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PHONOLOGICAL AND MORPHOLOGICAL  
MEANS COMPENSATING FOR NON-METRICALITY  
IN 19<sup>TH</sup>-CENTURY CZECH VERSE<sup>1</sup>

**Keywords:** generative metrics, vowel length, Czech 19<sup>th</sup>-century verse, computational prosody

**Słowa kluczowe:** metryka generatywna, iloczasy, XIX-wieczny wiersz czeski, prozodia komputerowa

0. The present study is based on a conception (held in Czech verse theory by Miroslav Červenka) according to which various degrees of non-metricality, or more precisely, various types of violation of the metrical norm are distinguished, and the context (the preceding and subsequent positions in a verse) of these violations are analyzed. We concur with the approach that views verse,

in which the stress of a polysyllabic word in a weak position is preceded by a sentence boundary, e.g. Mácha's:

/ u u / / u u /  
Budoucí čas! – Zejtřejší den  
W S W S    W S W S

[as] less non-metrical than:

/ u u / / u u /  
hrdliččin zval **ku** lásce hlas.  
W S W S    W S W S

In the second line, the conflict with the metre is still mitigated by the fact that the stressed weak position is occupied by a preposition and in the following unstressed strong position the stress

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“is replaced” by the vowel length. Therefore, non-metricity is perceived less intensively than in the verse:

∪ / ∪ ∪ / ∪ ∪ / ∪  
 jenž v hlubokých **mrá**ko**tá**ch leží  
 W S W S W S W SW

by the same author, where no mitigating means are present. (Červenka 2006: 57-58)<sup>2</sup>

1. The aim of the present study is to analyze the context in which violations of the metrical norm in Czech syllabotonic (i.e. accentual-syllabic) trochee and iamb occur, i.e. the context of those cases where W-positions carry the stress of a polysyllabic unit.<sup>3</sup> The analysis is based on 70,000 verse lines by twelve selected authors. However, due to the limited scope of this study we will focus only on the following issues: i) the frequency of long vowels in an S-position which immediately follows a W-position affected by a violation of the norm, ii) the frequency of a preposition in a W-position affected by a violation of the norm. The material was excerpted from the Corpus of Czech verse (Korpus českého verše – KČV, henceforth)<sup>4</sup> and was subjected to an automatic computer analysis. So that the main periods in the development of 19<sup>th</sup>-century Czech verse were represented, the following authors were selected (six authors from the first half of the 19<sup>th</sup> century, six authors from the second half of the 19<sup>th</sup> century):

- a) Early National Revival Period (Puchmajer),
- b) Syllabifying (i.e. irregular) Period of syllabotonic verse (Kamarýt, Chmelenský, Čelakovský, Mácha, Frič),
- c) Máj-poets (Hálek, Heyduk),
- d) Lumír-poets (Zeyer, Kaminský),
- e) Modernism (Březina, Karásek).<sup>5</sup>

<sup>2</sup> The highlighting and both types of notation above and below the verse are our own. The translations of the original Czech quotations in the present study are also our own.

<sup>3</sup> Note that the metrical norm of the Czech iamb enables the first W-position to be stressed; this phenomenon is referred to as the so-called dactylic incipit of the Czech iamb, which has been incorporated into the metrical norm with regard to Czech language rules – see 2.1.

<sup>4</sup> KČV is a phonetically, morphologically and also metrically, rhythmically and strophically annotated corpus consisting of texts from the Czech electronic library (*Česká elektronická knihovna*) that is available on the Institute of Czech Literature AS CR website <<http://www.ucl.cas.cz>> [accessed 17 Jan. 2013]. It contains more than 2 million verse lines mostly from the 19<sup>th</sup>-century. The KČV, see <<http://www.versologie.cz>>, was created by the authors of this study.

<sup>5</sup> This involves the following authors and works: Otokar Březina: *Tajemné dálky* (1896); František Ladislav Čelakovský: *Růže stolistá* (1840); Josef Krasoslav Chmelenský: *Básně* (1823); Josef Václav Frič: *Upír* (1849), *Výbor básní* (1861), *Různé básně. Sebrané spisy veršem i prózou 3* (1880); Vítězslav Hálek: *Alfréd* (1858), *Mejrma a Husejn* (1859), *Večerní písně* (1859), *Goar* (1864), *Černý prapor* (1867), *Dědicové Bílé hory* (1869), *Děvče z Tater* (1871), *V přírodě* (1872), *Pohádky z naší vesnice* (1874),

Our aim is to verify the following hypotheses:

H1 The distribution of long syllables in n-syllable units of 19<sup>th</sup>-century Czech syllabotonic verse is not accidental.

H2 If the metrical norm is violated in the W-position, there is a preference for vowel length in the next S-position. In the present study this will be called compensation by quantity.

H3 If the metrical norm is violated in the W-position, there is a preference for a preposition in this position. In the present study this will be called compensation by a preposition.

H4 The preference for a specific compensation type depends on additional factors, for example, the author's style or the historical context, i.e. on an overall tolerance for the frequency of violation of the metrical norm.

2. Before proceeding any further, it would be useful to highlight certain basic information concerning the Czech language and Czech verse, and to list the principles that we follow in the present analysis.

2.1. In Czech the stress is initial, fixed and non-phonological (however, the stress can have a demarcative function, i.e. it is capable of distinguishing between the word *jeden* and the combination *je den*).

In the case of a monosyllabic preposition proper<sup>6</sup> combined with a noun, it is the preposition that carries the stress, e.g. *škola* x *ve škole*.

All the analyses presented in this study are based on the fact that:

- a) we only distinguish word stress,
- b) there is only one stress in a word/stress group (thus, we disregard the category of secondary stress; note that this category is not taken into account either by the modern Czech verse theory or by a phonetic description of Czech – cf. Palková 1994),
- c) all polysyllabic words are stressed,
- d) monosyllabic words are i) stressed if they are lexical words, and ii) unstressed if they are grammatical words (this also includes the unstressed auxiliary verb *být*).

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*Balad a romanci řada druhá* (1912); Adolf Heyduk: *Lesní kvítí* (1873), *Mahomed II.* (1878), *Oldřich a Božena* (1883), *V zátíší* (1883), *Na přástkách* (1884), *Šípy a paprsky* (1888); Josef Vlastimil Kamarýt: *Smíšené básně* (1822), *Pomněnky* (1834); Bohdan Kaminský: *Ztracené volání* (1884), *Rokoko* (1889), *Den šesