyllabic possessive pronouns in the post-nominal position, disyllabic prepositions, and the like.

Viktor Zhirmunsky called these words "metrically ambiguous" ("*metričeski dvojstvennye*") and formulated a rule: they should be considered stressed in "strong" (ictic) positions and unstressed in "weak" (non-ictic) positions (Žirmunskij 1925: 95–120 [§§ 17–19]; English translation: Žirmunskij 1966: 93–113). In other words, their rhythmical interpretation depends on the metrical scheme. It would therefore be more reasonable to describe such words as "rhythmically ambiguous" rather than "metrically ambiguous," because they never alter or violate the metrical interpretation of a line but indeed affect its rhythmical interpretation.

Mikhail L. Gasparov, who accepted and elaborated on Zhirmunsky's rule, issued an important caveat: he pointed out that "schematic stresses may have different strengths depending on whether they are represented by an unconditionally stressed word or an accentually ambiguous word. This difference in the quality of stress in strong positions has not yet been studied by verse theorists, though it has a significant impact on the rhythm of verse, especially that of ternary meters" (Gasparov 1974: 148–149; translations from Russian are mine unless otherwise noted).

The main point of the present paper is that this ambiguity equally affects Russian binary meters, and therefore is all the more deserving of examination. To demonstrate this claim, I will target the best studied Russian meter, iambic tetrameter. In the rhythmical compositions of many poems, the fully-stressed lines (Form I), which contain rhythmically ambiguous words, often tend to be isomorphic with the predominating rhythmical form.[1] To put it simply, if we mark the rhythmically ambiguous words on ictic positions as unstressed, the resulting rhythmical forms could theoretically coincide with any of the other seven rhythmical forms of iambic tetrameter. In practice, however, rhythmically ambiguous lines often coincide with the form that predominates in the poem. In particular, this applies to poems with a high level of "rhythmical monotony," i.e. the poems (or fragments thereof) in which one or two forms constitute extensive homogeneous groups (see Beglov 1996).

1 It is generally accepted to use the form numbers proposed by Georgii Shengeli (see Šengeli 1923: 139–141). The unstressed ictuses are underlined here and in all later examples:

xXxXxXxX(x) I	x<u>x</u>x<u>x</u>xXxX(x) V
x<u>x</u>xXxXxX(x) II	x<u>x</u>xXx<u>x</u>xX(x) VI
xXx<u>x</u>xXxX(x) III	xXx<u>x</u>x<u>x</u>xX(x) VII
xXxXx<u>x</u>xX(x) IV	x<u>x</u>x<u>x</u>x<u>x</u>xX(x) VIII

2 Examples

2.1 Konstantin Batiushkov's "Moj Genij"

Batiushkov's four-foot-iambic poems of 1815–17 have a two-mode rhythm: Forms I and IV add up to almost 87% (57.5% of Form IV and 29% of Form I; see Taranovski 1953: TAB. II; Dobritsyn 2016: 42–43). A typical example is Batiushkov's "Moj Genij" (1815), where Forms I and IV are used throughout the poem, while Form II in the concluding line serves as a kind of "rhythmical italics" ("*ritmičeskij kursiv*"). However, out of six fully-stressed lines two are ambiguous, and both are isomorphic with Form IV (see FIG. 1). In Form IV, the third ictic stress is skipped. Correspondingly, in the ambiguous lines, the rhythmically ambiguous words fall on the third ictus: *O pámjat'sérdca, ty sil'néj* (line 1); *Xranítel' Génij moj — ljubóvju* (line 13).

О па́мять се́рдца! *ты* сильне́й	I (IV)
Рассу́дка па́мяти печа́льной,	IV
И ча́сто сла́достью свое́й	IV
Меня́ в стране́ пленя́ешь да́льной.	I
Я по́мню го́лос ми́лых сло́в,	I
Я по́мню о́чи голубы́е,	IV
Я по́мню ло́коны златы́е	IV
Небре́жно вью́щихся власо́в.	IV
Мое́й пасту́шки несравне́нной	IV
Я по́мню ве́сь наря́д просто́й,	I
И о́браз ми́лой, незабве́нной,	IV
Повсю́ду стра́нствует со мно́й.	IV
Храни́тель Ге́ний *мой* — любо́вью	I (IV)
В уте́ху да́н разлу́ке о́н:	I
Засну́ ль? прини́кнет к изголо́вью	IV
И услади́т печа́льной со́н.	II

I(IV) — IV — IV — I
I — IV — IV — IV
IV — I — IV — IV
I(IV) — I — IV — II

FIG. 1: The rhythmical composition of Batiushkov's "Moj Genij"

2.2 Joseph Brodsky's "Soznan'e, kak šestoj urok..."

"Brodsky is the most monotonous poet in Russian" (Beglov 1996: 124). A typical example is his 24-line poem "Soznan'e, kak šestoj urok..." (1960s), in which 75% of the lines belong to Form III (Beglov 1996: 113). The rest (25%, i.e. six lines) consists of two lines corresponding to Forms I, three to Form IV and one to Form II. The Form II line and two Form IV lines are found in the concluding quatrain, whereas both fully-stressed lines are isomorphic to Form III (see FIG. 2). In Form III, the second ictic stress is

skipped. Correspondingly, in the ambiguous lines, the rhythmically ambiguous words fall on the second ictus: *v prostránstve mežd<u>u</u> dvúx desníc* (line 11); *zovét eg<u>o</u>, kak pút' nazád* (line 19).

Созна́нье, к<u>а</u>к шесто́й уро́к,	III
выво́дит <u>и</u>з каз<u>е́</u>нных сте́н	III
ребе́нка н<u>а</u> ночно́й поро́г.	III
Он та́щится<u>я</u> во тьму́ зате́м,	III
чтоб, ту́чам п<u>о</u>каза́в персто́м	III
на то́нущ<u>и</u>й в снегу́ пого́ст,	III
себя́ здесь <u>о</u>сени́ть кресто́м	III
у це́ркви в ч<u>е</u>лове́чий ро́ст.	III
Скопле́нье м<u>е</u>ртвецо́в и пти́ц.	III
Но жи́зни <u>о</u>стае́тся ми́г	III
в простра́нстве *м<u>е</u>жду* дву́х десни́ц	I (III)
и в сто́рон<u>ы</u> от ни́х. От ни́х.	III
Одна́ко ж<u>е</u>, стремя́сь впере́д,	III
так тя́жек н<u>а</u>пряже́нный взо́р,	III
так се́рдце сда́влен<u>о</u>, что ро́т	IV
не про́буе<u>т</u> вдохну́ть просто́р.	III
И то́лько з<u>а</u> спино́ю са́д	III
поки́нуть н<u>е</u>изве́стный кра́й	III
зове́т *ег<u>о</u>*, как пу́ть наза́д,	I (III)
знако́мый, к<u>а</u>к соба́чий ла́й.	III
Да в ту́чах <u>и</u>з холо́дных ды́р	III
луна́ стара́ется<u>я</u> блесну́ть,	IV
чтоб п<u>о</u>дсказа́ть, что в но́вый ми́р	II
забо́р ука́зыва<u>е</u>т пу́ть.	IV

III — III — III — III
III — III — III — III
III — III — I(III) — III
III — III — IV — III
III — III — I(III) — III
III — IV — II — IV

FIG. 2: The rhythmical composition of Brodsky's "Soznan'e, kak šestoj urok..."

3 Jakobson's approach

The phenomenon discussed above may be considered in connection with Roman Jakobson's hypothesis that monosyllabic words gravitate toward "weak" ictuses (Jakobson 1973). The weakest, i.e. the least frequently stressed ictus in the Russian iambic tetrameter of the eighteenth and nineteenth centuries is the third (penultimate) one. Jakobson attempted to explain this with reference to the non-phonological nature of stress in the monosyllables (Rudy 1976: 493–495). Although Jakobson's view

of accentual ambiguity was different from Zhirmunsky's, a cross-pollination of their approaches may prove fruitful.

First and foremost, it has been demonstrated that Jakobson's calculations were methodologically inaccurate and monosyllables, either stressed or unstressed, are not most frequent on the weak ictuses (Gasparov–Skulacheva 2003: 38–39; Golovastikov 2011: 43–47). However, Jakobson's insight may nevertheless be correct if we suppose that the words that gravitate toward the weak ictuses are not necessarily monosyllabic, but rhythmically ambiguous, and they can be either mono- or disyllabic.

The list of rhythmically ambiguous *disyllabic* words includes, for example, the prepositions *sredi*, *protiv*, *mezhdu* etc., the personal/possessive pronouns *ego* and *eë*, the possessive pronouns *moja*, *tvoju*, *svoej* etc. (especially if they are used as enclitics, i.e. in the post-nominal position), and others. Their special accentual status was already emphasized by Viktor Zhirmunsky, Boris Tomashevsky, Kiril Taranovsky and Roman Jakobson. In particular, these words may generate the forbidden trochaic "trans-accentuation" (or "accentual reversal") of an iambic foot (Jakobson 1979a: 168; 1979b: 583–584).[2] Tomashevsky noticed that the only example of such trans-accentuation in Pushkin's iambs involves the personal pronoun *ego*: *Ja pr̲edlagáju výpit' v e̲gó pámjat'* (Tomaševskij 1923a: 55). Pushkin treats the disyllabic personal pronoun *ego* "as if" it is unstressed—or, in fact, he uses it as rhythmically ambiguous. If Pushkin had considered it completely unstressed, there would have been many examples of this kind in his poetry, rather than only one (Šapir 2005: 50; English translation: Šapir 2019: 125).

Taranovsky showed that the more numerous trans-accentuations in Radishchev and some other eighteenth- and nineteenth-century poets are of the same nature. They involve the pronouns *egó*, *svojú*, *tvoím* and the like: *Ispólni sérdce tvo̲ím žárom*, etc. (Taranovski 1953: 19). Such examples are especially frequent in Radishchev. His renowned ode "Vol'nost'" (1780s) features eight lines (1.5%), in which several parts of speech are trans-accentuated: the possessive pronouns *tvoím*, *tvoé* and *svoí*, the pronouns *mnóju, za tó* and *sebé*, and even the adverb *vsegdá*, which is, moreover, trans-accentuated twice (Šapir 2005: 50; English translation: Šapir 2019: 125). However, the fact that all of Radishchev's trans-accentuations are of the same kind suggests that these words are rhythmically ambiguous—he did not allow himself to "trans-accentuate" fully-stressed words. Characteristically, they fall on the penultimate (third) ictus—the "weakest" in Russian iambic tetrameter (at least in the poetry of that time).

Compare Brodsky's rhythmically ambiguous disyllabic words on the weak ictus: *v prostránstve me̲ždu dvúx desníc*; *zovét ego̲, kak pút' nazád*. These lines can be recited as either Form I or III. Although no trans-accentuation is observed here, the second ictus is "weak," because Form III, in which the second ictic stress is skipped, predominates in the poem.

2 It is much less common in Russian verse than, say, in English poetry (Tarlinskaja 1987).

4 Rhythmical impulse

The presence of rhythmically ambiguous lines is one of the manifestations of what Russian verse theorists of the 1920s referred to as "rhythmical impulse" ("*ritmičeskij impul'*s"). Tomashevsky and Zhirmunsky thus described it in their treatises on Russian versification:

> "Creating the design of a poem, the poet adopts a metrical scheme, which he feels to be a kind of rhythmical-melodical contour, a framework, into which words are 'inserted.' As it is realized in words, the rhythmical impulse finds expression in the actual rhythm of individual lines" (Tomaševskij 1923b: 83).

> "The listener perceives the rhythm in inverse order. First he is confronted with the actual verse-line rhythm. Then, under the impression of the reiteration of rhythmical configurations, due to his perception of a sequence of verse-lines, the listener grasps the rhythmical impulse [...]. At a still higher degree of abstraction from the rhythmical pattern he grasps the metrical scheme which may be uncovered by scanning" (Tomaševskij 1923b: 83).

> "Only the entire poem exhibits that inertia of the rhythm, that general rhythmical impulse, those regularities of rhythmic movement, which we call meter". "The presence of a metrical scheme in verse is perceived by the reader as the *inertia of rhythm* [...]. From the point of view of the author or the performer of the poem this metrical scheme or law can be described as a sort of impulse dominating the given linguistic material. In more abstract terminology we speak of a metrical *design* [*zadanie*] or a metrical *law* [*zakon*]" (Žirmunskij 1925: 67, 71; translation quoted from Žirmunskij 1966: 67, 71; author's emphasis).

The concept of *rhythmical impulse* describes a stochastic, not deterministic, norm (Červenka 1984: 30). Scholars of Russian verse have defined this phenomenon in statistical terms: as a *rhythmic tendency* in the works of Taranovsky and as an *"image of the meter"* (*"obraz metra"*) in the works of Andrei Kolmogorov (see Gasparov 2015: 12; Pilshchikov 2017: 16–17). Taranovsky's *stressing profile* (as a particular case of a rhythmic tendency) and Gasparov's *rhythmic profile of the meter* are also statistical characteristics, but they are not identical to the statistics of rhythmical forms and do not always reflect the differences between individual types (or, to use Kolmogorov's definition, "images") of the meter (see Dobritsyn 2016: 34–38).

The statistics of rhythmical forms may be complemented with an analysis of the ambiguous forms, better reflecting the rhythmical impulse of the poem. Batiushkov's iambic tetrameter has a two-mode rhythm (with predominating Forms IV and I), but a single rhythmical impulse, which makes both modes isomorphic. Batiushkov's Form I sounds different from Brodsky's because they are governed by different rhythmical impulses.

Acknowledgment

This paper is part of a research project based at Lomonosov Moscow State University and supported by Russian Science Foundation Grant № 17-18-01701.

References

Beglov, A. L. (1996). Iosif Brodskij: monotonija poetičeskoj reči (na materiale 4-stopnogo jamba). *Philologica* 3, 109–124.

Červenka, M. (1984). Rhythmical Impulse: Notes and Commentaries. *Wiener Slawistischer Almanach* 14, 23–53.

Dobritsyn, Andrei (2016). Rhythmic entropy as a measure of rhythmic diversity (The example of the Russian iambic tetrameter). *Studia Metrica et Poetica* 3(1), 33–52.

Gasparov, M. L. (1974). *Sovremennyj russkij stix: Metrika i ritmika.* Moskva: Nauka.

Gasparov, M. L. (2015). A. N. Kolmogorov v russkom stixovedenii. In Kolmogorov, A. N. *Trudy po stixovedeniju* (10–20). Moskva: MCNMO.

Gasparov, M. L. – Skulacheva, T. V. (2003). Odnosložnye slova v stixe: ritm i čast' reči. *Russkij jazyk v naučnom osveščenii* 5, 35–50.

Golovastikov, K. A. (2011). Odnosložnye slova v russkoj sillabo-tonike: ritm i grammatika. In *Studia Slavica: Sbornik naučnyx trudov molodyx filologov*. Vol. X (42–53). Tallinn.

Jakobson, R. (1973). Ob odnosložnyx slovax v russkom stixe. In R. Jakobson, C. H. Van Schooneveld, D. S. Worth (Eds.), *Slavic Poetics: Essays in honor of Kiril Taranovsky* (239–252). The Hague–Paris: Mouton.

Jakobson, R. (1979a). Russian Binary Meters [1955]. In Jakobson, R. *Selected Writings*. Vol. 5: *On Verse, Its Masters and Explorers* (167–169). The Hague–Paris: Mouton.

Jakobson, R. (1979b). Retrospect. In Jakobson, R. *Selected Writings*. Vol. 5: *On Verse, Its Masters and Explorers* (569–601). The Hague–Paris: Mouton.

Pilshchikov, I. A. (2017). Ponjatija "stix", "metr" i "ritm" v russkom stixovedenii XX veka. In *Trudy Instituta russkogo iazyka im. V.V. Vinogradova*. Vol. XI: *Slavianskii stikh* (12–30). Moskva.

Rudy, S. (1976). Jakobson's Inquiry into Verse and the Emergence of Structural Poetics. In L. Matejka (Ed.), *Sound, Sign and Meaning: Quinquagenary of the Prague Linguistic Circle* (477–520). Ann Arbor: Michigan Slavic Contributions.

Šapir, M. I. (2005). "Tebe čisla i mery net": O vozmožnostjax i granicax "točnyx metodov" v gumanitarnyx naukax. *Voprosy jazykoznanija* 1, 43–62.

Šapir, M. I. (2019). "For Thee There Is No Weight Nor Measure": The Possibilities and Limitations of "Exact" Methods in the Humanities. Translated by Craig Saunders. *Journal of Literary Theory* 13(1), 116–144.

Šengeli, G. A. (1923). *Traktat o russkom stixe. Chast' 1: Organičeskaja metrika*. Izdanie vtoroe, pererabotannoe. Moskva–Petrograd: Gosudarstvennoe izdatel'stvo.

Taranovski, K. (1953). *Ruski dvodelni ritmovi I–II*. Beograd: Naučna knjiga.

Tarlinskaja, M. (1987). Meter and Language: Binary and Ternary Meters in English and Russian. *Style* 21(4), 626–649.

Tomaševskij, B. V. (1923a). Pjatistopnyj jamb Puškina. In *Očerki po poetike Puškina* (7–143). Berlin: Epoxa.

Tomaševskij, B. V. (1923b). *Russkoe stixosloženie: Metrika*. Petrograd: Academia.

Žirmunskij, V. M. (1925). *Vvedenie v metriku: Teorija stixa*. Leningrad: Academia.

Žirmunskij, V. M. (1966). *Introduction to Metrics: The Theory of Verse*. Translated from the Russian by C. F. Brown. Edited with an introduction by E. Stankiewicz and W. N. Vickery. London–The Hague–Paris: Mouton.

Assessing the Reliability of Stress as a Feature of Authorship Attribution in Syllabic and Accentual Syllabic Verse

Petr Plecháč
Institute of Czech Literature,
Czech Academy of Sciences
plechac@ucl.cas.cz

David J. Birnbaum
University of Pittsburgh
djbpitt@pitt.edu

Abstract

This work builds on a recent study by one of the authors, which shows that statistics about versification may be used as a feature in the process of authorship attribution. One such statistic is what we have called the stress profile of a poem, a vector consisting of frequencies of stressed syllables at particular metrical positions.

Our initial hypothesis was that because syllabic versification (SV) regulates by definition the number of syllables in a line but not the distribution of stresses, it allows authors to individualize their rhythmical style much more than accentual syllabic versification (ASV), where the distribution of stresses is primarily determined by meter. For that reason, we expected the stress profile to be a more reliable indicator of authorship in Spanish SV than in Czech or German ASV. This hypothesis, however, was not supported by our analysis. For most of our samples, German ASV had lower accuracy than Spanish, which we had predicted, but, contrary to our expectations, the accuracy for Czech ASV and Spanish SV were more or less the same.

This result led us to hypothesize further that the traditional labels SV and ASV were misleading and we sought to measure the tonic entropy of our data. In this case, Spanish SV, as expected, was found to be the least tonically regular, while there was a significant difference between the two ASV systems: the values for Czech were even closer to Spanish than to the low-scoring German system. This explains why our initial grouping of Czech and German together into a single ASV category was insufficiently nuanced.

1 Introduction

In a recent article (Plecháč–Bobenhausen–Hammerich 2018) we proposed that statistics about versification may be used as a feature in the process of authorship attribution. A pilot experiment that we conducted with samples of poetry written in four different languages (Czech, German, Spanish, and English) has shown that rhythm and rhyme may be considered rather reliable indicators of authorship, in some cases outperforming even the features traditionally used for this purpose (e.g., frequencies of words, or frequencies of character *n*-grams).

In this article we further examine one of the feature sets employed in that previous paper, namely the so-called *stress profile*, a vector consisting of frequencies of stressed syllables at particular metrical positions (we refer to this as the metrical valence of the position; see Birnbaum 2018) across an entire poem or set of poems, which is widely used for formalizing rhythmical style. We proceed from a simple hypothesis: because syllabic versification regulates by definition the number of syllables in a line but not the distribution of stresses, it allows authors to individualize their rhythmical style much more than accentual syllabic (that is, *syllabotonic*) versification, where the distribution of stresses is primarily determined by meter. We thus expect the stress profile to be a more reliable indicator of authorship in Spanish syllabic versification than in Czech and German accentual syllabic versification.[1] In order to test this hypothesis we first set up attribution models with Czech, German, and Spanish samples of poetry using the stress profile as a feature set and a Support Vector Machine as a classification method. Next, we estimate the accuracy in the given languages by means of cross-validation of particular models. Finally, we compare the results to the degree of tonic regularity of the data calculated on the basis of entropy.

2 Method and data

We extract our samples from three corpora of poetry: *Corpus of Czech Verse* (Plecháč 2016; Plecháč–Kolár 2015), *Metricalizer* – corpus of German poetry (Bobenhausen–Hammerich 2015; Bobenhausen 2011), and *Corpus of Spanish Golden-Age Sonnets* (Navarro-Colorado et al. 2016; Navarro-Colorado 2015). TAB. 1 gives some basic information about these corpora.

As we intend to examine the relationship between the language of the sample set and the accuracy of the attribution, we need to control extraneous variables that might affect the result as much as possible. This in the first place requires samples to be represented by the same number of features, i.e., in the case of stress profile, to analyze lines of the same syllabic length. Since the Spanish corpus consists exclusively of 11-syllable lines (hendecasyllabs), we need to stick with this length. Fortunately, one

1 Let us emphasize that we are taking into account only strict accentual syllabic German poetry and not the rich tradition of German accentual verse (Senkungsfreiheit). Unlike in the previous article, we do not include English versification because of insufficient corresponding data.

	# of poems	# of lines	time span	website
CS	~ 75,000	~ 2,500,000	late 18th to early 20th century	http://versologie.cz
DE	~ 50,000	~ 1,700,000	16th to early 20th century	http://metricalizer.de
ES	~ 5,000	~ 70,000	16th to 17th century	https://github.com/bncolorado/CorpusSonetosSigloDeOro

TAB. 1: Basic information on corpora

of the corresponding accentual syllabic meters, feminine iambic pentameter, is very frequent in both remaining corpora, and we therefore have enough comparable data to work with.

Another important variable, as has been pointed out many times (e.g., Eder 2017), is the time span between analyzed samples. For example, it is self-evident that no matter what method is used, distinguishing Goethe (*1749) from Schiller (*1759) is a much more complicated task than distinguishing Cervantes (*1547) from García Lorca (*1898).

Given that, we extract the sample sets from each corpus in the following way:

(1) Each sample consists of 100 hendecasyllabic / feminine iambic pentameter lines written by one author. Multiple poems might be combined into a sample, and no poem contributes to more than one sample.

(2) Three sample sets are built from each corpus (es-A, es-B, es-C; de-A; de-B; de-C; cs-A, cs-B, cs-C), each set consisting of samples written by at least 5 authors born in a specified time period. We tried to keep all the periods to between 15 and 20 years long, although es-A and de-A had to be longer because of sparse data. Details about the sample sets are given in TAB. 2.[2]

Each sample was represented by a stress-profile vector consisting of 11 values corresponding to particular metrical positions. The principle of calculating the stress profile is illustrated in TAB. 3 with an example from Ludwig Tieck.

In order to consider the metrical valence of each position as a marker of equal importance, data were transformed to *z*-scores.[3]

2 We recognize that not all the relevant variables have been controlled this way. First, eras from which the data comes differ across the corpora, and one may, for instance, assume that romantic poets in general have put more effort into individualizing the rhythm of their poems than renaissance ones. Additionally, proximity in time is not the only factor here: we may assume that there was stronger mutual influence in the poetry of the Argensola brothers than, for instance, between the Austrian Betty Paoli and the German August von Platen.

3 The metrical valences of particular positions have a different scale. For example, the stressing of some positions varies across samples by tens of percents (this concerns mainly strong positions), stressing of others varies only in units of percents (this concerns mainly weak positions); cf. Sect. 3. Without any normalization of the data, SVM would treat positions with higher variance as more important. To avoid this, we transform the frequencies to *z*-scores: $z_S = (f_S - \mu) / \sigma$, where f_S is the original frequency of stressing of the position in sample S, μ stands for mean frequency at the given position across all samples

es-A (1515-1549)	**es-B (1550-1569)**	**es-C (1570-1589)**
de Acuña, Hernando (10)	de Arguijo, Juan (8)	de Molina, Tirso (7)
de Cervantes, Miguel (9)	de Argensola, Lupercio (7)	de Quevedo, Francisco (64)
de Cetina,Gutierre (31)	de Argensola,Bartolomé (19)	de Rojas, Pedro Soto (15)
de Herrera, Fernando (40)	de Góngora, Luis (14)	de Tassis y Peralta, Juan (25)
de la Torre, Francisco (9)	de Vega, Lope (168)	de Ulloa, Luis (13)
de-A (1770–1794)	**de-B (1795–1814)**	**de-C (1815–1834)**
Chamisso, Adelbert von (9)	Droste-Hülshoff, Annette von (7)	Geibel, Emanuel (16)
Eichendorff, Joseph von (7)	Grün, Anastasius (13)	Heyse, Paul (10)
Grillparzer, Franz (13)	Lenau, Nikolaus (15)	Keller, Gottfried (11)
Schlegel, Friedrich (9)	Platen, August von (7)	Lingg, Hermann von (7)
Tieck, Ludwig (9)	Paoli, Betty (7)	Otto, Louise (12)
cs-A (1825–1839)	**cs-B (1840–1854)**	**cs-C (1855–1869)**
Hálek, Vítězslav (18)	Čech, Svatopluk (58)	Kaminský, Bohdan (51)
Heyduk, Adolf (7)	Krásnohorská, Eliška (48)	Klášterský, Antonín (85)
Neruda, Jan (9)	Pokorný, Rudolf (13)	Kvapil, František (17)
Pfleger Moravský, Gustav (77)	Sládek, Josef Václav (29)	Mužík, Augustin Eugen (35)
Šolc, Václav (7)	Vrchlický, Jaroslav (417)	Škampa, Alois (24)

TAB. 2: Sample sets extracted from each corpus. The number enclosed in parentheses indicates the number of samples by the given author.

	DISTRIBUTION OF STRESSED SYLLABLES (0: unstressed; 1: stressed)										
1. Viel Wunder in der Dichtkunst Garten blühen.	0	1	0	0	0	1	0	1	0	1	0
2. Es drohet als verschlingend Ungeheuer	0	1	0	0	0	1	0	1	0	1	0
3. Allem, was lebt, das hunger-grimme Feuer,	1	0	0	1	0	1	0	1	0	1	0
…	…	…	…	…	…	…	…	…	…	…	…
100. Der Sonnenschein, des blauen Himmels Helle;	0	1	0	1	0	1	0	1	0	1	0
SUM	13	79	3	73	3	73	6	74	2	94	2
RELATIVE FREQUENCY (STRESS PROFILE)	0.13	0.79	0.03	0.73	0.03	0.73	0.06	0.74	0.02	0.94	0.02

TAB. 3: Example of stress profile calculation (Ludwig Tieck‘s sample)

In each language we randomly selected 7 100-line samples by each author, so that each sample set was reduced to 35 samples. We then performed a leave-one-out cross-validation of Support Vector Machine driven authorship attribution on:

(1) each sample set (A; B; C)

(2) each consecutive pair of sample sets of one language merged together (A∪B; B∪C)

(3) all the samples of one language merged together (A∪B∪C)

(4) random selections of 4 authors from each consecutive pair of sample sets of one language merged together (A∪B(4); B∪C(4))

and σ stands for its standard deviation. This results in a distribution with mean value = 0 and standard deviation = 1.

(5) random selections of 5 authors from each consecutive pair of sample sets of one language merged together (A∪B(5); B∪C(5))

(6) random selections of 6 authors from each consecutive pair of sample sets of one language merged together (A∪B(6); B∪C(6))

(7) random selections of 4 authors from all the samples of one language merged together (A∪B∪C(4))

(8) random selections of 5 authors from all the samples of one language merged together (A∪B∪C(5))

(9) random selections of 6 authors from all the samples of one language merged together (A∪B∪C(6))

In order to obtain more representative results the entire procedure was repeated 500 times, with new random selections of both authors and their samples in each iteration.

3 Results

The experiments described above produced 15 sets of 500 accuracy estimations for each language. FIG. 1 summarizes the results. We also report the value of a random baseline calculated as

$$\text{random baseline} = \sum_{i=1}^{N} \left(\frac{a_i}{X}\right)^2$$

where N is the number of authors in a sample set, X is the number of samples and a_i is the number of samples written by author i.

While all the mean accuracy estimations are above random baseline values, there are significant differences between particular languages. Only the results for single sample sets (A; B; C) are consistent with our expectations based on the above-mentioned hypothesis: we attained the best scores for syllabic Spanish, and low scores for accentual syllabic German, with accentual syllabic Czech standing in the middle. In all other results, however, the situation is quite different: in agreement with our expectations, accentual syllabic German has lower values than Spanish, but, contrary to our expectations, the results for accentual syllabic Czech and syllabic Spanish are more or less the same.

The direct association between the type of versification and the accuracy of stress-profile-based classification thus has not been confirmed. On the other hand, we must keep in mind that the traditional labels “syllabic” and “accentual syllabic” are extremely simplifying. One needs to consider typology of versification as a continuous, rather than a discrete, system. For example, it has been shown that there is a certain degree of tonic (accentual) regularity in Spanish hendecasyllabs (e.g. Piera 1980) and that German versification exhibits a higher degree of tonic regularity than is the case with Czech (e.g. Levý 2011). In order to explore the consequences of those differences, in the following section we aim to measure the degree of tonic regularity of our data.

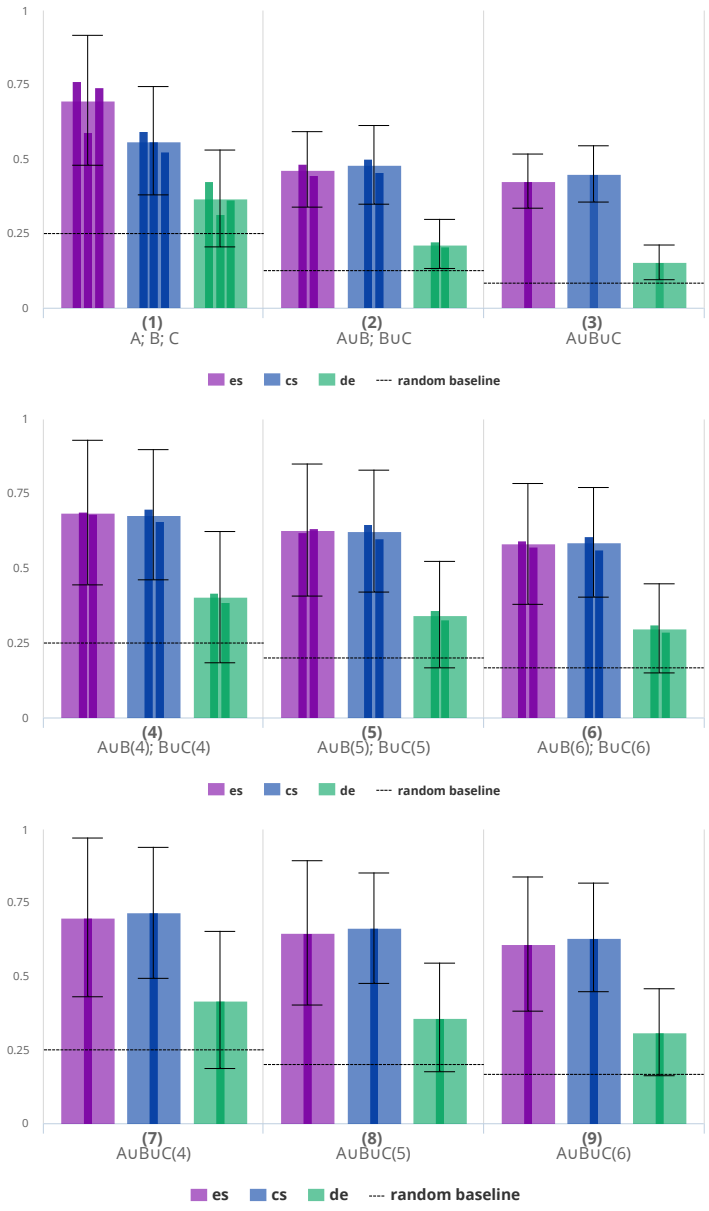


FIG. 1: Mean accuracy estimations. Thin columns correspond to the mean values for particular sample sets (A; B; C), merged pairs of sample sets (AUB; BUC), all samples merged together (AUBUC), random selections from merged pairs of sample sets ($AUB_{(4\text{-}6)}$; $BUC_{(4\text{-}6)}$), and random selections of all samples merged together ($AUBUC_{(4\text{-}6)}$). Thick columns correspond to the mean values of thin ones; whiskers denotes the 95% confidence interval of all the accuracy estimations under the given thick column.

4 Tonic regularity

In order to estimate the degree of tonic regularity we modify the procedure proposed in Dobritsyn 2016 and measure the entropy of what may be called *rhythmic types*. As a rhythmic type we denote the bit string representing the distribution of stressed syllables in a particular line (e.g., the example in TAB. 3 provides three different rhythmic types: 01000101010 (line 1 and 2), 01000101010 (line 3), and 01010101010 (line 100)). The entropy of rhythmic types in particular samples is calculated as:

$$S = -\sum_i \frac{n_i}{N} \log \frac{n_i}{N}$$

where n_i is the number of occurrences of rhythmic type i and N is the number of lines.

FIG. 2 gives the entropy of rhythmic types in sample sets A, B, and C in particular languages, as well as the same value for all the lines of a given meter in each entire corpus (columns ES, CS, DE).

Values across the sample sets as well as the entire corpus of one language vary in very small intervals, which suggests that we're actually capturing an important and constant feature of the versification systems in question. Syllabic Spanish, as expected, was found to be the least tonically regular. Interestingly enough, though, there is a significant difference between the two accentual syllabic versification systems: values for Czech are even closer to Spanish than to the low-scoring German. We may roughly identify which metrical positions contribute the most to the regularity/irregularity by plotting the stress profiles of our data on a chart (FIG. 3).

Once again, values across sample sets and corpora are more or less the same in each language. There is an iambic tendency in all of the data, which is most evident in German: the metrical valence of all the odd positions (weak) except for the first one is very close to zero, for even positions (strong) it is about 0.75, and the metrical valence of the penultimate almost 1. Spanish exhibits a noticeably weaker iambic tendency in the first four positions and the eighth position, but otherwise is comparable to German even in the highly regular ending; the metrical valence is 0 for the penultimate and 1 for the last position. Czech data exhibit the highest degree of irregularity at the very beginning and at the end of the lines: there are many more Czech lines with a stressed syllable in the first position than in German (even slightly more than in Spanish),[4] and, unlike in the

4 Czech has a fixed initial stress and is thus usually mentioned as having a natural propensity toward trochaic onset. On the other hand, there is generally a high degree of correspondence between verse-line boundaries and clause boundaries and many Czech connectors (conjunctions, pronouns, and others) are often realized as unstressed monosyllabic words. Trochees thus enforce rather simple syntax, while iambs (when trochaic onsets are not preferred) usually tend toward complex syntactic structures and complex interclause relations (cf. Červenka 2006: 81–111). Initial stress should nonetheless be taken into consideration as a factor in assessing the difference between the metrical valence of the first position in Czech and the German iamb, as there are sentence-initial words that naturally tend to bear stress on the first syllable.

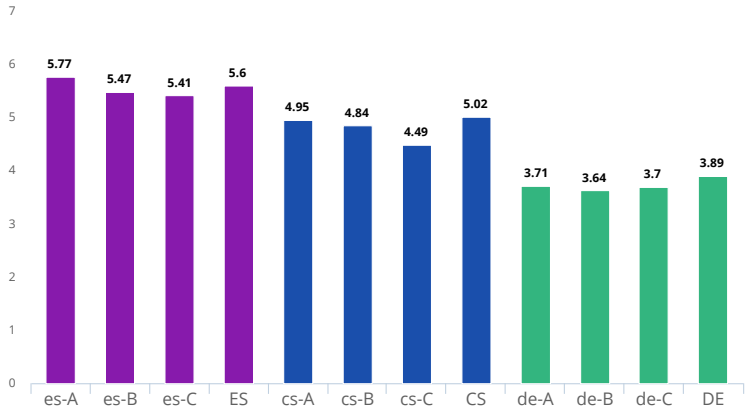


FIG. 2: Entropy of rhythmic types in particular sample sets and in the entire corpora (ES, CS, DE)

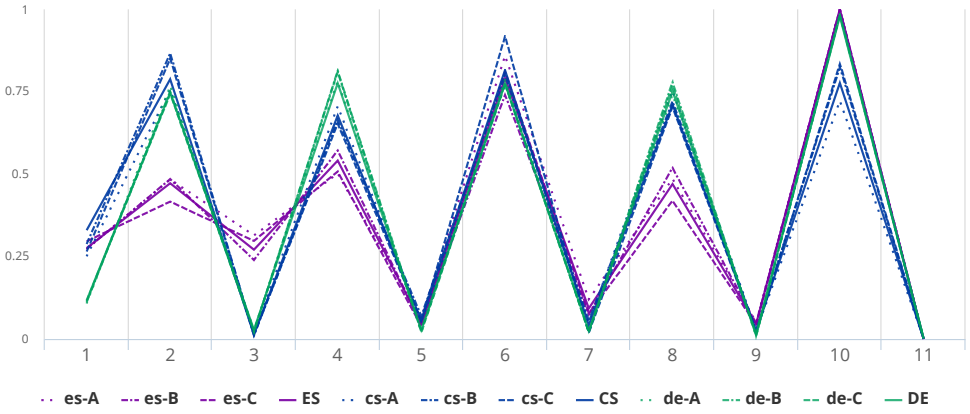


FIG. 3: Frequency of stressed syllables at particular metrical positions in particular sample sets and in the entire corpora (ES, CS, DE)

other two languages, the metrical valence of the penultimate does not exceed the metrical valences of other even positions. In Czech there is also a slightly higher variability in the fourth position than in German, and a slightly lower variability in the second position.[5]

5 The latter may come from the phonetic rules of the language itself. Unlike German and Spanish, it is not possible to have two adjacent unstressed syllables at the beginning of the line in Czech. The sum of the first and the second values in each Czech series thus inevitably has to be greater than 1.

5 Conclusion

We have proceeded from a simple hypothesis that Spanish syllabic poetry should perform better in stress-profile-based authorship attribution than Czech and German accentual syllabic poetry. This, however, was not confirmed with our data. While German versification showed the weakest performance in all the experiments conducted, Spanish and Czech yielded more or less the same scores in most of the experiments. The problem seems to be in the initial assumption: it has been shown that all the data exhibit tonic regularity to some extent, and that Czech is in this respect closer to less regular Spanish than to more regular German. We thus may conclude that the degree of tonic regularity of the versification affects the accuracy of stress-profile-based attribution to some extent; it is not a direct correlation, but, rather, a question of a certain limit where the meter ceases to offer authors enough space to individualize the rhythm of their poems. As a consequence, we may expect that in order to achieve acceptable reliability, versification-based attribution tasks dealing with German poems (or poems from other strongly regulated versification systems) would require more features than languages with less regular versification systems.

Acknowledgment

The authors were supported by the Czech Science Foundation, project GA17-01723S (Stylometric Analysis of Poetic Texts).

References

Birnbaum, D. J. (2018, November 5). Strong and weak metrical positions. Retrieved from <http://poetry.obdurodon.org/metrical-analysis.xhtml>.

Bobenhausen, K. (2011). The Metricalizer: Automated Metrical Markup for German Poetry. In C. Küper (Ed.), *Current Trends in Metrical Analysis* (119–131). Frankfurt am Main: Peter Lang.

Bobenhausen, K. – Hammerich, B. (2015). Métrique littéraire, métrique linguistique et métrique algorithmique de l'allemand mises en jeu dans le programme Metricalizer². *Langages* 199, 67–87.

Červenka, M. (2006). *Kapitoly o českém verši* [Chapters on Czech Versification]. Praha: Karolinum.

Dobritsyn, A. (2016). Rhythmic entropy as a measure of rhythmic diversity (The example of the Russian iambic tetrameter). *Studia Metrica et Poetica* 3(1), 33–52.

Eder, M. (2017). Short samples in authorship attribution: A new approach. In R. L. Lewis et al. (Eds.), *Digital Humanities 2017: Conference Abstracts* (221–224). Montreal: McGill University.

Levý, J. (2011). *The Art of Translation*. Amsterdam: John Benjamins.

Navarro-Colorado, B. (2015). A computational linguistic approach to Spanish Golden Age Sonnets: metrical and semantic aspects. In *Proceedings of the Fourth Workshop on Computational Linguistics for Literature* (105–113). Denver (Co): NAACL.

Navarro-Colorado, B. – Ribes-Lafoz, M. – Sánchez, N. (2016). Metrical Annotation of a Large Corpus of Spanish Sonnets: Representation, Scansion and Evaluation. In N. Calzolari et al. (Eds.), *Proceedings of the Tenth International Conference on Language Resources and Evaluation* (4360–4364). Portorož: ELRA.

Piera, C. J. (1980). *Spanish Verse and the Theory of Meter* (Ph.D. thesis). Los Angeles: University of California.

Plecháč, P. (2016). Czech verse processing system KVĚTA: Phonetic and metrical components. *Glottotheory* 7(2), 159–174.

Plecháč, P. – Bobenhausen, K. – Hammerich, B. (2018). Versification and authorship attribution: Pilot study on Czech, German, Spanish, and English poetry. *Studia Metrica et Poetica* 5(2), 29–54.

Plecháč, P. – Kolár, R. (2015). The Corpus of Czech Verse. *Studia Metrica et Poetica* 2(1), 107–118.

Taktovik or Mixed Meter? Rhythmic Features of Russian Non-classical Verse (1890–1920)

Vera Polilova
Moscow State University
vera.polilova@gmail.com

Abstract

Recent studies of texts by Aleksandr Blok and Konstantin Bal'mont have demonstrated that the four-ictus *taktovik* (Tk4) of Russian Symbolists can be productively interpreted as a combination of two separate hemistichs. Regarding Balmont's verse, it has also been established that his lines corresponding to Tk4 have a visibly stricter metric structure. This structure can be described as a combination of segments of classic Russian accentual-syllabic meters composed of disyllabic or trisyllabic feet. The anacrusis and clausula of each segment may vary freely, while the hemistichs are separated by word boundaries and syntactic breaks that may be considered as a quasi-caesura. Based on this fact, I have compiled a corpus of four-ictus tonic texts dated between 1890 and 1920 and carried out an analysis of rhythmic structure, not only for each line as a whole but also separately for the left and right hemistichs. This article represents an analysis of Balmont's lines, never previously subjected to rhythmic analysis. The resulting data enables a new vision of the genesis of Russian strict stress-meters and the question of *dolnik/taktovik* separation.

1 Introduction

The modern nomenclature of Russian non-classical meters traditionally mentions two special meters with a fixed number of ictuses and fixed limits for varying unstressed syllables in between them. The meter where the inter-ictic interval usually varies between 1 or 2 syllables is known as the dolnik, while the one where the interval may be equal to 1, 2, or 3 syllables (rarely 0, 1, or 2) is called the taktovik. Therefore, the taktovik is conventionally identified as an independent meter where each line has a fixed number of ictuses and the number of unstressed syllables between them varies between one, two or three (occasionally zero, one or two; see among others Gasparov 1968, 1974; Bejli 2004; Kvâtkovskij 2008).

The dolnik is much more widespread in Russian poetry and better studied than the taktovik. Over the last few years, the understanding of the dolnik, its origins and rhythmic nature has significantly evolved, with new methods of corpus and statistics studies proposed, Mikhail Gasparov's classic theories updated and developed, and new rhythmic varies identified, such as the “segmented” dolnik (among others Lâpin 2011; Lâpin– Pil’šikov 2014; Plungân 2010). It has also become clear that the problem of delimitation and classification of Russian tonic meters is far from having been positively resolved. A recently posed problem is the delineation between the forms of “free” dolnik (one with a varying number of ictuses in a line) and taktovik.

It is therefore imperative: 1) to revise the existing taktovik nomenclature; 2) to conduct a statistic study of all Symbolist texts conforming to Gasparov’s classic definition of the taktovik; 3) to compare its results with modern data of dolnik rhythmics; and 4) to construct a complete typology of rhythmic varieties of the taktovik based on the studied corpus, taking into account the latest achievements of dolnik studies (especially the discovery of “segmented” dolnik; see Lâpin 2011). Resolving these problems can aid in the solution of the fundamental question of taktovik’s (non)existence as a separate tonic or syllabo-tonic meter distinct from the dolnik.

The papers Semenov 2013 and Polilova 2017, dealing with Aleksandr Blok's and Konstantin Balmont's four-ictus taktovik correspondingly, demonstrated that lines written in this meter can be productively interpreted as a combination of two separate hemistichs. This fact was the main impetus for an analysis of Symbolist Tk4 that would handle the rhythmic patterns of left and right hemistichs separately. I have compiled a 2300-line corpus for this study. The present article deals with the results of an analysis of the most voluminous Tk4 Symbolist text, never previously analyzed (it was published for the first time in 2015–2016). My goal is to conduct a case study of rhythmic qualities of the hemistichs that comprise Tk4. Balmont himself referred to his own four-ictus taktovik as *interrupted lines* (прерывистые строки; see Polilova 2017).

1.1 Material

The study deals with Tk4 passages (a total of 527 lines) from Balmont's *Salamankskij student* (1919). The text is the Russian translation of Estudiante de Salamanca, a polymetric poem by Spanish Romantic poet José de Espronceda (Balmont 2015–2016; on the translation, see Polilova 2015). Tk4 poems by other Symbolists are usually no longer than 50 lines.

2 The structure of *interrupted lines*

Balmont’s interrupted lines can be described in ways other than Tk4. They have an observably stricter metric structure which I describe by the following formula: [(Ds3/Ts2/Ds2) + (Ds3/Ts2/Ds2)]. (Ds3/Ts2/Ds2) represents a verse segment structurally cognate to a line of:

1) 3- or 4-foot iamb or trochee [= Ds3];
2) 2-foot dactyl, amphibrach, or anapest [=Ts2];
3) 2-foot iamb or trochee [= Ds2].

The anacrusis and clausula of the segment line vary freely, while implicit hemistichs are separated by a break between words that can be identified as a quasi-caesura or cesura-like partition. Here, I will not undertake an in-depth analysis of the problem of caesura in Russian non-classical meters (for different takes on the question, see Semenov 2010; Korčagin 2010; Lâpin 2011). An insignificant number of trochaic tetrameters found in the corpus were interpreted as 3-ictic segments with anapestic anacrusis: (И навстречу дерзновенно; Возростает незапятнанной; нетерпением горя; удивлённый Монтемар; у лазурного окна etc.) or with a dactylic clausula with an extra-metric stress (Зрительное – мыслит он). The same approach was applied to select 4-ictic iambic hemistichs that were treated as 3-ictic segments with an extra-metrical stress on a dactylic clausula (на человеческих устах), which is admissible within the scope of our analysis (see Gasparov 1974: 374). With the aforementioned reservations, the length of the interval between the last ictus of the left segment and the first ictus of the right segment in Balmont's verse varies between one and three or four syllables, and 4-syllable unstressed intervals are extremely rare (see examples below).

Salamankskij student contains but a single anomalous right hemistich, with a clear dolnik structure:

странные звуки чётки, 1001010

We also encountered nearly two dozen hemistichs of a 101001(0/00) structure. They were counted separately but for the purposes of overall data they were treated as anapestic hemistichs with an extra-metric stress one the first line's syllable.

Голый череп, скелет 101001
Дама с быстрой походкой 1010010
Смерть мою вам прощаю 1010010
Лик едва ли красивый 1010010

The Tk4 of the type discussed here may contain the following lines made of hemistich combinations: 1) Ds3+Ds3; 2) Ts2+Ts2; 3) Ds3+Ts2; 4) Ts2+Ds3; 5) Ts2+Ds2; 6) Ds2+Ds3; 7) Ds3+Ds2; 8) Ds2+Ts2.

Our material contains no Ds2+Ds2 lines that can be extrapolated from the aforementioned formula of Balmont's experimental meter, therefore they will not be discussed further.

The remaining lines can be gathered in the following three groups:

- "Trisyllabical" lines: Ts+Ts (Ts2+Ts2)
- "Disyllabical" lines: Ds+Ds (Ds3+Ds3; Ds3+Ds2; Ds2+Ds3)
- Mixed lines: Ts+Ds и Ds+Ts (Ts2+Ds3; Ds3+Ts2; Ts2+Ds2; Ds2+Ts2)

3-syllable unstressed intervals, typical for the taktovik, can occur in this structure under the following conditions:

1) on the border between hemistichs (resulting from the clausula of the first hemistich and the anacrusis of the second hemistich):

   Там кружатся тени, | переменчивый бред. 010010 | 001001

2) on the point of stress omission in the first ictus of the second hemistich:

   Как снова был он твёрд, | невозмутим, и смел. 010101 | 000101

3) in the unstressed syllable at the ictus in disyllabical hemistichs:

   Так смутное виденье, | из сумрака и света, 0100010 | 0100010
   Таинственная, лёгкая, | сомнительная тень, 01000100 | 010001

The latter example demonstrates that the entire line allows for an alternative interpretation: not only Ds3+Ds3 but also Ia7 is plausible for this particular case.

4-syllable intervals in *Salamankskij student* occur eight times, all of them at the break between hemistichs:

Вокруг ощупал воздух, | и проклинает хмуро, 0101010 | 0001010

To further illustrate the structure of the meter, see several additional examples:

(1) Мрачная улица, | ночь уж на исходе, 100100 | 100010
Печальная лампада | едва-едва горит, 0100010 | 010101
И вот замрёт и сумрак | сильней во всей природе, 0101010 | 0101010
И вот священный образ | на миг озарит. 0101010 | 01001

(2) Вращаясь под вихрем, | тёмные фигуры 010010 | 100010
Железных петухов | пронзительно скрипят, 010001 | 010001
И слышен звон цепей, | под ветром башни хмуры, 010101 | 0101010
Колокола гудят – | умолкнут – говорят. 000101 | 010001

(3) Отравное озеро | желчи язвящей, 0100100 | 10010
Крупные слёзы | одна за другой, 10010 | 01001
Ищешь утешенья | в минуте настоящей, 100010 | 0100010
И надежды нет, | и ушёл покой. 00101| 00101

(4) В вечной спирали, | век в водовороте, 10010 | 100010
В бесконечность уходит | минутный угар, 0010010 | 01001
Разум с безумьем | в одном смешались счёте, 10010 | 0101010
Чрез тысячу падений | нисходит Монтемар. 0100010 | 010001
Смерчем закручен | в бешеном вращеньи, 10010 | 100010
В воздухе он мчится, | с воздухом слит, 101010 | 1001
Всё в новых поворотах, | но в том же движеньи, 0100010 | 010010
Он чувствует, как в бездну, | как в пропасть он летит. 0100010 | 010101
Со ступени на ступень | без конца упадая, 0010001 | 0010010
Он клянёт и проклинает | буйным языком, 10100010 | 10001
Круженье свершается, | свирепо возрастая, 0100100 | 0100010
И в свисты урагана | врывается гром. 0100010 | 01001

It should be once again emphasized that many lines can be seen as perfect examples of long, regular (without caesura-based effects), and classic accentual-syllabic meters.

In addition, it bears mention that one line in *Salamankskij student* consists of a single hemistich, which arguably speaks in favor of a certain independence of segments:

Сказал Монтемар, | и с спокойствием смело	01001 | 0010010
За нею он идёт.	010101

The hemistich separation is often supported by the syntactic division of a sentence: more than half of the lines use a comma, dash, or a period at the end of a hemistich.

(1) Он видел их спокойно. | Рука на рукоятке. 0100010 | 0100010

(2) О белой той женщине. | Где теперь она? 010010 | 10101

(3) Смерть мою вам прощаю. | Конечно, конечно 1010010 | 010010

(4) Под ветром, но с якорем, | опущенным на дно. 0100100 | 010001
Всё в мёртвом безгласии, | людского нет дыханья, 0100100 | 0101010
Ни ропота людского, | ни звука голосов, 0100010 | 010001
Здесь время проходит – | сохраняя молчанье <…> 010010 | 0010010

3 Rhythmic features of *interrupted lines*

In the first stage of work, I undertook an analysis of unstressed inter-ictic intervals in the taktovik of *Salamankskij student* (regardless of separation of lines into hemistichs). We prepared a sample of 135 lines to compare them with Gasparov's data, obtained from other Balmont's texts.

	Place in line			
Intervals	**1**	**2**	**3**	**Total**
1	3.3%	20.3%	9.75%	11.1%
2	56%	54.5%	43.1%	52.2%
3	40.7%	25.2%	47.2%	37.7%

TAB. 1: Tk4 from *Salamankskij student*, sample (135 lines)

	Place in line			
Intervals	**1**	**2**	**3**	**Total**
1	11.9%	23.8%	12.7%	16.1%
2	49.3%	52.3%	24.6%	42.1%
3	38.8%	23.8%	62.7%	41.8%

TAB. 2: Balmont's Tk4 according to Gasparov's data (1968: 89; 1974: 336); Boloto (1903), Zamok (1905), Staryj dom (1903), Gimn Bessmertiju (1919) (134 lines)

Salamankskij student and texts analyzed by Gasparov have a very similar frequency of 1-, 2-, and 3-syllable intervals in mid-line; however, their frequency in the first and third interval is noticeably different. Line incipits in *Salamankskij student* have a rarer (3.3% vs. 11.9%) 1-syllable interval. Line terminations in *Salamankskij student* involve a more frequent 2-syllable interval (43.1% vs. 24.6%) and a third interval more rarely composed of three syllables (47.2% vs. 62.7%). This data renders Gasparov's suggestion of a special “Balmontesque” trend in the taktovik (a longer third interval) completely untenable.

As a matter of fact, the frequency of differing-length intervals in Balmont's taktovik is determined by the proportions of different types of hemistichs. In different texts created by the poet, different types of hemistichs (Ds3/Ts2/Ds2) and their combinations (Ts+Ts / Ds+Ds / Ts+Ds / Ds+Ts) are seen with dissimilar frequency, and their proportions fluctuate from text to text (see Polilova 2017: 738, 743 table 1). *Salamankskij student* has a nearly equal number of Ts+Ts and Ds+Ds lines (more than two thirds of the lines correspond to one of those two types). Ts+Ds lines comprise almost a quarter. Ds+Ts lines are the least numerous, nearly one line in ten. Similar data was obtained in an analysis of another 74 of Balmont's taktovik lines (see Polilova 2017: 738, 743 table 1). A remarkable trait of all analyzed texts is the extreme rarity of Ds+Ts lines.

Our material contains more than four dozen rhythmic varieties of hemistichs (with different types of anacrusis, clausula, stressed and unstressed metrical positions, extra-metrical stresses). However, there are clear favorites among the most frequent rhythmic types of hemistichs. Here is a list of those numbering more than 40 examples, in descending order of frequency:

1) 010010
2) 0100010
3) 0010010
4) 010001
5) 01001
6) 001001
7) 0101010
8) 010101
9) 100010
10) 0100100

Amphibrachic and iambic hemistichs are clearly in the lead. See tables 3 and 4 for more data. The most frequent line patterns are (max. 15 examples, min. 8):

1) 0010010 | 001001
2) 010010 |010010
3) 0100010 | 010001
4) 010010 | 01001
5) 010010 | 001001
6) 010010 | 100010
7) 0100010 | 0100010
8) 0100010 | 01001
9) 0100010 |010101
10) 0010010 | 01001
11) 0010010 | 010010
12) 0101010 |010101
13) 0100100 | 010010
14) 0100100 | 10010
15) 010001 | 010001
16) 01001 | 0010010
17) 001001 | 0010010

1.	010010	80
2.	0100010	52
3.	0010010	43
4.	0101010	41
5.	0100100	39
6.	010001	32
7.	01001	29
8.	10010	27
9.	001001	24
10.	100010	19
11.	01000100	16
12.	010101	13
13.	100100	12
14.	00100100	10
15.	1010010	10

TAB. 3: Frequency of rhythmic patterns (min. 10 examples); left hemistichs

1.	0100010	67
2.	010010	59
3.	010001	53
4.	001001	52
5.	01001	46
6.	0010010	45
7.	010101	42
8.	100010	33
9.	0101010	26
10.	10010	18
11.	1001	15
12.	0010001	10

TAB. 4: Frequency of rhythmic patterns (min. 10 examples); right hemistichs

4 Conclusions and perspectives for further study

The preliminary results of the study of the Tk4 Symbolist corpus demonstrate the extreme paucity of *dolnik*-structured verses and hemistichs, as well as a significant number (no less than half) of hemistichs written in disyllabic meters. Sections 2 and 3 of the present study confirm the aforementioned theses, using Balmont's Tk4 as a basis. The established facts lead to a reappraisal of Gasparov's theory, claiming *taktovik*'s origins in the *dolnik* (which, in its turn, allegedly descended from trisyllabic meters and has a trisyllabic basis). The structure of Balmont's and Blok's Tk4 points to an entirely different genesis of the Russian *taktovik*. It is much more reminiscent of mixed or heteromorphic meter that allows for a free interchange of iamb, trochee, dactyl, anapest, and amphibrach lines. In the future, it would be useful to compare the rhythmic design of lines in regular corresponding meters employed by Symbolist poets and compare four-ictus *taktovik* with early heteromorphic verse. Another possible consideration is an in-depth study of the syntactic break between two hemistichs.

Acknowledgment

This paper stems from the research project based at Lomonosov Moscow State University and supported by the Russian Science Foundation grant 17-18-01701.

References

Bal'mont, K. (2015–2016). Salamankskij student. Legenda. *Solnečnaâ prâža* 9–10, 114–120, 128–144.

Bejli, Dž. (2004). Razvitie strogogo akcentnogo stiha v russkoj literaturnoj poèzii s 1890 po 1920 g. [1975]. In Dž. Bejli, *Izbrannye raboty po russkomu stihu* (252–279). Moskva: Âzyki slavânskoj kul'tury.

Gasparov, M. L. (1968). Taktovik v russkom stihosloženii XX v. *Voprosy âzykoznaniâ* 5, 79–90.

Gasparov, M. L. (1974). *Sovremennyj russkij stih: Metrika i ritmika*. Moskva: Nauka.

Kvâtkovskij, A. P. (2008). Ritmologiâ russkogo stiha [1966–1967]. In A. P. Kvâtkovskij, *Ritmologiâ* (9–336). Sankt-Peterburg: INAPRESS, Dmitrij Bulanin.

Korčagin, K. M. (2010). K utočneniû tipologii cezury: “cezurnye èffekty” v russkoj sillabo-tonike i tonike. In *Otečestvennoe stihovedenie: 100-letnie itogi i perspektivy razvitiâ: Materialy meždunarodnoj naučnoj konferencii 25–27 noâbrâ 2010 goda* (32–44). Sankt-Peterburg: Filologičeskij fakul'tet SPbGU.

Lâpin, S. E. (2011). “Segmentnyj” dol'nik: k opisaniû metričeskih novacij Iosifa Brodskogo. *Vestnik Moskovskogo universiteta. Seriâ 9: Filologiâ* 6, 36–46.

Lâpin, S. E. – Pil'ŝikov, I. A. (2014). “Ein Fichtenbaum steht einsam” i tipologiâ russkogo dol'nika. In *Metodologiâ i praktika russkogo formalizma: Brikovskij sbornik*. T. II (146–157). Moskva: Azbukovnik.

Plungân, V. A. (2010). Toničeskij stih Vâčeslava Ivanova: k postanovke problemy. In K. Û. Lappo-Danilevskij, A. B. Šiškin (Ed.), *Vâčeslav Ivanov: Issledovaniâ i materialy*. Vyp. 1 (291–309). Sankt-Peterburg: Izdatel'stvo Puškinskogo doma.

Polilova, V. S. (2015). “Vtoroj on Don Huan Tenorio…”: o “Salamankskom studente” Hose de Èspronsedy v perevode Bal'monta. *Solnečnaâ prâža* 9, 109–114.

Polilova, V. S. (2017). O neklassičeskom stihe Bal'monta: Ritmičeskaâ struktura preryvistyh strok. *Zbornik Matice Srpske za Slavistiku — Matica Srpska Journal of Slavic Studies* 92, 731–746.

Semenov, V. (2010). Polustišiâ v pozdnem neklassičeskom stihe I. Brodskogo: kvazicezura. In *Studia Slavica: sbornik naučnyh rabot molodyh filologov*. T. IX (199–222). Tallinn: Institut slavânskih âzykov i kul'tur.

Semenov, V. (2013). Rannij taktovik Bloka kak postmetričeskij stih: (v zaŝitu derivacionnoj modeli toničeskoj metriki). In *Stat'i na slučaj: sbornik k 50-letiû R. G. Lejbova* [digital edition]. Tartu. <http://www.ruthenia.ru/leibov_50/Semenov.pdf>

The Russian Quintain

Barry P. Scherr
Dartmouth College
barry.scherr@dartmouth.edu

Abstract

Although just one line longer than the quatrain, which is the predominant stanza length in Russian verse, the quintain occurs far less often, as a rule accounting for no more than several percent of a poet's oeuvre. After suggesting that the unavoidable asymmetry of this relatively brief stanza form may help account for its infrequent use, I examine a corpus of 300 poems in 5-line stanzas written since the early 19th century. The analysis reveals the relative frequency of the possible rhyme schemes and shows how this form has evolved from the 19th century through the Modernist era and into more recent times. Topics explored include the types of heterostanzaic poems and linked stanzas that have appeared, the metrical affinities of the 5-line stanza, and its stanza rhythm (the frequency of stressing in each line) as compared to that of quatrains. While the rhyme schemes and types of heterostanzaic poems have generally become more varied over the years, the quintain's limited range of meters and its main stanza rhythms ultimately suggest that poets still tend to fall back on certain familiar formal templates when employing this less common stanza.

1 Introduction

The predominant stanza form for Russian verse, as for many poetic traditions, has been the quatrain. In contrast, the quintain, or 5-line stanza, has consistently occupied a relatively modest position. An analysis of more than 3100 stanzaic poems written between 1735 and 1816 shows that fewer than 3% of these were composed in quintains (Smith 1977: 188). For that period as a whole, 5-line stanzas occupied the sixth position in terms of utilization, with quatrains, 10-line stanzas (thanks to the popularity of the ode), then 8-line and 6-line stanzas as well as sonnets all appearing more often. Although the 10-line stanza has long since become a very minor form, the quintain has at best made modest gains. A broad survey of stanza usage by thirteen poets, from Lomonosov and Zhukovsky to Brodsky and Kushner, found that about 2/3 of the stanzaic poems used quatrains, a little less than 1/8 employed 8-line stanzas, and about 1/12 were written in 6-line stanzas. Quintains, like couplets, only accounted for about one poem in 20 (Scherr 2014: appendix). Traditional forms, like terza rima,

were not the focus of that study, but since the Silver Age one such form, the sonnet, has clearly become more common than 5-line stanzas. M. L. Gasparov (2000: 323), in listing the frequency of various stanza forms, provided percentages for couplets, quatrains, 6-line stanzas and 8-line stanzas; however, whatever 5-line stanzas he located were simply grouped among "other" forms, a further indication that they have largely remained in the shadows over the years.

In this regard Russian resembles most and possibly all other verse traditions: quintains tend to appear only occasionally and rarely attract special attention. However, English poetry does have a popular single-stanza form—the limerick, which is generally humorous, sometimes nonsensical and occasionally bawdy. For instance, A.H. Reginald Butler composed this well-known instance: "There was a young lady named Bright / Whose speed was far faster than light; / She started one day / In a relative way / And returned on the previous night." In the most common form, illustrated here, verses are ternary, with lines 1, 2 and 5 in trimeters, while lines 3 and 4 consist of dimeters. The rhyme scheme is aabba, one of the less common patterns found among Russian poets. Perhaps because the limerick is both popular and associated with light verse, most English-language poets, like their Russian counterparts, have employed it only occasionally. Still, at least one poem familiar to every American schoolchild is written in 5-line stanzas: Robert Frost's "The Road Not Taken," rhyming abaab. Many other major poets have turned to the form at least occasionally: Poe and Browning in the 19th century, and Yeats and Auden in the 20th, with the latter using it for more than one poem in blank verse.

The Russian tradition lacks any 5-line form that even approaches the limerick's popularity, nor do any of its poets use it in more than a relatively small portion of their verse. Even some of the poets who have experimented with a wide range of meters and rhythms are nonetheless limited in their use of stanzaic forms and virtually avoid quintains. Pasternak is one such poet: throughout his career the great majority of his stanzas contain precisely four lines, and he does not seem to have found quintains congenial. Thus in his three late collections—*Na rannikh poezdakh*, *Stikhotvoreniia Doktora Zhivago*, and *Kogda razguliaetsia*—the only groupings of five lines are to be found in three poems that contain stanzas of varying lengths, while in the first of these collections, where 41 of the 44 poems consist solely of quatrains, there is not a single 5-line stanza to be found. Other poets, such as Joseph Brodsky, despite being far more innovative in their use of stanza forms, nonetheless have only a couple of poems written entirely in quintains. And yet, for all the reluctance of some poets to use this stanza, for others it has served as a worthy alternative to the quatrain and the more common stanza lengths, so that it has remained a part of the verse repertoire and has appeared in some strikingly original ways up to the present day. The goals of this study are thus several: to point to the quintain's wide range of possibilities, to suggest reasons for its seemingly limited appeal, to single out the forms that have appeared most often in Russian verse, and—over the major part of the study—to describe its evolution in Russian verse since the 19th century as well as note its metrical affinities and rhythmic characteristics.

1.1 The corpus of material

The findings below are based on 300 poems. Of these, 100 are by poets who were active exclusively in the 19th century, 100 are by poets who came to prominence during the age of Modernism, when there was a great deal of experimentation in Russian poetry, and the final 100 are by poets who first began to publish in the 1920s or later. All the poems consist of at least two stanzas (that is, "single-stanza" quintains—poems that contain only five lines in their entirety—have been excluded). Nearly all the works examined consist exclusively of 5-line stanzas although in several cases I have also analyzed poems where, for the sake of closure, poets have attached a brief envoi or a single stanza that differs in length from the others. From the 19th century, I have chosen works by 13 poets: Viazemskii, Del'vig, Pushkin, Tiutchev, Iazykov, Benediktov, Lermontov, Aleksei Tolstoi, Polonskii, Fet, Grigor'ev, Apukhtin and Nadson. In most cases, I have included all or nearly all the quintains written by these poets. From this period Fet has the most poems in this form, followed by Tiutchev—though as a percentage of his total oeuvre, Tiutchev uses 5-line stanzas more frequently. The Silver Age features more poets who used numerous quintains; Briusov has about 50 poems in this form, and Bal'mont, who wrote more than 2000 poems, has 100. In their two cases I selected only 18 quintains from each, and then took most or all of the 5-line stanzas written by the following figures: Viacheslav Ivanov, Gippius, Lokhvitskaia, Kuzmin, Blok, Gumilev, Mandel'shtam, and Georgii Ivanov. The most recent period, in keeping with the relative conservatism that distinguishes the use of stanzaic forms by Russian poets since the period of Modernism (Baevskii [1976: 53] noted that nearly 90% of the stanzaic poems from the mid-20th century were written in quatrains), has seen fewer poets employ 5-line stanzas with any regularity. Thus nearly half the quintains examined here come from the large body of work in that form by Kushner.[1] The others are by Antolkol'skii, Tarkovskii, Chinnov, Morits, Loseff, Kublanovskii, Elena Shvarts and Sedakova.

1.2 Individual tendencies

Various proclivities are sometimes evident among the poets who have used this form: they may show a striking preference for certain rhyme schemes or their interest in 5-line stanzas may wax and wane from one period to the next. This is particularly the case among some of the poets who employ quintains only occasionally. Thus Aleksei Tolstoi preferred just two variants for his quintains: he has three iambic pentameter poems that rhyme AbAAb, and four poems with the same rhyme scheme but with the feminine and masculine rhymes switched (aBaaB). In these four works the "a" lines are in amphibrachic tetrameter and the "B" lines in trimeter. Gumilev's three poems in quintains all date from 1907 or 1908, while Sedakova's interest in the form has been confined both to a specific period (the mid-1970s) and to poems in either anapestic or amphibrachic tetrameter. Other poets changed over the years. Kushner

1 According to Laletina–Lutsiuk–Tver'ianovich (2008: 540), through 2006 Kushner had already composed 78 poems consisting entirely of 5-line stanzas.

seems to have approached 5-line stanzas only gradually, but then has collections where they are particularly in evidence. For example, Kushner (1991) contains 115 poems, of which quintains are found in 12, or 10.4%, an unusually high frequency of occurrence for a good-sized collection. (Seven of the 12 are among those in the corpus for this study.) Tiutchev has few early quintains; the great bulk of his work in this form dates from 1850 on. Fet, conversely, writes few 5-line stanzas after 1860, with most dating from the earlier portion of his mature period. In his early years Blok's 5-line stanzas are all in either AbAAb or aBaaB, but six of the eight poems in quintains from 1908 and on employ linked stanzas, a form otherwise quite rare. Thus, when generalizing about the salient qualities of quintains it needs to be kept in mind that individual poets often use the form in idiosyncratic ways.

2 Rhyme schemes for the quintain

Quatrains only have three basic rhyme schemes, depending on whether the rhyme is alternating (ABAB), adjacent (AABB) or enclosed (ABBA).[2] Of course, differences in the clausula multiply the combinations than can appear: the A and B rhymes may be either masculine or feminine, or, less commonly, dactylic or even hyperdactylic. In addition, the entire stanza may use a single rhyme, while one or more lines in a stanza may be unrhymed. And of course all of the rhyme scheme and clausula combinations may be written in any of the many meters found in Russian poetry. In other words, this relatively small number of schemes masks a wide range of possibilities. With quintains, the number of basic rhyme schemes goes from 3 to 10, while stanzas written all in one rhyme form an eleventh possibility. TAB. 1 does not distinguish between the types of clausulae but instead categorizes the poems in this corpus just by the general rhyme scheme that is used throughout; those poems that employ more than one scheme, contain unrhymed lines, or feature linked stanzas are grouped separately.

That a single scheme (ABAAB) should emerge as predominant is not especially surprising: after all, in quatrains alternating rhyme occurs far more often than either adjacent or enclosed rhyme. Still, with so many other possibilities it is striking to see one form used so often: not only in 45.3% of all quintains, but in 63.3% of the 215 poems that employ a single form throughout. Perhaps even more unexpected is the relatively small number of forms that achieve any degree of acceptance among poets. Just three others (AABAB, ABABA, ABBAB) appear more than 10 times. One form does not appear at all in the poems of this corpus written in homogenous stanzas, and five forms are found only in the work of a single poet: both the AAAAA poems are by Briusov; Kuzmin, who wrote the one work in AABBB, also composed all four of the AABBA poems (the main rhyme scheme for the limerick); the form ABABB appears just in a single work by Fet;

2 Small capitals describe a rhyme scheme, independent of the clausulae. As is generally accepted, I will use small letters to designate masculine clausulae (where rhyme and last stress fall on the final syllable of a line), capitals for feminine line endings (2-syllable rhyme), capital plus ' for dactylic clausulae (rhyme from the third to last syllable) and capital plus " for hyperdactylic endings, where the final stress is still further back.

Rhyme schemes	No. of poems	% of total
AAAAA	2	0.67
AAABB	0	0.00
AABAB	30	10.00
AABBA	4	1.33
AABBB	1	0.33
ABAAB	136	45.33
ABABA	22	7.33
ABABB	1	0.33
ABBAA	4	1.33
ABBAB	14	4.67
ABBBA	1	0.33
SUBTOTAL	215	71.67
UNRHYMED	6	2.00
PARTLY UNRHYMED	9	3.00
HETEROSTANZAIC	52	17.33
LINKED	18	6.00
TOTAL	300	100.00

TAB. 1: Usage of rhyme schemes

and Viazemskii provides the sole example of a poem in ABBBA.[3] On the other hand, the four poems in ABBAA were written by four different poets: Tiutchev, Bal'mont, Kuzmin and Mandel'shtam.

Russian poets writing 5-line stanzas have tended to avoid rhyme schemes with a concluding rhymed couplet. Only 8 of the 215 poems, or less than 4%, end with a paired rhyme (AA or BB), and in two of those cases the quintains consist of a single rhyme (AAAAA) throughout. This tendency may well account for the appearance of the stanza ABABB only once in the corpus, whereas the otherwise similar stanza ABBAB occurs 14 times. Triple rhymes are similarly avoided, with no instances of AAABB in poems employing a single rhyme scheme, and only one each of ABBBA and AABBB. Furthermore, a weaker but still prominent tendency to avoid a couplet at the beginning is also evident: 178 poems begin AB and just 37 AA. Only one form, ABABA, avoids adjacent rhyme entirely, but the more popular rhyme schemes have no more than one instance of adjacent rhyme; thus ABBAB occurs much more often than AABBA or ABBAA. A likely reason for these preferences stems from the predominance of alternating rhyme in Russian: three of the four most common forms are similar to a quatrain in alternating rhyme with an extra A-rhymed line inserted, most commonly after line three of the quatrain, but also after line 1 or 4.[4] The other common form has a B rhyme added after the second

3 While extremely rare in poems using a single form throughout, this ABBBA stanza does serve as one of the forms used in five heterostanzaic poems from our corpus.

4 Tomashevskii (1958: 78) sees the AbAAb stanza as resulting from a "doubling" of the third line in a quatrain with alternate rhyme, ascribing quintains' "neutrality" in terms of genre to their similarity to the widely-used quatrains. His view of the quintain as an expanded quatrain has become the norm among those few scholars who have discussed the form.

line. Meanwhile, as we shall see, some of the least common rhyme schemes appear on occasion in those poems that are heterostanzaic—apparently, poets have felt freer to use these rare forms when they are not in isolation but employed with at least one other type of quintain.

2.1 The historical context

Smith not only lists all the quintains in his corpus (1977: 371-376), but also offers several observations regarding the prevalence of particular rhyme schemes (see especially 219-221). More than other stanza lengths in the 18th century, quintains reveal a tendency to incorporate unrhymed lines. Indeed, no fewer than 50 (61%) of the poems in 5-line stanzas are partially unrhymed and another 8 (9.7%) eschew rhyme entirely (185). All but two of the 50 partially rhymed poems employ forms that consist of four rhymed lines followed by a single unrhymed line (220); thus there can be a temptation to read them as quatrains with an extra line tacked on. More than a third of the poems employ more than one variation of the quintain rather than homogenous stanzas (182). Finally. just one fully rhymed poem in Smith's corpus contains a single type of clausulae—in this particular case, all masculine.

Only the latter trait holds generally true for the verse examined in this article. Quintains typically contain different types of clausulae, most often an alteration of masculine and feminine rhymes. Among the 100 poems from the 19th century, the period closest to that examined by Smith, just three are written with all masculine or all feminine rhyme (TAB. 2). However, in other regards the 18th century is quite different. Poems containing more than one stanza form are much less common afterward: 17.3% for the entire corpus examined here as opposed to roughly twice that percentage in Smith (182).[5] Furthermore, the bulk of the poems employing more than one stanza form occur in the 20th century; few of the poems in the 19th century are heterostanzaic, as though its poets were trying to distance themselves from their predecessors. The greatest distinction, though, is in the frequency of partially rhymed poems: just 3% for the sample as a whole and 5% during the 19th century, as opposed to 61% in the 18th. In other words, already by the 19th century poets had largely broken away from the 18th-century model, when quintains often resembled a quatrain with an additional unrhymed line. Instead, 5-line stanzas were being cultivated as a distinct form that could assume a place within the predominant Russian tradition of fully rhymed lyric poetry.

Kholshevnikov (1987: 31) similarly describes quintains as originating from the "doubling" of one line in a quatrain, while noting that the ABABA stanza is the one common variant that does not involve a "doubling." Laletina–Lutsiuk–Tver'ianovich (2008: 541) say that Kushner's favored 5-line stanzas, AABAB and ABAAB, are "perceived by readers as a quatrain in alternating rhyme with a doubling of the first or third line."

5 It should be noted that I count poems in which the rhyme scheme remains the same but clausulae are reversed (e.g., AbAAb/aBaaB) as homogenous and Smith would label these as heterogenous. Thus the differences are not quite as sharp as indicated here, but they are still significant.

2.2 Factors inhibiting the use of quintains

In one of the few scholarly examination of the quintain, Klenin (2002: 286-91) has analyzed Fet's 5-line stanzas in some detail. She points to the inherent asymmetry of his favorite schema (ABAAB, usually realized as AbAAb), but notes that Fet often would offset that asymmetry by semantically privileging the middle line of a stanza as well as by creating a strong sense of closure. In some cases Fet would also create an interplay between the tension of an asymmetric rhyme scheme and a poem's thematic content. While Klenin does not generalize from Fet's practice, it is easy to see that the eccentric structure of a 5-line stanza (which in most cases contains both adjacent and alternating rhyme in an uneasy juxtaposition) has tended to give poets pause. As Klenin notes, the ABABA form is symmetrical in terms of its rhyme scheme (and lacks adjacent rhyme). However, that form still has an inherent imbalance, with one rhyme appearing three times and the other only twice. As Tomashevskii (1958: 56–57) has noted, lines of verse tend to group naturally into pairs. Thus in a way it is easier to create a series of quatrains, which in many cases readily fall into a 2+2 symmetry that cannot exist in a 5-line stanza.

At the same time the relative brevity of the 5-line stanza limits its possibilities. The most common form of the 8-line stanza simply joins two quatrains together, most often as ABABCDCD, thus perhaps explaining why this length generally is second only to the quatrain in its frequency of use. In addition, 6- and 10-line stanzas, while a bit more complicated in structure than a double quatrain, also benefit from a sense of balance or symmetry, which is relatively easy to achieve with an even number of lines. Granted, fairly intricate patterns can become widely accepted. In ottava rima, which has enjoyed some popularity among Russian poets, the first two rhymes each appear three times before a concluding couplet (ABABABCC). However, the very intermediate length of the quintain, like that of quatrains and 6-line stanzas, would seem to have hindered it from becoming canonic in any of its manifestations. Thus, on the one hand, the five lines of the quintain as opposed to the four of the quatrain would seem to be as conducive—if not more so—for expressing the individual motifs that appear over the course of a lyric poem. On the other though, the quintain's innate sense of imbalance along with the particular length that does not lend itself to establishing a traditional form like the ottava rima, have together, it would seem, relegated 5-line stanzas to relatively occasional use among most Russian poets.

3 Diachronic usage

3.1 Homostanzaic poems

Breaking down the basic rhyme schemes to show the use of individual clausulae over periods reveals more about both the favored patterns and the evolution of the Russian quintain. First and most notably, the frequency of the ABAAB stanza is much greater in the 19th century, when it accounted for nearly 2/3 of all quintains and about 3/4 of those written in a single form. Its predominance then drops steadily.

Ultimately, among poets who became active since the 1920s, the two most frequent patterns of clausulae for that scheme (AbAAb and aBaaB) occur just 22 times, the same number of times as the AAbAb and aaBaB patterns, which barely registered in the 19th century (TAB. 2).

A fairly strong tendency to favor forms that begin with feminine rhyme (owing much to the popularity of the AbAAb stanza) marks the 19th century; this preference gradually declines to only a slight preponderance in the most recent period. A single poem in the 19th century contains dactylic rhyme, which remains infrequent later as well. The 19th century uses the fewest combinations of clausulae; the variety increases sharply during the experimental Silver Age before falling back somewhat for the most recent period. Poems that employ clausulae of a single type follow a similar evolution. They are least frequent in the 19th century, when just two poems with all masculine rhyme appear and one with all feminine. Twelve such works are found in the Silver Age, including one poem with all dactylic rhyme, and among the more recent poets that number recedes to six poems (again, including one with all dactylic rhymes). A couple of general conclusions can be drawn from these observations. First, the types of 5-line stanza in use remain somewhat constrained in every period. While that trait is most obvious in the 19th century, even during the Silver Age just four variations of clausulae (AbAAb, aBaaB, abaab, and aBaBa) account for nearly 2/3 of the poems written with identical stanzas, and three of those four variations employ the same basic rhyme scheme. Among poets active since the 1920s, four variations (AbAAb, aBaaB, AAbAb, and aaBaB), representing two basic rhyme schemes, now account for nearly 3/4 of the poems with identical stanzas. Second, the 19th century is clearly a period of consolidation, when the form is seen as still new and perhaps somewhat innovative in and of itself; hence poets are cautious of using other types than the most familiar, and there is a strong tendency not to mix various kinds of stanzas within the same poem. By the Silver Age significantly fewer poems employ just one form of quintain, and poets feel freer to try out less familiar rhyme schemes. If the most recent period seems at first to be a continuation of the Silver Age, with its further decline in the frequency of homostanzaic poems, the sharp turn away from the ABAAB form also suggests a veering in different directions.

3.2 Unrhymed and heterostanzaic poems

The differences between periods becomes even more stark when looking at the poems that do not consist of fully rhymed identical stanzas. Quintains that totally lack rhyme are rare in all periods. Although partly unrhymed quintains occur most often in the 19th century (TAB. 3), they actually reflect a certain conservatism: note that all five instances essentially consist of a regular quatrain with a single unrhymed line added either at the beginning or, more often, the end, much as in common 18th-century practice. In contrast, of the two partly rhymed Silver Age poems in this corpus, one has three unrhymed lines in the middle and a second puts the unrhymed line in the penultimate position. One of the more recent poems with an unrhymed line moves it around from stanza to stanza, so that it may appear in the first, third or fourth position.

Clausulae grouped by rhyme scheme		19th C.	Silver Age	Post-1920 poets	Totals
AAAAA			**2**		**2**
	AAAAA		1		1
	aaaaa		1		1
AAABB					**0**
AABAB		**3**	**4**	**23**	**30**
	AAbAb	1	2	12	15
	aaBaB	1	2	10	13
	aabab	1		1	2
AABBA			**4**		**4**
	AAbbA		2		2
	aaBBa		2		2
AABBB			**1**		**1**
	aabbb		1		1
ABAAB		**64**	**43**	**29**	**136**
	AbAAb	49	28	12	89
	aBaaB	12	7	10	29
	abaab	1	5	3	9
	ABAAB	1	1	1	3
	A'bA'A'b			1	1
	A'BA'A'B	1	1	1	3
	A'B'A'A'B'			1	1
	AbAAb/aBaaB		1		1
ABABA		**9**	**7**	**6**	**22**
	aBaBa	6	4	3	13
	AbAbA	1		1	2
	aB'aB'a		1		1
	A'BA'BA'			1	1
	A'B'A'B'A'		1		1
	AbAbA/aBaBa	2	1	1	4
ABABB		**1**			**1**
	aBaBB	1			1
ABBAA		**1**	**3**		**4**
	AbbAA		1		1
	aBBaa	1	1		2
	AbbAA/aBBa		1		1
ABBAB		**7**	**4**	**3**	**14**
	AbbAb	7		3	10
	aBBaB		2		2
	ABBAB		2		2
ABBBA		**1**			**1**
	aBBBa	1			1
TOTALS		**86**	**68**	**61**	**215**

TAB. 2: Diachronic usage of homogenous stanza forms

Clausulae grouped by rhyme scheme	19th C.	Silver Age	Post-1920 poets	Totals
UNRHYMED	**1**	**2**	**3**	**6**
XXXXx	1		2	3
XXXXX		2	1	3
PARTLY UNRHYMED	**5**	**2**	**2**	**9**
AABBx	1			1
A”BA”BX”	1			1
aBBax	1			1
XaBBa	1			1
AbAbx	1			1
aXXXa		1		1
AbAXb		1		1
X’AbAb/AbAxb/A’bXA’b/AbAX’b			1	1
xaBBa			1	1
HETEROSTANZAIC	**8**	**12**	**32**	**52**
AABAB/ABAAB	2	2	10	14
ABBAB/ABAAB	2	3	4	9
ABABA/ABAAB [OR] ABABA/ABBAB	1	1	7	9
ABABB/ABAAB			3	3
AABAB/AABBA			1	1
AABAB/ABABB		1		1
ABBBA AND OTHER RHYME SCHEMES	2	2	1	5
AABBB AND OTHER RHYME SCHEMES			2	2
ABAAB AND 2 OTHERS	1	2	3	5
ABAAB AND 3 OTHERS			1	1
ABABA/ABBAA/ABBAB		1		1
LINKED		**16**	**2**	**18**
ABABA/BAABA [THROUGH RHYME]		1		1
ABCDE/ABCDE [THROUGH RHYME]		1		1
ABCAC/ABDAD		1		1
ABABC/DEDEC		1	2	3
ABACB/DEDCE		4		4
ABCAB/DECDE		6		6
ABCAB/DEDCD//ABCAB/CDEED		1		1
ABACB/CDCED/EFEGF…		1		1
TOTAL	**14**	**32**	**39**	**85**

TAB. 3: Diachronic usage of forms with unrhymed lines or differing stanzas

Heterostanzaic and linked poems similarly reveal a sharp difference between the 19th century and later practice. The 19th-century corpus contains only eight heterostanzaic poems, and in each of them the widely used ABAAB stanza comprises one of the forms. Admittedly, Polonskii and Nadson both have poems that also employ the unusual ABBBA scheme, and Nadson has a poem that uses three different stanza types, but none of these three poems were written before the 1870s—and in fact all the heterostanzaic poems in the nineteenth century are from the 1860s or later. It would again appear that for much of the 19th century poets sensed that the quintain was still a nascent form and therefore they were hesitant to be innovative in using it. Although during the Silver Age the frequency of heterostanzaic poems was only a little higher, the appearance of linked 5-line stanzas serves as a major development. Six of the linked stanzas in this corpus are by Blok and six are by Briusov. Blok's poems are among the longest to feature this form (one has 10 stanzas, another has 12), though he uses only the two most common patterns for linked stanzas, with either the third or the fourth line in each pair of stanzas forming the linking rhyme. Briusov's linked quintains on the whole turn out to be more innovative. For instance, in one poem ("Solntsevorot") he manages to connect all four of its stanzas in a complicated pattern. Viacheslav Ivanov's three poems in this manner are all unusual. "Snitsia mne priton igornyi" has the first, second and fourth lines all forming the link, so that the two stanzas rhyme ABCAC ABDAD. In "Trizna kreza" the same rhymes are used in both stanzas, a phenomenon perhaps better labeled as "through rhyme." All three stanzas in "Vox populi" have the scheme ABCDe—that is, the corresponding lines in each stanza rhyme with each other.

It is here that another sharp difference emerges between the Silver Age and more recent poetry. Linked poems largely fall out of fashion after the 1910s, with the two examples of such poems in the third part of our corpus simply using the rather simple pattern of having the fifth line of each stanza provide the link. On the other hand, heterostanzaic poems come to comprise nearly a third of the total. Granted, more than half of these employ the familiar ABAAB stanza as one of the components, but several exhibit a high degree of inventiveness. Only one poem in our corpus, by Kuzmin, used the AABBB stanza for an entire poem, but that stanza then reappears in two heterostanzaic works from this last period. Particularly striking is Arsenii Tarkovskii's "Pod serdtsem travy tiazheleiut rosinki," which combines that highly unusual stanza with AAABB, which is not used as the sole form in any poem from our corpus. However, AAABB also shows up in two of the eight stanzas that comprise Iunna Morits's "Surovoi nit'iu," which uses four different rhyme schemes in all. Igor' Chinnov combines three relatively uncommon forms in one poem (ABABB, ABBAB, ABBBA) and then uses three totally different forms in another. Except for the aforementioned poem by Tarkovskii, all the works singled out here date from the 1970s or later. Thus if the 19th century is marked by the narrowness of the quintain's usage and the Silver Age by the notable introduction of linked stanzas, then the most recent period has witnessed a sharp increase in the frequency and the variety of heterostanzaic verse in 5-line stanzas.

4 The metrical repertoire of quintains

The overall metrical repertoire of the Russian quintain roughly adheres to the practice of Russian poets during each period, though there are a few notable exceptions. While the divisions into periods that Gasparov (2000: 316) created in compiling his table of Russian poetry's metrical repertoire do not correspond precisely to those delineated in TAB. 4, several of the columns in his chart contain data that allow for an approximate comparison.

As Smith (1977: 219-220) observed, quintains in the 18th century employed a rather narrow range of meters, while exhibiting several distinctive traits. Relatively high proportions of these poems were written in trochaic or non-classical meters. The iambic and especially the trochaic poems also tended to feature mixed forms more frequently than for the period as a whole, with the iambic hexameter and trochaic tetrameter consequently being used less often than expected. By the 19th century that situation changed. Our corpus includes only one 19th-century poem in a non-classical meter, while trochees as a whole, if anything, appear somewhat less often than in other verse of the time. Notably, the metrical repertoire employed in 19th-century verse shows even less variety than that of the 18th-century. None of the 19th-century poems in the corpus employ iambic trimeter, while all but one of the trochaic poems are written in trochaic tetrameter, thereby making that specific meter slightly overrepresented. If half the quintains are in either iambic or trochaic tetrameter, then for the 19th century overall only about a third of the poems are written in those two meters. The total amount of ternary poetry is roughly what would be expected, though anapests instead of amphibrachs occupy the lead position, even if by a small margin. As with the rhyme schemes, poets seemed to approach the quintain with a degree of conservatism, for the most part relying on the more widely used meters.

Perhaps surprisingly, iambic tetrameter and trochaic tetrameter together account for even more of the quintains during the Silver Age. In Gasparov's survey for the period of 1890-1935—which is the time frame in which all but four of the 100 Silver Age quintains in our corpus were composed—nearly a fifth of the poems are written in iambic tetrameter and approximately the same amount in non-classical verse. Trochaic tetrameter verse makes up just over 8% of the works examined. In Gasparov's table, the sum for all the trochaic meters is 21.3% (versus 33% here), while that for all iambic verse is 44.5%—not very different than the percentage of that verse in Silver Age quintains. What, then, are the main differences? First, the range of meters for the quintains is considerably narrower. The non-classical poetry (logaoedic, dol'nik, taktovik, accentual and free verse) that became widely used during this period is significantly underrepresented, appearing not quite a third as often as in all verse. While the percentage for all iambic verse is close to the period's norm, the tetrameter predominates over the other iambic lines much more in quintains. And the same is even more evident for trochaic verse. Second, the frequency of the trochaic tetrameter is as striking as the avoidance of non-classical verse: it occurs approximately three times more often than expected. Third, as in the 19th century, anapests are somewhat overrepresented and amphibrachs underrepresented, though here the numbers are too small to allow for firm conclusions.

Meters:	19th C.	Silver Age	Post-1920 poets	Totals
Iambic	**64**	**49**	**48**	**161**
I3		2	2	4
I4	36	30	9	75
I5	8	8	12	28
I6	12	3	9	24
Mixed	8	6	16	30
Trochaic	**15**	**33**	**5**	**53**
T3	1	1		2
T4	14	25	2	41
T5		3		3
T6		1		1
Mixed		3	3	6
Ternary	**20**	**12**	**39**	**71**
Dactyls	3	2	5	10
Amphibrachs	7	2	14	23
Anapests	9	8	20	37
Mixed ternary	1			1
Nonclassical	**1**	**6**	**8**	**15**
TOTAL	**100**	**100**	**100**	**300**

TAB. 4: Metrical data

While it is difficult to be certain, it is quite possible that poets felt that 5-line stanzas were themselves an unusual form and hence resorted to more established meters rather than the newly emergent types of verse. Notably, for some poets at least, the trochaic tetrameter became the favored form for their more inventive quintains. Perhaps the most striking example in our corpus is that of Blok. Six of the 13 works by him in our corpus employ the trochaic tetrameter—that is, just under half. Yet in his poetry as a whole only 7.2% of his poems (91 out of 1260) use this meter (Rudnev 1972: 236, 267). What is more, five of the six instances when he uses linked stanzas are written in trochaic tetrameter, as is one of his two heterostanzaic poems. Or consider Viacheslav Ivanov: he wrote the two unrhymed quintains from this period, and both are in trochaic tetrameter, as are three of his four heterostanzaic poems and two of those with linked stanzas (the other is in trochaic pentameter). Conversely, all five of Ivanov's poems that employ a single type of rhymed 5-line stanza are written in iambic meter (and in three of those instances iambic tetrameter).

That reliance on trochaic tetrameter for the most innovative poetry essentially disappears among the more recent poets. Now iambic and trochaic tetrameter verse together appear in just 11 poems, less than half the frequency in Gasparov's table (the end date of which is about 25 years before that of our corpus, though there is still significant overlap). The iambic verse is more varied, though the relative frequency of individual iambic meters departs from the period as a whole, with nine instances of iambic hexameter (which occurs in less than 1% of all verse for the period) and sixteen of mixed iambs—about three times the expected amount. If trochees were overrepresented in the previous period, they are now sharply underrepresented with just

5 instances, as opposed to 20% overall in Gasparov's table. The use of non-classical verse remains modest, though it is a little closer to the norm for this period than was the case during the Silver Age. Ternary verse in general was fairly common during the Soviet period, appearing in 22.8% of the poems surveyed by Gasparov, but for quintains the percentage is significantly higher, and not far below that for iambic verse. Once again, anapests appear somewhat more often than expected in relation to the other two ternary meters. For the most part poets tend to use a wide range of meters for their quintains (Tarkovskii, for instance, employs seven different meters for the 10 poems by him in our corpus; the eight poems by Loseff display seven meters), without showing the same affinities between meters and stanza forms that characterized the Silver Age. On the one hand, this picture suggests that 5-line stanzas have become more of a "regular" verse form, with poets not confining their use of it to just a very limited number of meters. However, that variety on the individual level masks a certain metrical conservatism in the overall utilization of meters. The great majority of amphibrachic and anapestic poems, for instance, employ trimeter or tetrameter lines, the most common forms for these ternary meters. Entire poems in very short lines (such as iambic dimeter) or very long lines (anapestic pentameter, trochaic octameter) are not represented in the corpus, even though some of the poets surveyed here have used such lines on occasion.

5 Stanza rhythm

G. Shengeli (1923: 109-121) was the first to notice that the average amount of stressing on a line depended on its position in a stanza. More specifically, he began by examining the various rhythmic forms. He saw that the fully-stressed (first) form tended to appear most often on the first line of certain types of stanza and then went on to note patterns in the distribution of the heavier and more lightly stressed forms. In a later study (1960: 174-86), after collecting extensive data for iambic and trochaic tetrameter quatrains, he confirmed some of his earlier results and noted a similar pattern for both meters, with the first line more heavily stressed and then average stressing decreasing line by line throughout the stanza, thereby creating a distinct "stanza rhythm." Since then a relatively small number of scholars have made some significant advances in the methodology employed by Shengeli.[6] Thus G. S. Smith (1980) noted how the frequency of weakly stressed words in metrically strong positions and hypermetrical stressing can affect the comparative strength of lines in the stanza; in a later article (Smith 1981), he demonstrated that simply a reversal of the feminine and masculine lines in alternately rhymed quatrains (that is, AbAb quatrains as opposed to those that rhyme aBaB) can lead to differing stanza rhythms. In the sole effort to look at the evolution of stanza rhythm, M. L. Gasparov (1989) discovered that stanza rhythm for iambic tetrameter quatrains rhyming AbAb differed from century to century, with the pattern discerned by Shengeli applicable to the 19th century but not to the 18th or 20th. He also looked at other clausula patterns for iambic quatrains, at

6 For a more extensive survey of the research on this topic, see Scherr (2017).

trochaic tetrameter quatrains, at stanzas of other lengths, and at verse written in iambic and trochaic pentameter. It is important to point out that all these scholars are pointing to general propensities; the distribution of more and less heavily stressed lines in a particular work (or for the verse of a particular poet) may differ from the overall results.

To describe stanza rhythm with the precision that characterizes the studies of these scholars requires identifying a significantly large body of verse that is written in the same meter and has the same alternation of masculine and feminine lines. The frequency with which poets employ quatrains as well as such meters as the iambic and trochaic tetrameter and pentameter means that there is more than adequate material for establishing the chief rhythmic tendencies of quatrains in those meters. And the same is true for some other stanza forms that, at least during certain periods, appeared in adequate numbers (Shengeli 1923: 113-121; Gasparov 1989: 142-145; Scherr 2017: 131-135). Because only small numbers of 5-line stanzas occur and the formal features they may assume are quite varied, it is difficult to identify a body of poems—all with the same rhyme scheme, clausulae, and meter—that is sufficiently extensive to allow for meaningful analysis. However, the iambic tetrameter appears often enough in the widely used AbAAb stanza during the 19th century and the Silver Age to allow for some tentative observations (see TAB. 5). The overall stanza rhythm for these quintains closely resembles that found by Gasparov (1989: 135-136) in the AbAb quatrain from the 19th and early 20th centuries, with the first line most strongly stressed and a more or less steady falling off until the last line, which is stressed the least often. The verse by the Silver Age poets, when isolated from the rest, shows two anomalies. Although, as Gasparov mentions, the average stressing generally becomes "lighter" over time, during that one period it is somewhat higher in these 5-line stanzas. Also, the second and fifth lines receive more frequent stressing than expected. Both anomalies, of course, could result from the relatively small samples.

The description of stanza rhythm for the trochaic tetrameter lacks the precision of previous studies, because, given the relatively small number of quintains, it was necessary to take all the poems in our sample employing that meter, whatever their rhyme pattern. Strikingly, however, the overall stanza rhythm for this meter resembles the main pattern in trochaic tetrameter quatrains. Gasparov observed a tendency for a wave-like pattern in the stressing for the trochaic poems (as opposed to the gradual decline in stressing over the entire stanza when poems were written in iambic tetrameter). The first line is again the strongest, but the third has heavier stressing than the second, and then the fourth line once more has the lightest stressing (Gasparov 1989: 136, 138). For the trochaic tetrameter quintains, in our corpus there is similarly a falling off from the first line to the second, then a moderate rise on the third, followed by a decline in stressing on the fourth—and in this instance on the fifth and last line as well.

Gasparov provided only preliminary data for iambic pentameter quatrains, which, at least in the 19th century, resembled the stanza rhythm found in iambic tetrameter poems: they maintained the most frequent stressing on the first line and the least stressing on the fourth, with the second and third lines essentially equal. Here too the

	Average stressing on each line in stanza				
	1	2	3	4	5
AbAAb stanza / I4 / All periods (34 poems, 139 stanzas, 695 lines)	**3.35**	**3.31**	**3.19**	**3.09**	**3.06**
AbAAb stanza / I4 / 19th C. (20 poems, 78 stanzas, 390 lines)	3.33	3.28	3.13	3.05	2.97
AbAAb sanza / I4 / Silver Age (13 poems, 58 stanzas, 290 lines)	3.36	3.40	3.29	3.14	3.19
All forms / X4 / Silver Age (25 poems, 116 stanzas, 580 lines)	**3.23**	**3.00**	**3.08**	**2.99**	**2.85**
All forms / I5 / All periods (28 poems, 139 stanzas)	**4.07**	**3.99**	**3.95**	**3.97**	**3.85**
All forms / I5 / 19th C. (8 poems, 48 stanzas, 240 lines)	4.13	4.13	4.00	4.08	3.88
All forms / I5 / Silver Age (8 poems, 42 stanzas, 210 lines	4.00	4.10	3.98	4.00	3.93
All forms / I5 / Post 1920-poets (12 poems, 49 stanzas 245 lines)	4.08	3.78	3.90	3.84	3.76

TAB. 5: Stanza rhythm

overall picture for the quintain resembles that for the quatrain: the most frequent stressing is at the beginning of the stanza and the least frequent at the end, with the middle lines all roughly equal. There are notable differences from period to period, however, with the earlier verse showing somewhat stronger than expected stressing on the second line, while the most recent poets create more of a wave-like pattern, mirroring that found in the trochaic tetrameter poems. However, these variations from the overall pattern could be explained by the small number of stanzas being examined for each period; the overall figures for the iambic pentameter suggest that 5-line stanzas behave much like quatrains in terms of stanza rhythm, and in any case are similarly consistent in stressing the first line of the stanza most frequently and the last lines least frequently.

6 Conclusion

A close study of quintains reveals that they have a discernible and unique history among the stanza forms employed by Russian poets. At first glance 5-line stanzas can present a seemingly monotonous picture: only four of the ten possible patterns based on two rhymes have enjoyed even moderate usage and just one of the four, the ABAAB form, predominates over all others. However, 5-line stanzas have evolved significantly, with the ABAAB form achieving its peak popularity during the 19th century, when the modern quintain was first emerging as a distinct verse form. During the Silver Age both the varieties of clausulae within that basic rhyme pattern and the types of patterns in use expanded, while several poets came to use 5-line stanzas that were linked together, sometimes in quite imaginative ways. In more recent times it became more difficult to pick out any one or two types of quintain as dominant; instead, sev-

eral combinations of rhyme scheme and clausulae are employed almost equally. Furthermore, although linked stanzas have become less common, a given poem may freely mix various kinds of quintains—including many less common types. Poets seem to have become bolder in their use of this stanza, both in terms of exploiting previously rare rhyme patterns and in terms of not being bound to any one pattern for an entire poem. However, even though the increasingly varied rhyme schemes indicate a growing level of comfort in using this form, the associated meters and stanza rhythms suggest that poets still sense 5-line stanzas as somewhat exotic. Thus they seem reluctant to alter the basic stanza rhythm or to combine it with the full range of meters found in modern Russian verse. Until a leading poet, or group of poets, brings the quintain into greater prominence, this is likely to remain the case.

References

Baevskii, V. S. (1976). Strofika sovremennoi liriki v otnoshenii k strofike narodnoi poezii. In M. L. Gasparov – E. M. Dzhrbashian – R. A. Papaian (Eds.), *Problemy stikhovedeniia* (51-67). Erevan: Izdatel'stvo Erevanskogo universiteta.

Gasparov, M. L. (1989). Strofic heskii ritm v russkom 4-stopnom iambe i khoree. In B. P. Scherr – D. S. Worth (Eds.), *Russian Verse Theory: Proceedings of the 1987 Conference at UCLA* (133–147). Columbus, Ohio: Slavica.

Gasparov, M. L. (2000). *Ocherk istorii russkogo stikha: Metrika. Ritmika. Rifma. Strofika.* Moscow: Fortuna Limited.

Kholshevnikov, V. E. (1987). *Mysl', vooruzhennaia rifmami: Poeticheskaia antologiia po istorii russkogo stikha*. 2nd ed., rev. and enl. Leningrad: Izdatel'stvo Leningradskogo universiteta.

Klenin, E. (2002). *The poetics of Afanasy Fet*. Köln: Böhlau Verlag.

Kushner, A. S. (1991). *Nochnaia muzyka: Kniga stikhov.* Leningrad: Lenizdat.

Laletina, O. S. – Lutsiuk, I. V. – Tver'ianovich, K. Iu. (2008). Metrika i strofika A. S. Kushnera. In E. V. Khvorost'ianova (Ed.), *Peterburgskaia stikhotvornaia kul'tura: Materialy po metrike, strofike i ritmike peterburgskikh poetov* (517–634). St. Petersburg: Nestor-istoriia.

Rudnev, P. A. (1972). Metricheskii repertuar A. Bloka. In *Blokovskii sbornik*, vol. 2 (218–267). Tartu: Tartuskii gosudarstvennyi universitet.

Scherr, B. P. (2014) Odd stanzas. *Studia Metrica et Poetica*, 1 (1), 28-54, + appendix after 54.

Scherr, B. P. (2017). Analyzing stanza rhythm: A brief history and future directions. In Marina Akimova – Marina Tarlinskaja (Eds.), *M. L. Gasparovu–stikhovedu: In memoriam* (117–137). Moscow: Iazyki slavianskoi kul'tury.

Shengeli, G. A. (1923). *Traktat o russkom stikhe. Chast' I: Organicheskaia metrika*. 2nd ed., rev. Moscow and Petrograd: Gosudarstvennoe izdatel'stvo.

Shengeli, G. A. (1960) *Tekhnika stikha*. Moscow: Gosudarstvennoe izdatel'stvo khudozhestvennoi literatury.

Smith, G. S. (1977). The stanza forms of Russian poetry from Polotsky to Derzhavin (Doctoral dissertation). University of London. Retrieved from: https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.473140

Smith, G. S. (1980) Stanza rhythm and stress load in the iambic tetrameter of V. F. Xodasevič. *Slavic and East European Journal*, 24 (1), 25–36.

Smith, G. S. (1981). Stanza rhythm in the iambic tetrameter of three modern Russian poets. *International Journal of Slavic Linguistics and Poetics*, 24, 135–152.

Tomashevskii, B. V. (1958). Strofika Pushkina. In *Pushkin: Issledovaniia i materialy*, II (49–184). Moscow: Akademiia nauk SSSR.

Homeric Formulas and Meter

Sophia Sklaviadis
Tufts University
ssklaviadis@gmail.com

James K. Tauber
Eldarion
jtauber@jtauber.com

Abstract

We present a computational simulation of 20th century theories of metrics and stylistics. We construct a visualization of the formulae in the Homeric corpus, through which it is possible to explore stylistic features such as the correspondence between formulae boundaries and metrical boundaries. We use a Python script to count all repeated *n*-grams in the Homeric corpus. We visualize *n*-grams at a high level across the entire corpus. We construct a reading environment in which repeated *n*-grams in the text are indicated by color. The reader is able to jump to various instances of a given *n*-gram or to its close variants. Most significantly, *n*-gram variants can be defined in terms of different types of equivalence classes: *n*-gram equivalence class may be set by the user, based on tokens or on any function of surface forms. For example, *n*-grams can be visualized over orthographic normalization, lemmatization, part of speech, and meter. Our *n*-gram analysis is potentially useful for further purposes, including semi-automatic treebank correction based on partial *n*-gram matches at different equivalence classes, and a computational characterization of epic prosody.

1 Formulas as *n*-grams

Formulaic language is pervasive in the *Iliad* and the *Odyssey*. Formulas are repeated sequences of words that have been the object of intense scrutiny by centuries of Homerists. The patterns displayed by the formulas are complex and they have given rise to many hypotheses about the authorship of the two epics: Were there individual authors or a diffused tradition? What is the relation between the composition of the *Iliad* to its "sequel"? In a recent book M. Mueller analyzes formulas in terms of computationally derived *n*-grams (2009, *The Iliad*). This is a natural way of detecting the formulas in the two texts. Moreover it provides systematic data that may allow us to take a more scientific approach to the questions relating to formulas that have been posed in the history of Homeric scholarship.

Even before encountering Mueller's work, thinking about visualizing the formulas in digital editions of the Homeric epics, we used a naïve algorithm for detecting *n*-grams

in the poems. Our results confirm Mueller's, which, in turn, quantitatively confirm various well known patterns such as the high degree of similarity between the first and last books of the *Iliad* and the first book of the *Odyssey*. In FIG. 1, we can see that the last book of the *Iliad* and the first book of the *Odyssey* have among the highest frequencies of common formulas.

The rest of the paper is structured as follows. First, we discuss some of the more technical issues that we encountered in computing the *n*-grams. Then we discuss some of the 20th ce. scholarship that leads to our final visualization of the relation between *n*-grams and metrical position on the hexameter.

2 *N*-gram generation with location information

The first step in the identification of repeated *n*-grams in a text is the generation of all *n*-grams in that text for a given *n*. The *n*-gram generation code takes as input a sequence of tokens organised into lines such that each line has a unique reference (https://github.com/jtauber/homer-ngram). Neither the lines nor the references contribute to the *n*-gram generation itself but they are used to label the location of each *n*-gram for later visualisation in terms of both the line reference and the start and end offset within that line.

For example, the following input

```
ref1 A B C
ref2 D E F G H
```

results in the generation of 5-grams with location information:

```
A B C D E (ref1 offset 1 of 3 to ref2 offset 2 of 5)
B C D E F (ref1 offset 2 of 3 to ref2 offset 3 of 5)
C D E F G (ref1 offset 3 of 3 to ref2 offset 4 of 5)
D E F G H (ref2 offset 1 of 5 to ref2 offset 5 of 5)
```

Note that as well as formulas, repeated *n*-grams (particularly longer ones) may be quotations from an earlier passage. In this analysis we made no attempt to distinguish such quotations from traditionals formulas.

3 Normalisation of tokens before *n*-gram generation

The tokens in the *n*-grams (A, B, C, etc. above) need not be the word forms in the text. A normalisation process may be employed depending on the desired equivalence between *n*-grams. For example, if one wishes to consider two *n*-grams identical if they contain the same sequence of lexemes (regardless of their specific inflection), then lemmatization can be performed prior to *n*-gram generation. Normalisation may be as simple as stripping punctuation or folding case. It may, however, involve replacement of the word form with any property of that word form such as part-of-speech.

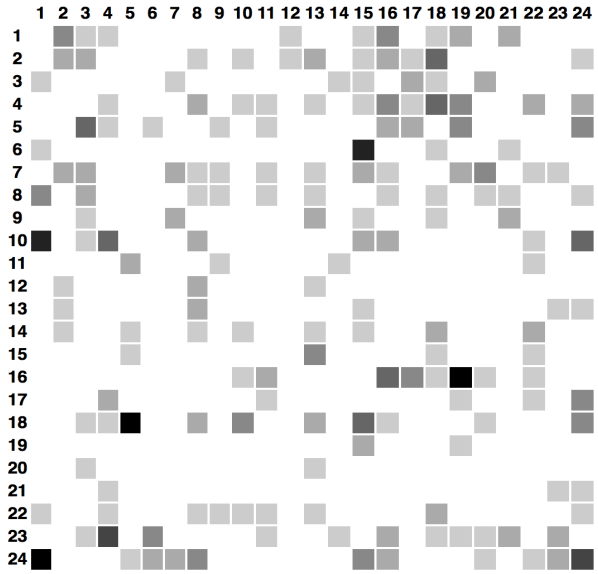


FIG. 1: Rows represent the 24 books of the *Iliad*, columns represent the 24 books of the *Odyssey*. Darkness indicates how many *n*-grams pairs of Iliad versus Odyssey books share for $n \geq 8$.

The same normalisation need not apply to all tokens. For example, one might convert all proper names to a single token leaving all else untouched if the intention is to find repeating *n*-grams where the specific proper name used does not matter.

4 Subgram removal

One problem with naïve *n*-gram generation for multiple values of *n* is that all the subgrams of a repeated *n*-gram will show up as well, and this is generally not what is wanted. For example, the string A B C D A B C A B C D has a repeated 4-gram A B C D. Naïve generation of 3-grams gives three A B C and two B C D. The A B C is helpful to know because it not only occurs as part of A B C D but also apart from it. In contrast, B C D is only repeated because it forms part of the longer sequence A B C D. In this case, we would not want B C D to be considered a repeating *n*-gram. The heuristic we developed is to output an *n*-gram if and only if the raw *n*-gram count is greater than one *and* is greater than the count from subgrams of repeated (*n*+1)-grams.

5 Data format for visualisation

The output of the *n*-gram generation code (with subgram removal) is a list of the following information:

- repeated *n*-gram id
- tokens making up that repeated *n*-gram (which may not be the word forms in the text)
- a list of instances of the *n*-gram each consisting of
    - a start reference and offset
    - an end reference and offset

We can take just the list of start/end references and offsets to produce the following visualisation, where each column represents each of the book of the *Iliad*, and the horizontal lines of each column correspond to lines in the *Iliad* (FIG. 2).

The same visualisation code can apply to visualising any ranges within the text whether they are repeated *n*-grams or the results of some entirely different process. For example, if search results were output with similar start/end references and offsets, they could be visualised exactly the same way. It was a deliberate choice in our implementation to support this possibility.

6 A selective review of the tradition

In the late 1920s Milman Parry produced a groundbreaking analysis of Homeric verse as structured by formulas. Parry catalogues the possible ways of splitting the hexametric line in phrases that fit its 32 possible permutations of 4 dactyls or spondees plus the more rigid last two feet, a dactyl and a spondee (Parry 1971, *The Making of Homeric Verse*). Parry famously defines the formula as "an expression regularly used, under the same metrical conditions, to express an essential idea" (Parry 1971: 13).[1] The simplest type of formula is the combination of epithet with a proper noun, of which two notable examples are δῖος Ὀδυσσεύς [godlike Odysseus] (98 times), and δῖος Ἀχιλλεύς [godlike Achilles] (55 times) (Parry 1971: 84). More complex combinations of formulaic phrases are exhaustively catalogued in Parry's papers. For example, particular epithet-noun combinations with verbs of speaking, such as πολύμητις Ὀδυσσεύς [crafty Odysseus] is used 72 times with προσέφη [said] or μετέφη [said among] and 9 times otherwise (Parry 1971: 51).

The line of the hexameter is regularly broken by a caesura at several locations: after the first syllable of the third foot, after the second syllable of the third foot if it is a dactyl, after the first syllable of the fourth foot, after the fourth foot (bucolic diaeresis), and after a run-over word at the beginning of the line (i.e. after the first syllable of the second foot). Albert Lord's overview, *The Singer of Tales* (1960: 142), summarizes Parry's extensive categorization of formulas as follows: "One can ... expect to find formulas of one foot and a half, two feet and a half, two feet and three quarters,

1 In the next sentence Parry explains with the following example: "What is essential in an idea is what remains after all stylistic superfluity has been taken from it. Thus the essential idea of the words ἦμος δ᾽ ἠριγένεια φάνη ῥοδοδάκτυλος Ἠως is 'when day broke' ... that of πολύτλας δῖος Ὀδυσσεύς is 'Odysseus'" (Parry 1971: 13–14).

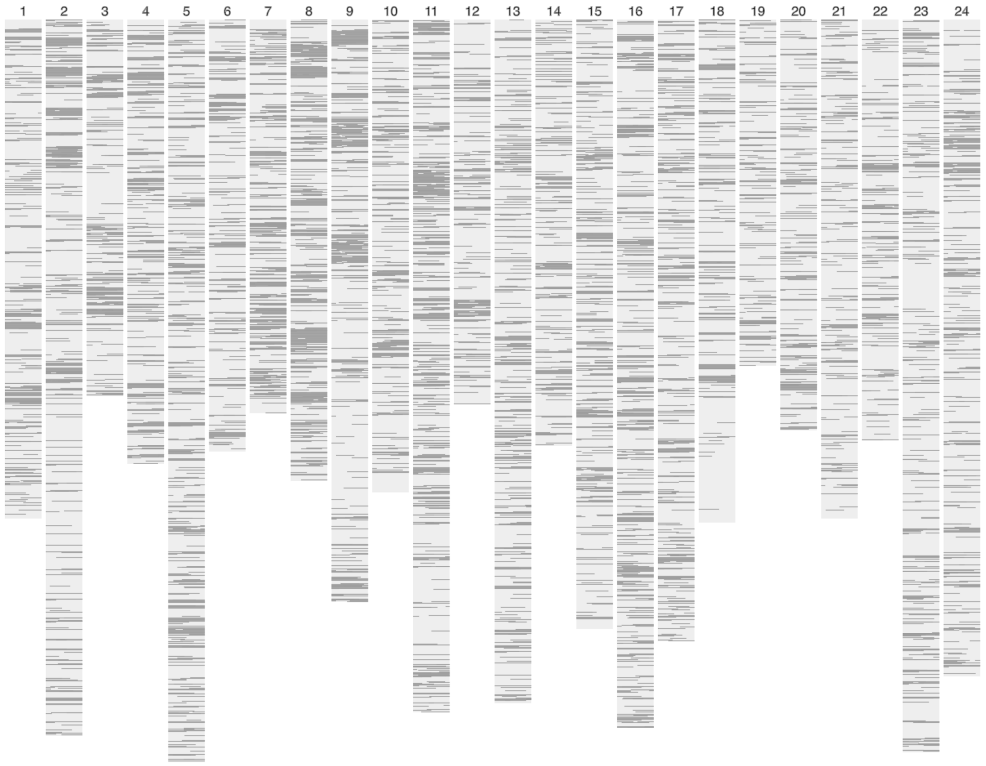


FIG. 2: Repeated instances of *n*-grams in the *Iliad* for $n \geq 5$ are shown in grey

three feet and a half, four feet, and six feet in length measured from the beginning of the line, and complementary lengths measured from the pause to the end of the line." Lord himself is most interested in establishing the oral nature of the Homeric poems. According to his arguments the first of three defining marks of oral poetry is the use of formulas. We can visualize formulas at a high level as in FIG. 2, at an even higher level to include both poems as in FIG. 1, as well as at lower levels: individual Book/Rhapsody, episode, etc.

Lord's second mark of oral poetry is enjambment, which, according to Parry, is usually not *necessary* in oral poetry (compared to Virgil or Apollonius). Enjambment is more difficult to visualize because it requires extensive manual correction. However, we propose the following idea about semi-automatic detection of enjambment. Computationally, we can search for the formulas that end at the beginning of the line (i.e. before the end of the second foot). In FIG. 4 below, we see that the hexametric position with the second highest frequency of *n*-grams ending in that position is the first syllable of the second foot. A next step that we hope to pursue in future work is to identify which of these enjambments are syntactically/semantically necessary. Further, it will be interesting to identify syntactic and formulaic patterns that precede the enjambments.

7 Meter

Pursuing Meillet's 1923 hypothesis that Greek Lyric is cognate to Sanskrit Vedic—to which Parry is sympathetic—Gregory Nagy derives prominent formulas of Homeric hexameter from formulas attested in Greek lyric verse (1974, *Comparative Studies in Greek and Indic Meter*). Nagy notes the central difficulty with his argument: "the prime of Greek Epic precedes the attested phases of Greek Lyric by a considerable span of time and, what is more, features a highly complex meter of mysterious origins" (Nagy 1974: 5).

Meillet argues that Greek Lyric is cognate with Sanskrit Vedic. The earliest attested Greek Lyric is from the 7th ce. BCE, which is later than Greek Epic. Moreover, Greek Lyric has variable and rigid meters that are relatively sparsely attested. This is in contrast with the few (approximately 6) flexible meters of the Rig-Veda's over one thousand religious hymns (dating as far back as 2000 BCE) ritually transmitted within a priestly society. Nagy traces the development of formulaic phrases alongside reconstructed lyric predecessors of the hexameter via the Indic meters. This constitutes the bridge between later Greek Lyric and Vedic that is required by Meillet's hypothesis. Nagy catalogues evidence that lyric meters, such as the Aeolic, which are attested only after the Homeric epics, are the building blocks of the hexameter.

Nagy makes a compelling case "that epic formulas are derived from lyric formulas appropriate mainly to Pherecratic meters", which underlies the claim that "epic meter itself is derived from a lyric meter, the Pherecratic" (Nagy 1974: 140). In part, these hypotheses are based on the frequency of word and *n*-gram breaks located at the positions where dactyls would have been added to simplest Pherecractic meter (Nagy 1974: 62).

Aeolic meters are based on the choriamb: ⏑ ⏑ – . In its simplest form Lyric Pherecractic has the following structure:

⏒ ⏒ – ⏑ ⏑ – ⏒ (Lyric Pherecratic)

In a more complex form, Pher^{3d}, another choriamb is added to the simple Pherecractic, and it is from this metrical pattern that Nagy argues the hexameter is derived:

⏒ ⏒ – ⏑ ⏑ | – ⏑ ⏑ | – ⏑ ⏑ | – ⏑ ⏑ ⏒ (Pher^{3d})

In order to explore Nagy's argument we produced the data summarized in FIG. 4.

In support of Nagy's argument we see the higher relative frequencies of *n*-grams ending at the end of the second foot of the hexameter, where the first dactyl would have occurred to produce Pher^{3d}, and after the first (necessarily long) syllable of the second foot (both natural locations to look for enjambment):

– ⏓ | – ⏓ | – ⏓ | – ⏓ | – ⏑ | – ⏒ (Hexameter)

The counts underlying FIG. 4 are calculated by first merging the metrical analysis of D. Chamberlain (2017) with the text used for repeated *n*-gram generation. This was

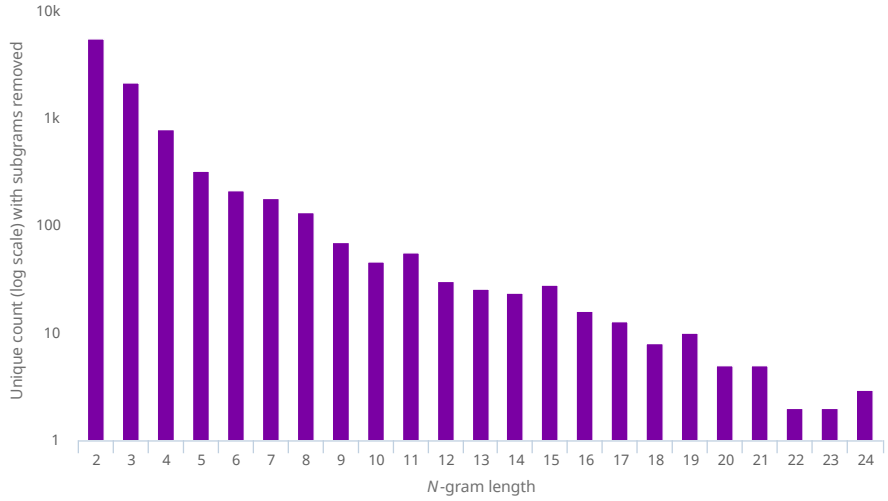


FIG. 3: Frequency of *n*-grams of sizes that fit in the hexameter

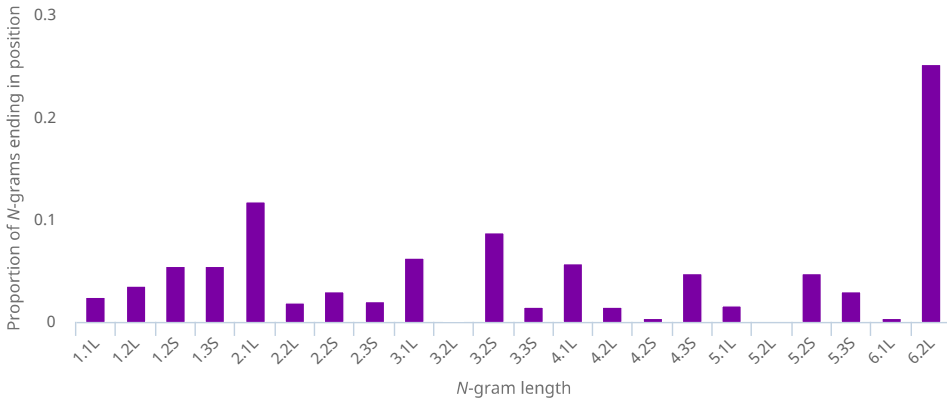


FIG. 4: Relative frequency of *n*-gram breaking at a particular syllable of the hexameter

non-trivial in small part due to occasional discrepancies in the text though more significantly due to the fact that word boundaries for metrical purposes do not always correspond to the typical tokenisation used for *n*-gram generation (due to clitics, etc). However, once the two data sources were joined, it was possible to look at the metrical position of the ending of each repeating *n*-gram. These positions were labeled according their foot number within the line, their syllable number within the foot, and the length of the syllable. Hence, for example, 3.2S refers to the second syllable of the third foot where it is short.

References

Chamberlain, D. (2017). A reading of Homer (work in progress). Retrieved from http://hypotactic.com/my-reading-of-homer-work-in-progress/

Lord, A. (1960). *The Singer of Tales*. Harvard University Press.

Mueller, M. (2009). *The Iliad.* Bristol Classical Press.

Nagy, G. (1974). *Comparative Studies in Greek and Indic Meter*. Harvard University Press.

Parry, M. (1971). *The Making of Homeric Verse: The Collected Papers of Milman Parry*. Oxford University Press.

Verse and Prose: Linguistics and Statistics

Tatyana Skulacheva
Institute of Russian Language of Russian Academy of Sciences
skulacheva@yandex.ru

Alexander Kostyuk
Philological Faculty of M.L. Lomonosov Moscow State University
kostyuk.ae@gmail.com

Abstract

Stable (statistically proven) linguistic differences between verse and prose were studied in a number of European Languages (Russian, French, Spanish, English). These differences regularly occur in verse of different meters, different systems of versification, different periods and literary trends.

1. Syntax. Parataxis is increased in verse, while hypotaxis is decreased as compared to prose, as show our calculations for 30,0000 lines of Russian, French, and Spanish poetry and prose of the 17th–20th centuries.

2. Intonation. Analysis of intonation in the Praat program and the statistical analysis of the obtained data shows that Chervenka's suggestion that verse has intonation of its own is correct. Perceptive analysis (listening by 23 informants) has also shown that people easily recognize verse intonation in contrast with prosaic even in a delexicalized text.

3. Other differences: there are number of other differences, connected with semantics, information processing, mistakes detection, etc. Most informative words in verse are scattered along the line, while in prose they occure most often at the end of the syntagm under syntagmatic stress. Participants of our experiment easily detected mistakes in prose, while in verse mistakes almost always remained undetected.

4. Recent data obtained by neurophysiologists at Carnegie Mellon University in the USA as well as British data from Liverpool and a number of other British universities enable us to suppose, that all these peculiarities observed in verse may be linguistic mechanisms of activating imaginative thinking at the expense of logical thinking.

1 Introduction

Determining the most stable linguistic features of verse as opposed to prose is one of the important tasks of modern verse study. We are primarily interested in those features of verse which consistently occur in verse of different languages, periods, literary trends, and presumably are required by verse form as such. As we know, predictable meter, rhyme, stanzas, alliteration, syntactic parallelism, enjambement and a big number of other verse elements can be totally absent from a verse text without it ceasing to be verse. The only parameter which cannot disappear from the text without the text loosing its verse character is its division into lines. Still, we do not so far possess enough knowledge about indispensable characteristics of a verse line as the basic unit of a verse text. We will describe some linguistic peculiarities of verse closely connected with its division into lines and suggest a hypothesis of how linguistic peculiarities of verse form a system aimed at a peculiar type of impact on the reader's consciousness and brain.

2 Linguistic differences between verse and prose and their impact on the reader's consciousness

If we look at the set of linguistic peculiarities of verse which most consistently occur in verse of different languages, periods and literary styles we will be surprised by the fact that the majority of them seem to be aimed not at a better understanding of a text, but, quite the opposite, at making the clear, precise, straightforward understanding of a text difficult, and, in some cases, even impossible. What might be the reason of writing a text and at the same time preventing the reader from a quick and effective understanding of it? Let us describe some of the linguistic peculiarities of verse structure and give possible explanations of their functions.

2.1 Syntax

We have analyzed about 30,000 lines of Russian verse of the 17th–20th centuries and French verse of the 18th–20th centuries and compared it with prose. We have analyzed parataxis and hypotaxis between clauses in the verse and prose by the same author for 14 Russian authors of the 17th–20th centuries and of 8 French authors of the 18th–20th centuries (Skulacheva–Buyakova 2010a; Skulacheva 2014). In verse we analyzed parataxis and hypotaxis between clauses in a position between lines, because our data show (Skulacheva–Buyakova 2010b), that though the parataxis grows in quantity in all positions within a verse line, the main place where the growth is most intensive is the position between lines. This probably happens because it is this position where parataxis is most functional in verse structure: it helps to present verse lines as equal or compatible in semantic weight and prominence —a feature mentioned by Gasparov as one of the main peculiarities of verse division into lines, while in prose the most important is the hierarchy of prominence, the demonstration of what is more important and what is less important in a text.

Data given in TAB. 1 and TAB. 2 show that there is very stable growth of parataxis in verse in comparison to prose within the texts of the same author. In fact there are so far no exceptions found to the fact that each author differentiates his verse from his prose by the important (normally a few dozen percent) growth of parataxis in verse.

	% of all ties between clauses	
	VERSE	**PROSE**
Folklore of the 17th century	92.2	68.4
Simeon Polocky	62.3	46.0
Lomonosov	54.7	22.8
Zhukovsky	81.7	62.0
Pushkin	74.1	36.3
Lermontov	77.5	57.0
Tyutchev	78.6	28.6
Fet	79.8	30.6
Kuzmin	62.5	40.5
Blok	70.9	42.8
Khlebnikov	76.4	46.7
Akhmatova	77.6	36.4
Tvardovsky	65.1	32.6
Brodsky	51.5	29.0

TAB. 1: Percentage of parataxis in verse and prose of Russian authors (17th–20th centuries)

	% of all ties between clauses	
	VERSE	**PROSE**
Voltaire	71.7	38.7
Hugo	73.7	26.3
G.de Nerval	73.0	32.5
Baudelaire	57.8	34.5
Mallarmé	39.2	28.6
Verlaine	57.0	27.0
Valéry	54.5	26.8
Eluard	76.5	34.0

TAB. 2: Percentage of parataxis between clauses in verse and prose of French authors (18th–20th centuries)

We also have data with similar regularity on Spanish verse, obtained by A.V. Kruglova (Kruglova–Smirnova–Skulacheva 2017), which show that parataxis between lines is 79%, and hypotaxis is 21% in the verse of Francisco de Quevedo (1580–1645). There are also data by A. Ilyushina, V. Bayburtsyan, S. Zarudneva, presented at the Gasparov conference of 2019 in Moscow, which show the same regularity for English verse of the 18th–19th centuries and Spanish verse of the 17th century as compared to prose. Why does verse so consistently need parataxis between lines? If a person is most interested in presenting the logic of his speech to the listener he or she will obviously use hypotaxis to show what is more and what is less important and to reveal the logical connection between clauses in his or her speech. Instead, verse uses parataxis, especially in positions corresponding with line borders:

His hall scarce echoes with his wonted name,
His portrait darkens in its fading frame,
Another chief consoled his destined bride,
The young forgot him, and the old had died…

(G.G. Byron “Lara”)

Thus, on the syntactic level verse works against an easy and quick understanding of the logical hierarchy of the text by increasing parataxis at the expense of hypotaxis between lines, while prose facilitates understanding of its logic by intensive use of hypotaxis.

2.2 Intonation

Intonation serves the same purpose of hampering quick and easy understanding of a text. Regular educated readers as well as some authors read verse with very even intonation, without bringing out important words, without focusing on something, without theme-rheme differentiation. As has been shown by T.E. Yanko, such intonation is typical of verse as well as of prayer in different languages (Russian, Italian, Arabic). FIG. 1 gives the pitch movement in the verse “Sretenye” read by I. Brodsky himself as shown by T.E. Yanko (2010, 2015). Each even segment on the picture corresponds to a verse line.

As we see in FIG. 1, intonation of the verse line is very even and monotonous, without emphasis on important words.

It has been shown by our experimental phonetic analysis that diapason in the oral presentation of verse is twice as narrow as that of read-aloud prose. When one tries to make the logic of oral speech most explicit, he or she varies pitch considerably to bring out the most important words and to generally bring out the logical hierarchy of information in an oral text. Verse remains monotonous with as little emphasis as possible. There is also another type of reading verse, typical of poets themselves rather than of regular readers. Some poets tend to emphasize every word in verse. This seemingly opposite way of reading actually serves the same purpose as monotony and narrow diapason: one can’t easily understand what is important and what is not. One cannot tell more important words from less important ones when every word is emphasized. So the very existence of these two types of reading suggests that the main aim of both types of reading is to neutralize an intonation based on a logical hierarchy of words in a text.

In FIG. 2 we suggest the invariant of verse intonation based on experimental data which we have obtained.

It is characterized by the technical rise at the beginning (as we technically cannot immediately reach a pitch high enough for intonation to go down from), then a smooth and even lowering within a rather narrow diapason from the beginning to the end, and no distinct drop at the end (Kostyuk 2017).

We also tried to prove experimentally that intonation specific for verse does exist and is recognized by listeners. We recorded and delexicalized 4 verse texts and 1 prose text

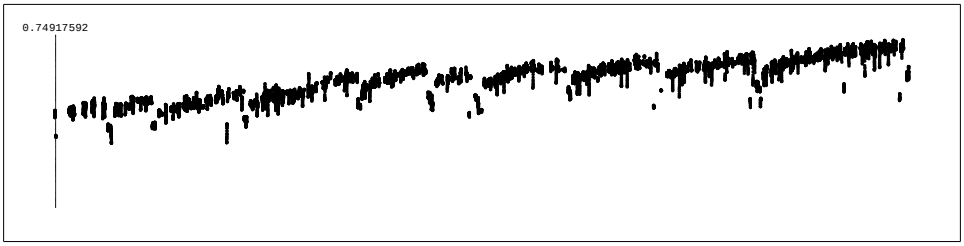


FIG. 1: “Sretenye” read by Brodsky, pitch (Yanko 2015)

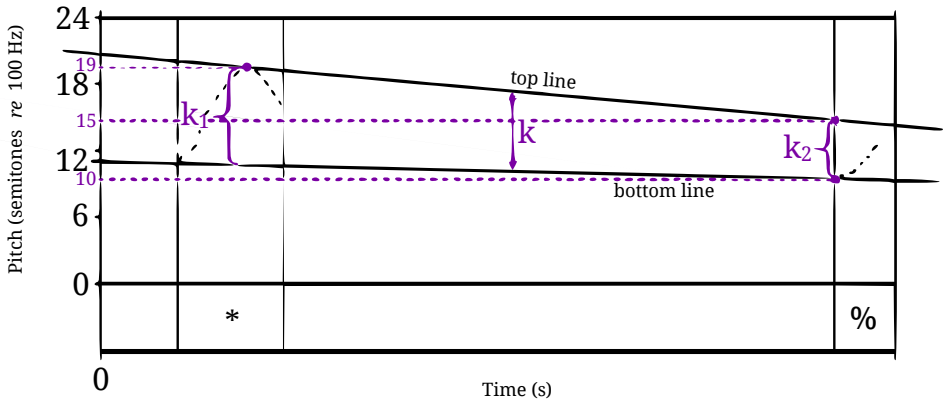


FIG. 2: Generalized tone frame pattern of prosodic structure of a verse line with reduced values of coefficient of the tone frame pattern at the beginning of a line (k1) and at its end (k2)

(dactyl by A. Blok, dolnik by I. Brodsky, verse libre by M. Kuzmin, English iambus by J. Tolkien). By delexicalization we mean the processing of sound signal so that only pitch is left but particular words become unrecognizable. Rhyhtm also was not easily recognizable or did not matter because free verse by M. Kuzmin with no predictable rhythm was recognized even better than the dactyl by A. Blok. The delexicalized text (where only pitch was left) was played to 23 participants of the experiment. The group of participants consisted of University students of ages 20–22. The duration of segments played to participants of the experiment was about 30 seconds. The graph below shows the percent of those who judged correctly (green) and incorrectly (violet) whether a particular text was verse or prose.

As we see in FIG. 3, verse and prose is quite easily recognized by intonation (pitch movement) only, which proves that specific verse intonation, the existence of which was once predicted by M. Chervenka, does actually exist. The only text that presented more problems for recognition was I. Brodsky’s “Niotkuda s l’ubovju”, a very complicated text, for which 30 seconds did not seem to be enough for recognition. Another experiment of a similar kind has lead to really unexpected consequences. We increased the number of texts given to participants of the experiment up to 23, the majority of which were verse. Quite unexpectedly, listening to a bigger portion of delexicalized verse texts caused complaints by informants of headaches, depressed moods,

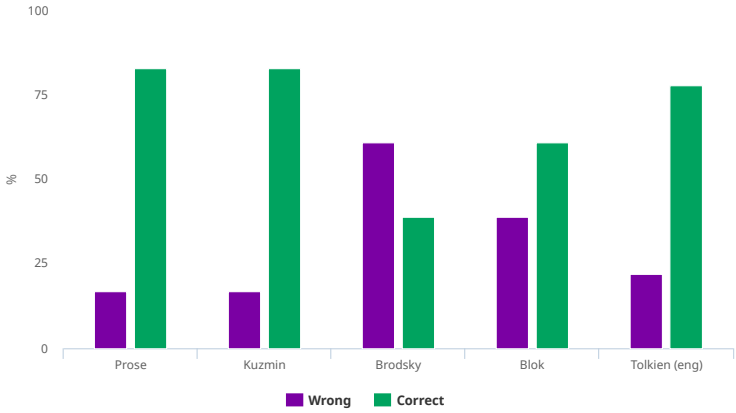


FIG. 3: Delexicalized verse/prose recognition experiment

and feeling sick, so that between one third to one fourth of participants refused to finish the experiment. This unexpected consequence shows that verse intonation given separately from other linguistic levels has a pretty strong influence not just on our consciousness but on some physiological parameters which we hope may be tested in a biochemical experiment in the near future.

2.3 Semantics and information significance hierarchy

There is also a hierarchy of the significance of words in a sentence (or, in our case, also in a verse line) because different words can be of more or less help for us when reconstructing the information of the sentence. If we need to meet somebody at the airport and we speak to that person on the phone in the noisy environment, it is of primary importance what words we hear and which we do not. For example, if out of the sentence “I come tomorrow at five” we hear “tomorrow at five” the major part of the information has reached us, if we hear “I” we got almost no information: it may mean “I have not got a ticket for tomorrow, I arrive in an hour”, or “I fell ill and do not come at all”. We asked our participants of the experiment to mark words in four-word sentences and four-word lines as “1” (“if you had a chance to hear only one word out of four, which will help you most to reconstruct the information delivered by the sentence), “2” (“if you had a chance to hear only two words out of four, what would be the second word which will help you most to reconstruct the information delivered by the sentence), same with “3” (“third word to hear”) and “4”. In prose participants of the experiment had very similar opinions on the hierarchy of the significance of words in a sentence apprehended in a noisy environment. Most often the most information-loaded words turned out to occur at the end of a sentence, where, as shown by phoneticians, phrasal stress most often appears. With verse, the situation was completely different. There were much more difference in opinion among the participants of the experiment regarding which words are more or less significant.

The most significant words turned out to be scattered randomly throughout a verse line, with even more significant words at the beginning of a line than at the end, and with almost unpredictable positions of important words in a verse line. Prose is aimed at quick understanding and we know where to look for the most informatively significant words, while in verse their position varies and becomes unpredictable. We once again have a mechanism which prevents easy and quick comprehension instead of facilitating it.

Yu. D. Apresyan once mentioned in an oral discussion that the main difference between verse and prose from the point of view of a semantician is that while in prose context normally helps to choose one meaning of a polysemantic word, in verse it often deliberately prevents the choice of one meaning. For example, a well-known poem by A. Blok "V goluboy dalekoy spalenke" ("Far away in a blue bedroom…") a situation is described when a woman loved by the author is in bedroom of her child. The word describing the child's condition is the Russian verb "opochil", which in Russian may mean 'asleep' or 'dead'. We questioned a number of professors and students of the philological faculties of Moscow State University and Russian State University for the Humanities and it turned out that opinions fall into almost equal groups: half imagined a peaceful and cozy room with a woman loved by the author and a sleeping child; the other half saw a tragedy in which a child has just died and the woman is grieving his death. This is not a common situation in prose, when the state of one of the main characters is directly described in the text and still almost half of the people sees one meaning ('asleep') and another half sees a completely different one ('dead'), and both groups of people are fully satisfied with their understanding.

There are also cases in verse when an object is named in a few different ways which are normally mutually exclusive alternatives in everyday life. For example, there is a poem by Mikhail Kuzmin "Trazimenskie trostniki" (Trasimene reeds"), where the same object is called a lake, a sea and a river within a short text. What would be viewed as an obvious mistake in prose remains unmentioned by a reader in verse. Readers imagine some features common to all three objects,—for example, water glittering under the sun, a shore and reeds in the water near it. In verse, the illogicality remains undetected and a reader remains fully satisfied by the text.

V. Kimmelman, who was our student, has shown that while participants of the experiment easily detected mistakes in prose, same mistakes remained undetected in verse (Kimmelman 2012). One serious mistake (he is given three objects—two are enumerated) was deliberately introduced into a verse text and the same mistake was introduced into a prosaic retelling of the text. The prosaic retelling was made as close to a verse text as possible—the only changes were aimed at destroying meter and rhyme by changing word order and, when this didn't suffice, by using one synonym instead of another (compare Skulacheva 2004). Mistakes remain undetected in verse, which signals the suppression of critical thinking, which psychologists consider one of the features of the altered states of consciousness; but we think that it may be not just an altered state of consciousness, but also a normal feature of imaginative thinking. We use the term "imaginative thinking" here in an old-fashioned everyday meaning, for lack of the correct modern term (fully different from how it is customarily used in

psychology). Thus, deciding how many chairs will fit into a room is what we will consider logical thinking, in contrast with modern use of this term. Logical thinking for us is when we think of a New Year from the point of view that a year contains 365–366 days, 12 months and so on; we put objects into strict logical hierarchy, we know what is hyponym, what is hyperonym and what are the logical relations among objects. Critical thinking is an indispensable part of this type of work with information: if we say that there are 13 months in a year everybody would immediately detect it. On the contrary, we can think about the New Year in a quite different way: imagining tangerines, the smell of fur-trees and cinnamon, Christmas tree balls, etc. In this case, we will not be interested in whether tangerines are more/less important than cinnamon, or concentrated on the logical relations between objects, or care about any hierarchy between objects and we will not be concentrated on mistakes. We will deal with objects like with equally significant images, and our critical thinking would obviously not reach the level of activity that occurs when we think that a year contains 12 months. Thus we may suggest that critical thinking is more typical for logical thinking and is suppressed at the point when imaginative thinking starts to dominate.

3 Conclusion

Thus, we can conclude that the linguistic structure of verse at all linguistic levels seems to provide deliberate obstacles to the quick and easy understanding of a text, and that the result of this strange text organization is that the readers get into the physiological condition when they seem, among other things, to loose critical thinking and not mention even obvious mistakes and illogicalities.

Recent neurophysiological studies suggest some possible explanations to this. There are a few articles from two different groups, one is Carnegie Mellon in the US (Mason–Just 2007; Mitchell et al. 2008), another is a group from Liverpool and a number of other British Universities (Keidel et al. 2013; Thierry et al. 2008; see also Falikman 2017; Jacobs 2015). The Carnegie Mellon group studied the reaction of the brain to lexical ambiguities, and the British group to syntactic ones. Both show that when some difficulties occur when processing information, segments of the right semisphere become more strongly activated. This may mean that we are dealing here with the linguistic mechanisms of the activation of imaginative thinking.

Our preliminary studies may suggest that the same elements (or at least partially same, i.e. the specific monotonous intonation without bringing out important words, the growing number of paratactic constructions and the lowering number of hypotactic ones) are not confined to verse but may be characteristic of speech in a number of situations when logical thinking is suppressed by stress, the application of specific linguistic mechanism working against the easy application of logical thinking, the use of certain chemicals (alcohol or drugs) suppressing logical thinking as well as mistakes detection.

Yu. I. Aleksandrov and his coauthors (Aleksandrov et al. 2017) describe a set of conditions for which they use Freud's term "regression" (meaning that in such conditions

people fall back to some previous state of their consciousness). These conditions include stress, borderline emotional conditions, learning, and alcoholic intoxication. Learning seemed to us at first a stranger on this list but listening to students learning to speak about something scientifically new to them we noticed even intonation, growth of parataxis, eyes fixed on the ceiling and some other elements. Also, as it has been mentioned to us by V. Nurkova, some similar phenomena may also be observed in situations dealing with autobiographic memory. We specially observed video-recordings of people being interviewed about events in their pasts and we noted that intonation became more even, parataxis grew, etc. All phenomena mentioned (verse, prayer, meditation, stress, borderline emotional conditions, speech in alcoholic or drug intoxication, possibly situations dealing with learning and autobiographic memory) are so far brought together only by our hypothesis and consistent longterm cooperation with physiologists of the brain and even biochemists may provide us with information which will enable us to see what is correct in this hypothesis. It is also obvious that the physiologists with whom we have started to work at present could formulate this in the much more precise terms of the natural sciences. Still, we thought it useful to mention this possible explanation of the difference between verse and prose and some similarities in the speech characteristics in this pretty broad set of phenomena, all of which are presumably characterized by the suppression of logical thinking, with imaginative (in the old, everyday sense of this word) thinking being left as the dominating mode of thinking.

Acknowledgment

This work is supported by the grant of Russian Foundation for Basic Research N 19-012-00534 under the supervision of T.V. Skulacheva.

References

Aleksandrov, Yu. I. – Svarnik, O. E. – Znamenskaya, I. I. – Kolbeneva, M. G. – Arutyunova, K. R. – Krylov, A. K. – Bulava, A. I. (2017). *Regressiya kak etap razvitiya*. Moscow: Institut psihologii RAN.

Falikman, M. V. (2017). Nejropoetika kak oblast kognitivnyh issledovanij: metody registracii aktivnosti mozga i dvizhenij glaz v issledovaniyah vospriyatiya i porozhdeniya poeticheskogo teksta. *Trudy instituta russkogo yazyka 14: Slavyanskij stih*, 349–368.

Jacobs, A. M. (2015). Neurocognitive poetics: methods and models for investigating the neuronal and cognitive-affective bases of literature reception. *Frontiers in Cognitive Science* 9.

Keidel, J. L. – Davis, P. M. – Gonzalez-Diaz, V. – Martin, C. D. – Thierry, G. (2013). How Shakespeare tempests the brain: Neuroimaging insights. *Cortex* 49(4), 913–919.

Kimmelman, V. I. (2012). Poeziya i proza: semanticheskij eksperiment. *Slavyanskij stih IX*, 281–288. Moscow

Kostyuk, A. E. (2017). Intonaciya stroki v russkom stihe. *Trudy instituta russkogo yazyka 13: Slavyanskij stih*. Moscow.

Kruglova, A. V. – Smirnova, O. S. – Skulacheva, T. V. (2017). Sintaksis i prosodicheskie shvy v strokah ispanskogo odinnatsatislozhnika. *Trudy instituta russkogo yazyka 14: Slavyanskij stih*, 152–168.

Mason, R. A. – Just, M. A. (2007). Lexical ambiguity in sentence comprehension. *Brain Research*, 115–127.

Mitchell, T. M. – Shinkareva, S. V. – Carlson, A. – Chang, K. M. – Malave, V. L. – Mason, R. A. – Just, M. A. (2008). Predicting Human Brain Activity Associated with the Meaning of Nouns. *Science* 5, V. 320, 1191–1195.

Skulacheva, T. V. (2004). Stih i proza: semanticheskie razlichiya. *Slavyanskij stih VII: lingvistika i struktura stiha,* 167–178. Moscow.

Skulacheva, T. V. (2014). Verse and Prose: A Linguistic Approach. *Poetry and Poetics*, 239–248. Bloomington (Indiana): Slavica.

Skulacheva, T. V. – Buyakova, M. V. (2010a). Stih i proza: sochinenie i podchinenie. *Voprosy yazykoznaniya* 2, 32–43.

Skulacheva, T. V. – Buyakova, M.V. (2010b). Sochinenie i podchinenie vnutri stikhotvornoy stroki i mezhdu strokami. *I-e Brikovskie chteniya: poetika i fonostilistika*. Moscow: MGUP, 22–27.

Thierry, G. – Martin, C. D. – Gonzalez-Diaz, V. – Rezaie, R. – Roberts, N. – Davis, P. M. (2008). Event-related potential characterisation of the Shakespearean functional shift in narrative sentence structure. *Neuroimage* 40(2), 923–931.

Yanko, T. E. (2010). Prosodiya predlozhenij so “snyatoj” illokutivnoj siloj. *Kompyuternaya lingvistika i intellektualnye tehnologii* 9(16), 609–621.

Yanko, T. E. (2015). Lingvisticheskie tehnologii analiza zvuchashego poeticheskogo teksta. *Kognitivnye issledovaniya yazyka* 23, 174–183.

Rhythm and Syntax in Aleksandr Sumarokov's Odes

Kseniia Tverianovich
Saint Petersburg State University, St. Petersburg, Russia
k.tverianovich@spbu.ru

Abstract

The paper studies accentual rhythm and grammatical structures in the lines of iambic tetrameter in odic stanzas of Aleksandr Sumarokov—one of the most prolific and influential 18th century Russian poets and theorists of verse. The research described in the paper is based on the concept of the Russian iambic tetrameter as a stereotype, a cliché, or a formula. This concept was introduced in the 1920s by Ossip Brik and later developed by Mikhail Gasparov in relation to individual lines of the meter. The results obtained in the research demonstrate that in Sumarokov's odes, not only do the individual lines of iambic tetrameter become formulaic, but so does, to a certain extent, the whole odic decastich. Formulaic lines tend to occur in certain positions in stanzas. Moreover, they tend to accommodate the key images and ideas of Sumarokov's solemn odes—the absolutist idea of state power and greatness of the monarch.

1 Introduction

The Russian odic stanza, particularly its traditional version—written in iambic tetrameter, with the sequence of 10 lines rhyming AbAbCCdEEd—has been explored quite extensively in Russian verse studies. Its composition in terms of accentual rhythm has been described in great detail based on extensive material (Taranovsky 2000; Gasparov 2012). However, the correlation between accentual rhythm and grammar in this stanza has been explored less profoundly. Certain aspects of the issue were considered by M. Shapir (2000) and I. Lilly (2004). The former studied the correlation between the average stress load in verse and the strength of syntactic links between lines in M. Lomonosov's odes. I. Lilly examined some very interesting trends in nouns and verbs located in the final position in lines, i.e. those that constitute rhymes.

This paper considers rhythmical and syntactic stereotypes in the odes of Aleksandr Sumarokov—those written in the traditional odic stanza. Sumarokov was chosen as one of the most prolific 18th century Russian odists and, at the same time, an outstanding theorist of verse, poetic language, and style.

The research was based on Sumarokov's odes included in his selected works published in the series *Biblioteka poeta* (Sumarokov 1957) in 1957 and on Parts 1 and 2 of his Complete works from 1787 (Sumarokov 1787a,b). Altogether, these account for 32 odes, or 302 stanzas (i.e. 3020 lines).

2 Method

In order to ensure wider comparability of the results, the description of grammar was based on typology introduced by M. Gasparov and T. Skulacheva (2004). The main groups of words, according to this typology, include the following:

A. nouns and pronouns in the nominative case
B. nouns and pronouns in the accusative case
C. adjectives and participles in the nominative case
D. adjectives and participles in the accusative case
E. short adjectives and participles as predicates
F. finite verb forms
G. adverbial participles and infinitives
H. adverbs
I. conjunctions

The capital letters marking this list are also used subsequently in this paper for the schemes that describe word order in lines; zero (0) signifies an unstressed ictus, i.e. no content word on the ictus.

In the material considered here, the other parts of speech are relatively rare and do not form any rhythmical-grammatical stereotypes.

The typology used for syntactic links is also based on that introduced by M. Gasparov and T. Skulacheva (2004: 120, 182, 154), for the same reasons of comparability. The links are described as follows:

(1) the strongest links, e.g. between proposition and noun, or between parts of a predicate
(2) attributive (coordinated attribute)
(3) objective (direct object)
(4) objective (indirect object)
(5) adverbial
(6) predicative
(7) between homogeneous elements
(8) with participial clauses etc.
(9) weaker links (e.g. between parts of compound sentences)
(10) no link

The numbers on this list appear in schemes to mark the types and order of syntactic links in lines.

In addition, for various rhythmical and grammatical stereotypes that were detected, the terms introduced by M. Gasparov (Gasparov and Skulacheva 2004: 224–225) have been used. These include, in particular, rhythmical and syntactic formulas and clichés. According to Gasparov, clichés are structures where the same parts of speech are placed in the same order, with the same types of links between them. Formulas are clichés that, in addition to the above, also include at least one content word that occurs in several lines, in the same position. Cases when pronouns are repeated are not considered here, neither are repetitions of whole lines, without any variations.

3 Results and discussion

The data show that, in Sumarokov's odic stanza, clichés are distributed unevenly among the 10 lines (see TAB. 1). They are the least frequent in the final line, and most frequent in lines 6 and 8—those especially prone to accommodating rhythmical form IV of the iambic tetrameter. It is striking that the lines, which are more and less likely to include clichés alternate in the same manner as the lines with a heavier and lighter stress load, as described by K. Taranovsky (2000). Lines with feminine ending, where the 3rd ictus is more likely to be unstressed, are more prone to forming clichés, while the lines with masculine ending, marking the borders of stanzas, half-stanzas, or strophoids,[1] more often bear an accent on the 3rd ictus, and are more diverse in terms of their rhythm and grammar.

3.1 Preferred clichés

In Sumarokov's odic stanzas, clichés are found in 1,726 lines. Not surprisingly, some clichés are notably more productive, i.e. occur more frequently, than the others, and only 29 of them appear in 10 or more instances. Altogether, these account for 14.8 per cent of all the lines. The three most productive clichés potentially make simple sentences—they include a subject, a predicate, and a subordinate element (see TAB. 2).

The most frequent clichés also tend to be based on structures with notably "sublime" syntax.[2] Out of the 29 frequent clichés, nine include verbs as predicates and nouns as direct objects, where the noun tends to precede the verb—a manifestly bookish word order (see TAB. 3).

1 The shortest symmetrical periods of two or more lines within stanzas (Lotman–Shakhverdov 1979: 147).

2 In this paper, any comments on sublime or neutral word order in regard to the Russian 18th century are based on observations by I. Kovtunova (1969: 110–111).

Lines in stanza	Rhythmical forms of I4						Lines with clichés	
	I	II	III	IV	V	VI	number	%
1	39	6	36	84	5	6	176	58.3
2	30	4	43	74	--	9	160	53.0
3	32	3	30	91	6	12	174	57.6
4	23	8	41	82	--	14	168	55.6
5	39	3	34	94	8	4	182	60.3
6	23	10	40	103	2	10	188	62.3
7	32	4	39	74	1	13	163	54.0
8	40	2	27	103	6	9	187	61.9
9	40	5	38	86	1	7	177	58.6
10	27	8	32	75	1	8	151	50.0
Total	325	53	360	866	30	92	1726	100

TAB. 1: Clichés, rhythmical forms of iambic tetrameter, and lines in Sumarokov's odic stanza

	Rhythmical form of I4	Parts of speech	Links	Examples	Occurrences
1	IV	A—B—0—F	(6) + (5)	И ветры с запада летят	28
2	IV	C—A—0—F	(2) + (6)	Злосердый рок окаменел	26
3	IV	A—B—0—F	(6) + (3)	Нептун державу покидает	25

TAB. 2: The most frequent clichés in Sumarokov's odic stanza

Forms of I4	Parts of speech	Links	Examples	Occurrences
IV	A—B—0—F	(6) + (3)	Нептун державу покидает	25
IV	D—B—0—F	(2) + (3)	И грозный рок остановила	21
IV	B—D—0—F	(2) + (3)	Пучину бурну возмутим	18
IV	B—A—0—F	(3) +(6)	Как воздух молния сечет	15
V	0—B—0—F	(3)	И тишину установила	15
IV	B—B—0—F	(3) + (4)	Неву покоем осеняет	13
IV	B—B—0—F	(4) + (3)	Пегасу лавры соплетаю	10

TAB. 3: Sublime style in frequent clichés

Nevertheless, many clichés are based on stylistically neutral word order. Dislocation of epithet, being a very sublime and frequent device in Sumarokov's poetry (Kovtunova 1969: 133), forms only one productive cliché.

The inclination to vary structures, where lines are potentially equal to simple sentences, with the prevalence of stylistically neutral word order, demonstrates the quest for clarity and temperance, so often noted in Sumarokov's oeuvre.[3]

3 A clarity that, however, often turns out to be illusionary. For more details, see, e.g., Alekseeva 2005: 243, 246.

3.2 Formulas

In the odes considered here, the more rigid stereotypes, referred to as formulas, occur in 324 lines, accounting for 10.7 per cent of the total amount of lines. This means that, on the average, each stanza includes one formulaic line.

It should be noted that formulas do not tend to emerge in the most frequent clichés. On the contrary, clichés that occur only twice may make very notable formulas.

Like clichés, formulas may emerge in syntactically simple or complicated lines alike. In the examples below, formulas 1 and 2 are very simple, with only one strong syntactic link, while formulas 3 and 4 are quite sophisticated, with multiple links and inversions:

Formula 1: C—0—0—A, (2)

Великая Императрица
Великая Елисавет
Великая Елисавета!
Великая Екатерина

Formula 2: C—0—0—A, (2)

И мудрая *Екатерина*
Премудрая *Екатерина*
Великая *Екатерина*

Formula 3: A—B—D—B, (10) + (4) + (2)

Как ток *Египту* Нильских вод
Брега с *Египтом* жарка юга

Formula 4: D—0—F—B, (2) + (5)

Претяжкою ступил *ногою*
И бурными попри *ногами*[4]

In some cases, the formulaic nature of verse is additionally supported by semantic parallels that occur between different words. E.g., in the following formula, the nouns *‘создатель’* (= creator), *‘обладатель’* (= possessor), and *‘повелитель’* (= lord) may be considered as contextual synonyms. Along with the repeated noun *‘вселенныя’* / *‘вселенной’* (= universe, in the accusative case), and the repeated pronoun *‘всей’* / *‘всея’* (= all of the, the whole), these words make the formula very obvious.

D—B—0—A, (2) + (4)

Всея вселенныя создатель
Я всей вселенной обладатель
Всея вселенной повелитель

This example is quite typical.

4 Italics emphasize the repeated words in formulaic lines.

3.3 Formulas and ideology

Not surprisingly, most of the odes considered here are based on images and ideas that represent state power, the greatness of the monarchy etc.—which is implied in the genre of solemn ode. Interestingly, approximately every second formulaic line represents absolutist ideology through a rather limited set of images. At the lexical level, those images are represented by sets of certain words that are repeated again and again. Such words include those that signify:

a. attributes of royal power, e.g. throne, crown etc. (*трон*, *престол*, *корона*)
b. names of the great ancient states, e.g. Egypt, Babel, Rome (*Египет*, *Вавилон*, *Рим*)
c. titles of rulers, e.g. monarch, sultan, tsarina (*монарх*, *султан*, *царица*)
d. words meaning 'country' (*страна*, *держава*)
e. names of the great ancient rulers, e.g. Mamay, David (*Мамай*, *Давыд*), or Russian monarchs, e.g. Peter the Great, Elizabeth, Catherine the Great (*Петр*, *Елисавета*, *Екатерина*)
f. ethnonyms or adjectives meaning 'Russian' (*Россы*, *Российский*, *Росский*)
g. the waters of the Baltic sea or the Neva river, as metonymic reference to Saint Petersburg as the capital of the Russian Empire.

Thus, in Sumarokov's odes, formulaic lines are very often key in terms of ideology.

3.4 Odic decastich as a stereotype

While words with a specific rhythmical and grammatical structure tend to occupy certain positions in lines (Brik 1927; Tomashevsky 1929: 127; Gasparov 1986; Gasparov–Skulacheva 2004: 62–90, 146–156, 202–225), lines with particular structures, in their turn, tend to be attracted to certain positions in the stanza. In Sumarokov's odes, 24 occasions were detected where lines that represent the same rhythmical and grammatical formula were similarly located in the stanza. E.g., the following formula occurs in three lines, all of them being #9 in the stanza (in italics):

F—A—F—A, (6) + (9)+ (6)

Во уготованны чертоги,
Твоя Екатерина ждет:
Цветами устланны дороги,
Престол порфирою одет:
Вокруг стоящия престола,
Младенцы обоюдна пола,
Тебе сплетают похвалы:
Ликуют Росския народы,
Шумят леса и плещут воды,
Играют Невския валы.

(Sumarokov 1787b: 79–80)

Икар высокомерный тает,
Низвержен гордый Фаетонт:
Екатерине соплетает,
Хвалу весь юг и Гелеспонт.
Турецкий флот горит, дымится
Трепещет море, небо тмится,
Земля колеблется, дрожит,
Врагам во страхе нет отрады,
Шумят леса, валятся грады,
К Дунаю вспять Визир бежит.

(Sumarokov 1787b: 116)

Великодушие имея,
Страдающа спасти от мук,
Муж древний восприял Борея,
В объятие дрожащих рук.
И се валы его познали,
Норвежски Горы возстенали;
Воздулась бездна к небесам,
Ужасны встали непогоды,
Шумят леса, взревели воды,
И воздрогнул Еол и сам.

(Sumarokov 1787b: 175)

4 Conclusion

Thus, the results obtained in the research described in this paper show that in the Russian iambic tetrameter not only lines tend to form rhythmical and syntactical stereotypes, as was noted by O. Brik (1927: 36–37), but so do odic stanzas of the same meter. These traditional stanzas tends to grow considerably formulaic—in terms of both rhythm and grammar.

A similar observation was made by I. Lilly (2004: 396), based on his analysis of verbs and nouns in rhymes of the odic stanza—he argues that the iambic decastich becomes “automated”. In regard to style and themes, a similar idea was expressed by N. Alekseeva (2005: 296), author of an erudite study devoted to the history of the Russian ode: she mentions that the odic mentality utilizes semantic “bricks” or “blocks”, and whenever a certain “block” is used, this implies a certain range of corresponding elements that should follow.

References

Alekseeva, N. Yu. (2005). Русская ода: Развитие одической формы в XVII–XVIII веках. СПб.

Brik, O. (1927). Ритм и синтаксис // Новый Леф. № 5.

Gasparov, M. L. (1986). Ритмический словарь и ритмико-синтаксические клише // Проблемы структурной лингвистики – 1983. М. С. 181–199.

Gasparov, M. L. (2012). Стихосложение од Сумарокова // Гаспаров М. Л. Избранные труды. Том IV: Лингвистика стиха. Анализы и интерпретации. М. С. 432–445.

Gasparov, V. L. – Skulacheva, T. V. (2004). Статьи о лингвистике стиха. М.

Kovtunova, I. I. (1969). Порядок слов в русском литературном языке XVIII – первой трети XIX в.: Пути становления современной нормы. М.

Lilly, I. K. (2004). Одическое десятистишие четырехстопного ямба АбАб || ВВгДДг: Динамика глагольных рифм // Славянский стих. VII: Лингвистика и структура стиха. М. С. 293–402.

Lotman, Yu. M. – Shakhverdov, S. A. (1979). Шахвердов С. А. Метрика и строфика А. С. Пушкина // Русское стихосложение XIX в. М. С. 145–257.

Shapir, M. I. (2000). Ритм и синтаксис ломоносовской оды (К исторической грамматике русского стиха) // Шапир М. И. Universum versus: Язык – стих – смысл в рус. поэзии XVIII – XX веков. М. Кн. 1. С. 161–186.

Sumarokov, A. P. (1787a). Полное собрание всех сочинений, в стихах и прозе... Ч. 1. М.

Sumarokov, A. P. (1787b). Полное собрание всех сочинений, в стихах и прозе... Ч. 2. М.

Sumarokov, A. P. (1957). Избранные произведения. Л.

Taranovsky K. F. (2000). Из истории русского стиха XVIII в. Одическая строфа в поэзии Ломоносова // Тарановский К. Ф. О поэзии и поэтике. М. С. 291–299.

Tomashevsky, B. V. (1929). О стихе. Л.

The Prosody of Poetic Reading in Comparison with the Prosody of Everyday Speech

Tatiana Yanko
Institute of Linguistics, Russian Academy of sciences
Pushkin State Russian Language Institute
tanya_yanko@list.ru

Abstract

This paper is aimed at analyzing the prosody of so-called poetic reading. Poetic reading is exemplified by Joseph Brodsky's reading of his own verse and the writings of other authors. Poetic reading is analyzed in comparison with ordinary spoken speech, where the prosody designates a variety of meanings that form sentences as speech acts and texts—as connected units of discourse. The paper is illustrated throughout with frequency tracings of sound recordings. The software program Praat is used in the process of analyzing the sound data.

1 Introduction

Yury Tynyanov, following Meumann (1894), differentiated between the phrasal type of verse reading, which is aimed at reconstructing the content of verse, and rhythmic reading, which highlights the metrical aspect of spoken verse (*Тынянов* 2002[1924]: 43). B. M. Eikhenbaum noted that highlighting the content when reading is characteristic of actors, while rhythmic reading is characteristic of poets (*Эйхенбаум* 1924).

Joseph Brodsky consistently used the rhythmic manner of reading, where all accents, pauses, and length variations are aimed at forming the rhythmic units of verse. He ignored all linguistic meanings—topics, foci, discourse continuity—that are designated by prosody. In this manner of recitation, the obligatory linguistic meanings remained unexpressed. Nevertheless, the prosodic system used by Brodsky is connected not only with the rhythmic structure of verse but is also aimed at designating some specific, non-linguistic, variety of meanings. These meanings are not random, they are organized in a system, and they belong not to the Russian language, but to a specific strategy of recitation.

Thus, my goal is to demonstrate that rhythmic reading can have an informative aspect. Brodsky develops a rather simple—unsophisticated—system for designating meanings, deliberately rejecting the system of meanings designated by prosody in the Russian language. In the majority of cases, poets preserve in their reading—either in full, or in part—the prosodies that are characteristic of natural spoken speech. Brodsky's reading is practically free of Russian prosody. Reconstructing the system of meanings in Brodsky's reading is the goal of this paper. Access to these meanings is provided by the prosodic system Brodsky uses.

The software program Praat is used to analyze the sound data. The system shows the transforms of the fundamental frequency of the human voice. On the graph, the axis of abscissas shows the time elapsed from the beginning of the tracing in seconds, while the ordinate axis represents the oscillation frequency in Hertz.

The paper contains three sections. Section 2 deals with the Russian prosodic means of expressing linguistic meanings: topic, focus, and discourse continuity. These means are described in (*Брызгунова* 1982). The goal of this section is to establish a reference system to which Brodsky's system is compared. Hence, in Section 2, I demonstrate the prosody used by Brodsky and other people when they speak and in Section 3 I demonstrate the prosody Brodsky uses when he recites verse. Brodsky's poetic reading is compared not only with his spontaneous speech but also with the recitation of the actor Mikhail Kozakov, who, when reading Brodsky's verse, preserves the system of the Russian linguistic meanings and their prosodic representation.

In Section 4, I introduce the concept of the minimal poetic unit in Brodsky's reading system and consider his reading verse of various genres and lengths. In the Conclusion, I formulate the main parameters of the semiotic system used by Brodsky.

2 An overview of Russian prosody

In this section the examples from an interview given by Brodsky to journalists and the fragments from Kozakov's reading a prosaic text illustrate the principal meanings expressed through Russian prosody. I do not see any cardinal difference between the means of expression in spontaneous speech and in prosaic reading. Hence, I analyze Brodsky's spontaneous speech and Kozakov's reading on equal terms. Consider a simple example from Kozakov's reading the stories of Koval:

(1) *Нюрка была веселая* (Cited from *Коваль* 2012).

Sentence (1) has the topic *Нюрка* and the focus *была веселая*. As we see in FIG.1, the tonic syllable of the topic shows a rise in the fundamental frequency, the post-tonic syllable shows a fall. This is a standard means for expressing the topic. The tonic syllable of the accent-bearer shows a fall followed by a subsequent fall on the post-tonic syllables of the word *веселая,* cf. FIG. 1. Such a fall is a cue for the focus. Similarly, the topic-focus structure of a statement is also expressed in a spoken recollection by Brodsky:

(2) *Когда-то мне Гослит заказал переводы такого итальянского поэта Умберто Саба.*

The graph in FIG. 2 demonstrates the three rises in frequency on the tonic syllables of the words *когда-то*, *Гослит*, and *переводы*. These words are the accent-bearers of the three topics of the sentence: *когда-то*, *мне Гослит* and *заказал переводы.* The word *Гослит* carries the highest rise in frequency. The accent-bearers of the topics *когда-то* and *переводы* carry relatively high post-tonics after the rise on the tonic syllable. This is another type of Russian rise, which serves (as well as the first type, which is followed by a fall on the post-tonics, if any, e.g. in the word *Нюрка*) as a marker of the topic. The accent-bearer of the focus—*такого итальянского поэта Умберто Саба*—the word *Саба*—shows a fall.

Examples (3) from Kozakov's reading and (4) from Brodsky's speech illustrate some means for the prosodic expression of discourse continuity (that is, 'the current step of discourse is not the last, a continuation of the story is expected'). Sentence (3) has a cue for discourse continuity: a rise on the accent-bearer of discourse continuity the word *дня*, cf. FIG. 3. The marker of continuity is preceded by a focal fall on the word *неделя*. This is an example of one specific strategy for marking continuity in Russian, when the continuity marker is placed after the accent-bearer of the focus.

(3) *Прошла неделя после этого дня, и наступило первое сентября.*

Within the structure of the compound sentence (3), the second sentence *наступило первое сентября* serves in its entirety as a focus with the accent-bearer *сентября*, which shows a fall.

Example (4) is the first sentence of Brodsky's story about his first visit to Venice:

(4) *Я купил билетик на самолет, и прилетел в Италию, пересадка была в Милане, чуть не опоздал, и приехал сюда.*

Example (4) depicts five steps in the narration: 1) 'I bought a ticket for a plane'; 2) 'I arrived in Italy'; 3) 'The connection was in Milan'; 4) 'I was nearly late'; 5) 'I came here'. As we see in FIG. 4, the first four steps of the narration are each marked with one of the Russian rises: a rise followed by a fall, if any, (steps 1), 3), and 4)), or a rise

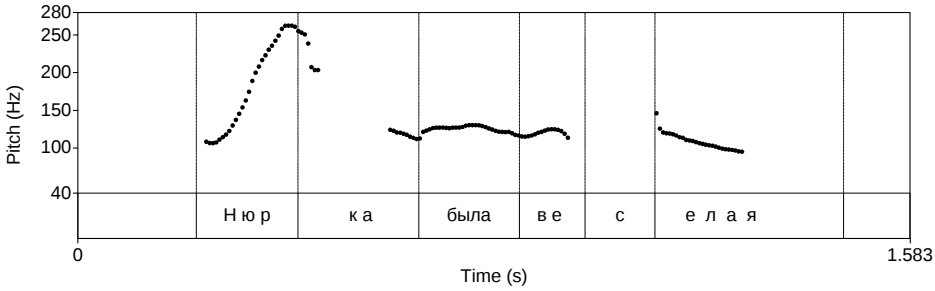


FIG. 1: The frequency tracing of example (1)

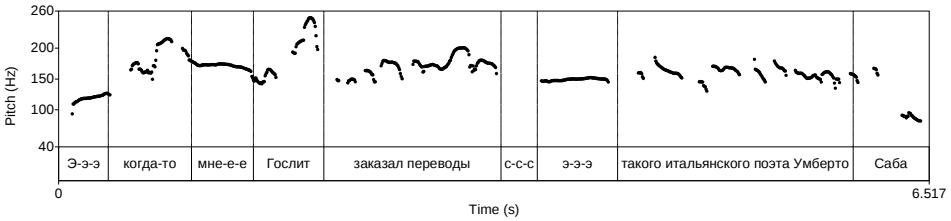


FIG. 2: The frequency tracing of example (2)

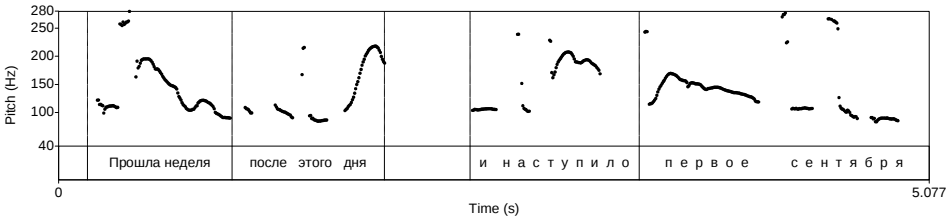


FIG. 3: The frequency tracing of example (3)

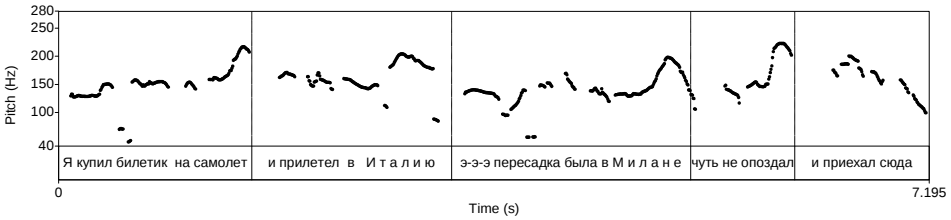


FIG. 4: The frequency tracing of example (4)

followed by relatively high post-tonics—the second step of narration. Lengthening of the tonic syllable adds to the prosody of discourse continuity the extra meaning of the speaker being absorbed in recollections. The final—the fifth—step of the series is marked by the expected fall on the accent-bearer of the last focus in the compound sentence: the episode is coming to the end, the speaker is putting in a full stop.

In this section, the four examples from the spoken speech of Brodsky and Kozakov demonstrate the principal communicative meanings and their means of expression used in Russian. These are as follows. 1) A rise on the tonic syllable followed by a substantial fall on the post-tonics, if any; this designates the topic and discourse continuity. 2) A rise followed by level or slightly falling post-tonics can also designate the topic. 3) A rise of the latter type characterized by lengthening of duration designates discourse continuity combined with the meaning of a focus on thoughts, dreams, or recollections. 4) A fall on the tonic syllable, followed by low post-tonics marks the focus. If there are no rising accents after the focus, it means that narrative series has come to an end.

Without marking topics, foci, and discourse continuity, there can be no spoken discourse. Although the inventory of meanings given here is not exhaustive, the above examples seem sufficient to serve as a background for describing the new prosodic system developed by Brodsky.

FIG. 5 below represents a fragment from Brodsky's conversation with journalists. During the interview, Brodsky recited his verse. In the segment before the dotted vertical line he was reciting verse; the segment after the line—corresponds to ordinary speech.

The graph in FIG. 5 demonstrates some characteristics that differentiate Brodsky's recitation of verse from his spontaneous speech: the monotony of verse reading, its tendency toward the medial frequency of the speaker's pitch range, a narrowing of the pitch range, and the lack of falls, except for the final fall in frequency at the end of a poetic unit (immediately before the vertical dotted line). The manner of Brodsky's verse recitation is detailed in Section 3 below.

3 The prosody of poetic reading

I begin the analysis of Brodsky's poetic reading with a concrete example. Consider Brodsky's poem "*Ниоткуда с любовью*" 'From nowhere with love'*: Ниоткуда с любовью, надцатого мартобря, / дорогой, уважаемый, милая, но не важно / даже кто, ибо черт лица, говоря / откровенно, не вспомнить уже, не ваш, но / и ничей верный друг вас приветствует с одного / из пяти континентов, держащегося на ковбоях; / я любил тебя больше, чем ангелов и самого, / и поэтому дальше теперь от тебя, чем от них обоих; // поздно ночью, в уснувшей долине, на самом дне, / в городке, занесенном снегом по ручку двери, / извиваясь ночью на простыне — / как не сказано ниже, по крайней мере — / я взбиваю подушку мычащим "ты" / за морями, которым конца и края, / в темноте всем телом твои черты, / как безумное зеркало повторяя*. (Cited from *Бродский* 1994). (The end of a line in written verse is marked by a slash (/)).

Consider the same fragment (5) as read out by Brodsky and Kozakov. Brodsky invariably follows the rhythmic manner of reading while Kozakov is pronouncedly informative.

(5) *…но не важно / даже кто, ибо черт лица, говоря / откровенно, не вспомнить уже…*

Fig. 6 depicts the graphs of reading fragment (5): the upper graph demonstrates Brodsky's reading, while the lower graph—shows Kozakovs reading.

As we see in FIG. 6, Brodsky read out the fragment in 6.5 seconds, while it took Kozakov 8.5 seconds to read the same text.

I begin by analyzing Kozakov's reading, because he preserves (and even emphasizes) all the prosodies developed in language for designating communicative meanings. Kozakov zealously employs the methods of so-called expressive reading. The graph shows him dividing the fragment *черт лица, говоря откровенно, не вспомнить уже* into the topic *черт лица* and the focus *не вспомнить уже* with a distinct—

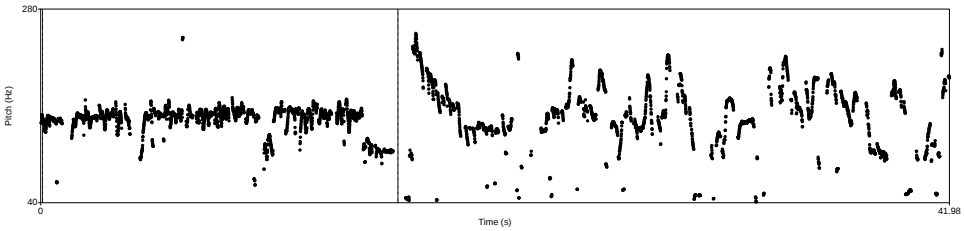


FIG. 5: The frequency tracing of verse reading followed by ordinary speech. Brodsky

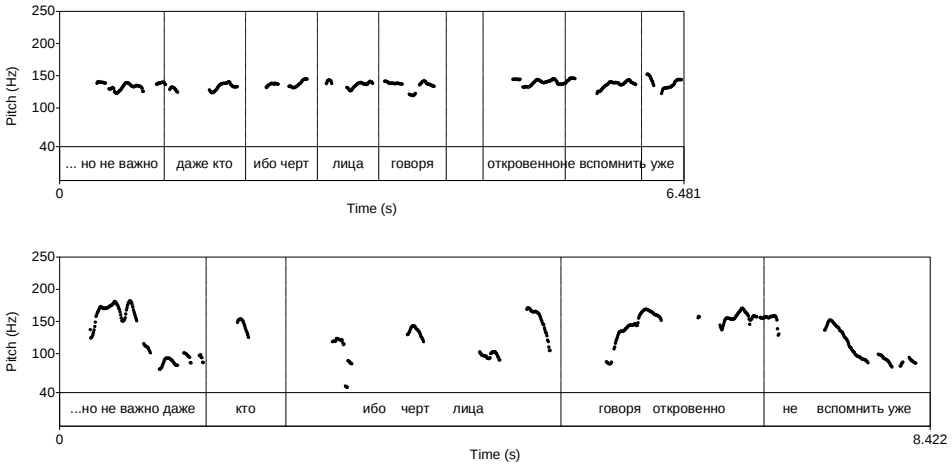


FIG. 6: The comparative frequency of reading example (5) by J. Brodsky, and M. Kozakov

"focal"—fall on *вспомнить* and extremely low frequency on the post-tonic *уже*. The prosody of parentheses—a rise followed by high level post-tonics in shortened tempo—appears on *говоря откровенно*. The pitch range in Kozakov's reading, both on falls and rises, is rather wide, while the level tone on *откровенно не*—is strictly maintained. Kozakov does not ignore any of the language's prosodies; he is skilled at employing prosodic means for expressing communicative meanings.

Brodsky, in his reading, demonstrates a complete denial of the topical, focal, and other meanings expressed by prosody. The basic element of his reading comprises a rise to a slightly higher value on the tonic syllable of each phonetic word in a line. (A phonetic word is the tonic syllable of a word together with atonic syllables and atonic words cliticized to this word.) In FIG. 6 (upper graph) we can see monotonous rises on the phonetic words *не важно, даже кто, черт* and *лица*. *Говоря* and *откровенно* are also articulated absolutely identically, which is completely incompatible with the prosody of Russian. We see the same rise on *не вспомнить* and even on the post-tonic (in standard Russian pronunciation) *уже*. Falls in frequency as the expected signals for designating the focus are absent. The lack of any falls up to the very end of a poem is a characteristic parameter of Brodsky's reading. All his pauses are also not cues for dividing the communicatively relevant components of speech

acts from other components, or speech acts from each other: Brodsky uses a pause only for catching his breath. The monotonous manner of reading is accompanied by a rise in the medial frequency and an increase in the tempo as the speaker approaches the end of the text. FIG. 7 depicts a compressed frequency tracing of the poem "*Ниоткуда с любовью*" as a whole.

The reading of the poem begins with a medial frequency of about 140 Hertz. The pre-final medial frequency increases to 180 Hertz. This is demonstrated by the frequency tracing, which exhibits a gradual rise. On the two final phonetic words, *зеркало* and *повторяя*, the author returns to the frequency at the beginning; cf. the final fragment of the frequency tracing in FIG. 7 and, separately, in example (6), FIG. 8.

(6) *…твои черты, / как безумное зеркало повторяя.*

The frequency of the last tonic syllable is 140 Hertz, while the frequency of the final post-tonic syllable is 120 Hertz. This final falling in frequency and tempo, which is similar to the focal pattern, signals the end of the poem. The reading takes 60 seconds even though Brodsky makes a slip of the tongue and wastes three seconds to correct it. Kozakov's reading takes 75 seconds. Brodsky reads the text in one breath and very fast, while Kozakov reads it emotionally and in a measured manner.

The rise in the frequency and tempo results from the increase in emotional tension. This is not a linguistic but a physiological parameter. It is widely known that nervous excitement can cause vocal frequency to increase. Brodsky employs this parameter for the purposes of his performance. The emotional tension climaxes with a sharp—theatrical—loss in frequency: a full stop occurs, the poem is over. This method is a means for effectuating the cohesion of a poetic work. Nevertheless, it should be noted that Brodsky is employing this means in a brief lyric poem. "*Ниоткуда с любовью*", even without its specific prosody, is regarded as an integral unit. This integrative tendency is also signaled by the absence of commas, full stops, and capital letters; along with the extensive use of *enjambement* (*не ваш, но / и ничей верный друг вас приветствует с одного / из пяти континентов…*), which can combine two or more lines into one syntactic whole.

Similarly, a poem by Pasternak (2004–2005)—"*Магдалина* (II)" ('Magdalene')—is recited by Brodsky in his peculiar manner, integrating the whole poem into a single poetic unit, cf. FIG. 9.

This work is of a rather substantial length—it takes Brodsky a minute and a half to recite it—and, of course, Brodsky uses a variety of means to establish boundaries between lines and/or stanzas. At the same time, the boundaries between the stanzas are not consistent. Consider example (7), which includes the break between the second and the third stanzas (*…твои. // Шарю…*), where, theoretically, one could expect a prosodic boundary marker. However, no such marker is present. Two slashes (//) are used to divide stanzas in the printed version of a poetic text:

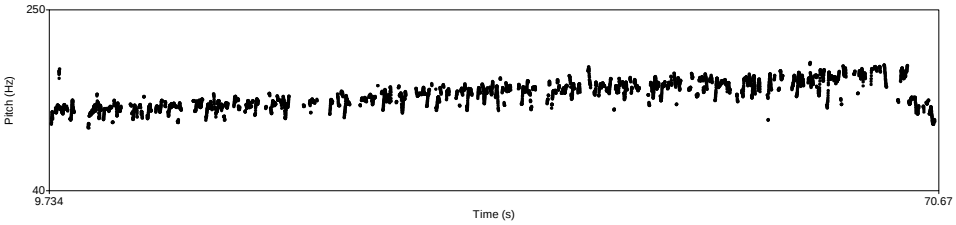


FIG. 7: Frequency tracing for Brodsky's reciting of his poem "Ниоткуда с любовью"

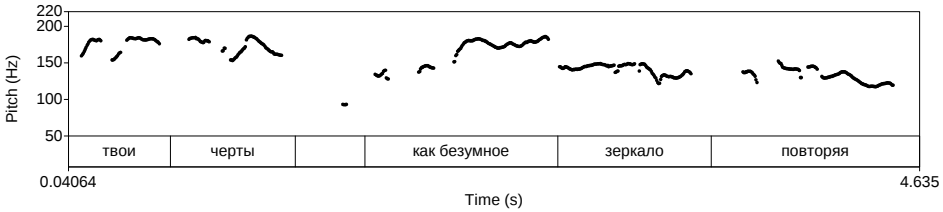


FIG. 8. Frequency tracing for example (6)

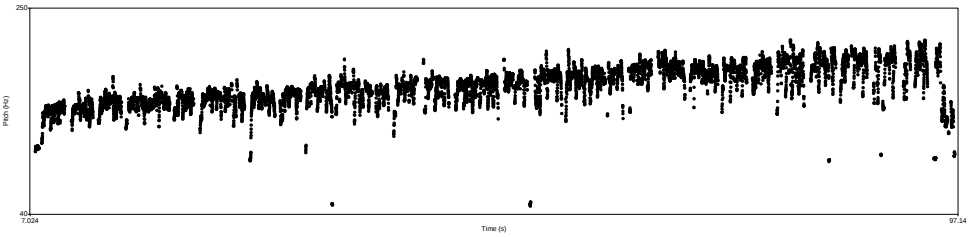


FIG. 9: Frequency tracing for Brodsky's recitation of Pasternak's "*Магдалина* (II)"

(7) *Обмываю миром из ведерка / Я стопы пречистые твои. // Шарю и не нахожу сандалий. / Ничего не вижу из-за слез* (Пастернак 2004-2005).

FIG. 10 shows that the main prosodic boundaries in Brodsky's style of reading are a slight pause and a rise in frequency (in a narrowed pitch range) on the tonic syllable of a phonetic word. However, the principal means for forming the minimal poetic unit—returning to the low frequency that is at the beginning of a unit—is not employed here. The graph shows that at the very boundary of stanzas (*…твои. // Шарю…*) neither a pause nor the expected rise in the frequency at the tonic syllable of the word *шарю* occurs: I regard these phenomena as indicating the unified nature of a verse passage.

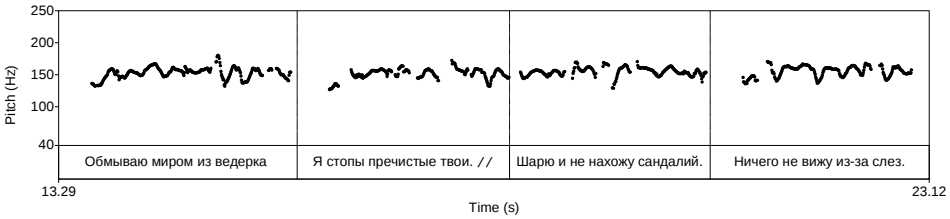


FIG. 10: The frequency tracing of example (7)

The preliminary results of my analysis are as follows:

- within the limits of a minimal poetic unit the consistent use of boundaries of any types is lacking,
- the medial frequency is increasing,
- at the end of a minimal poetic unit, Brodsky returns to the frequencies at the beginning of the unit.

4 Poetic passages containing more than one minimal poetic unit

In narrative verse, the method for integrating the text into a single unit is applied to a smaller structural component of the text than the whole poem. Thus, in "*Письма римскому другу*" 'Letters to a Roman friend' the prosodic means, exemplified in Section 3 by Brodsky's readings of the poems "*Ниоткуда с любовью*" and "*Магдалина* (II)", is applied to a single "letter". Fragment (8), consisting of two stanzas and integrated by the author into a single unit, represents one of the "letters":

(8) *Посылаю тебе, Постум, эти книги. / Что в столице? Мягко стелют? Спать не жестко? / Как там Цезарь? Чем он занят? Все интриги? / Все интриги, вероятно, да обжорство. // Я сижу в своем саду, горит светильник. / Ни подруги, ни прислуги, ни знакомых. / Вместо слабых мира этого и сильных — / лишь согласное гуденье насекомых*. (Cited from Бродский 1994).

FIG. 11 demonstrates the already recognizable prosodic contour characterized by the gradual increase in the frequency on the tonic syllable of each phonetic word and a fall on the final noun phrase *гуденье насекомых*. In FIG. 11, each line is divided from its neighboring lines by vertical dotted intervals. There are no visible prosodic boundaries at the ends of the lines.

In all, the poem has eighteen stanzas and, consequently, nine similar prosodic units each consisting of two stanzas. FIG. 12 depicts the compressed frequency tracing for the entire poem.

FIG. 12 shows that the means for forming the minimal poetic unit in "*Письма римскому другу*" is used nine times—in accordance with the number of "letters".

FIG. 11: Frequency tracing of the third and the fourth stanzas of "*Письма римскому другу*"

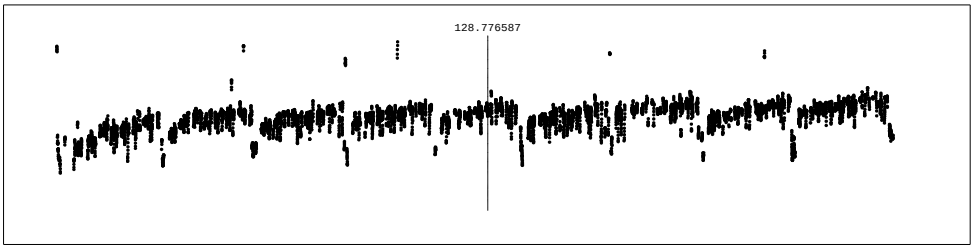


FIG. 12: The frequency tracing of Brodsky's reading "*Письма римскому другу*"

I hypothesize, that the most important objective of Brodsky's method is to ensure that the speech acts in the discourse of a verse lack a rational division into relevant components such as topics and foci. The goal is for the spoken poetic text to produce a captivating effect.

Brodsky's poem "*Сретенье*" 'Candlemas' has a clear plot. It is a story about Saint Simeon's meeting with the newborn Jesus Christ. In his reading, Brodsky singles out ten separate episodes. 1) Mary and the child come to the temple where Saint Simeon and Anna the Prophetess welcome them. 2) Simeon takes the child from Mary. 3) In the dusk of the temple, a ray of light appears at the top of the child's head. 4) Simeon understands that he is seeing the son of the Almighty. 5) Simeon's words echo beneath the arches of the temple. 7) Everybody remains silent. Simeon predicts glory and great suffering for the child. 8) Simeon heads to the temple's exit. 9) Simeon hears the voice of the Prophetess and realizes that it was not him whom she was addressing: his life has come to the end. 10) The image of the child lights up the path for the soul of Simeon. FIG. 13 depicts the compressed prosodic contour of Brodsky's reading of the poem.

The graph in FIG. 13 (exactly like the graph in FIG. 12) is shaped like stairs, and each "stair" refers, as I hypothesize, to a minimal poetic unit. In "*Письма римскому другу*", the minimal poetic unit is a "letter" that contains two stanzas. In "*Сретенье*", a minimal poetic unit can refer to sections of various lengths. As the end of a minimal poetic unit, I consider the point in a text where Brodsky uses his end marker, namely, a fall in the frequency—returning to the frequency at the beginning of a unit.

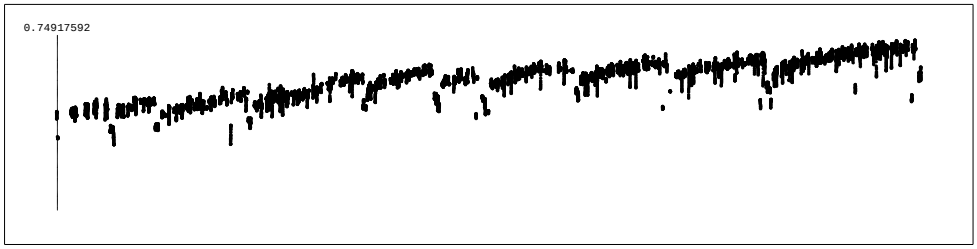


FIG. 13: The frequency tracing of reading poem "*Сретенье*" by Brodsky

In "*Сретенье*", the boundaries between the minimal poetic units do not always coincide with the boundaries between the stanzas. For instance, the boundaries after the first and second minimal poetic units coincide with the boundaries of the corresponding stanzas, while the boundary between the fourth and the fifth poetic units appears in the middle of the seventh stanza. The tenth poetic unit occupies the final three stanzas: at the end of the poem the size of a minimal poetic unit grows, the tempo and the medial frequency increase, and the emotional tension rises, so that at the end it can, as in music, conclude with an abrupt fall in tempo and frequency.

FIG. 14 represents the reading of the same poem by Kozakov.

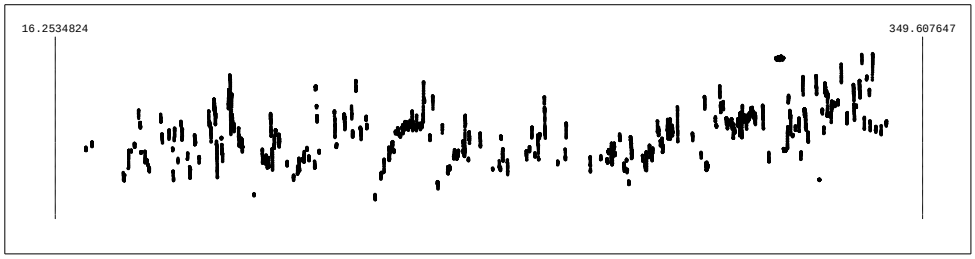


FIG. 14.: The frequency tracing for Kozakov's reading "Сретенье"

The compressed frequency tracing in FIG. 14 shows that Kozakov's reading is much less rhythmic and much more varied than Brodsky's. Kozakov's reading represents a conceptual interpretation of the text's structure. It is aimed at reconstructing the syntactic relations and preserving the meaning of the text. A comparative analysis of the frequency tracings shows that Kozakov employs the prosody of language, while Brodsky employs his personal prosodies for dividing a text into minimal poetic units.

5 Conclusion

Brodsky developed a highly consistent and very simple prosodic organization for the spoken poetic text based on the following markers:

- a rise on the tonic syllable of each phonetic word in a poetic text;
- an increase in the medial frequency in each minimal poetic unit;
- a final fall in the frequency at the end of each minimal poetic unit;
- an increase in the medial frequency from one minimal poetic unit to the next minimal poetic unit in advancing towards the end of the entire text.

Brodsky's manner of reading forms a kind of semiotic system, which treats the spoken poetic text as a structure.

Acknowledgments

This study has been supported by the Russian Science Foundation, project RSCI 8-18-00462 "The communicative-syntax interface: typology and grammar" realized at Pushkin State Russian Language Institute.

References

Бродский И.А., (1994). *Сочинения в четырех томах*. Том 2. Издательство "Пушкинский фонд", Спб.

Брызгунова Е.А. (1982) *Интонация. Русская грамматика*. Том 1. М. Наука.

Коваль, Ю. И. (2012). *Чистый Дор: рассказы*. М.: Издательский Дом Мещерякова.

Пастернак, Б. Л. (2004-2005). *Полное собр. соч. в 11 т*. М., Т. IV.

Тынянов, Ю.Н. (2002[1924]). *Проблема стихотворного языка. Литературная эволюция. Избранные труды.* М.: "Аграф", с. 29–166.

Эйхенбаум, Б.М. (1924). *О звуках в стихе. Сквозь литературу.* Л.

Meumann, E. (1894). *Untersuchungen zur Psychologie und Aesthetik des Rythmus*. Philos. Studien, 10.

Summary

This volume presents a wide range of quantitative approaches to versification. It comprises various methodological perspectives ranging from simple descriptive statistics to advanced machine learning methods (such as support vector machines, random forests or neural networks) as well as material covering a large span of time and languages: from very ancient versifications (Sumerian, Akkadian, Hittie; Ancient Greek), through medieval (Old English, Old Icelandic, Old Saxon) and Renaissance verse to modern experiments (free verse, concrete poetry); from English and Russian through Spanish and German to Portuguese and Catalan. Not only written, but also spoken poetry has been analyzed.

The book covers multiple topics. What they all share in common is that versification is being studied in the context of other linguistic phenomena that may affect or determine it. Analyses of large corpora go hand in hand with comparative approaches. It is shown that quantitative approaches can be used for the purpose of authorship attribution, to build reasonable typologies as well as to understand why certain forms play such a dominant roles in our cultural tradition(s).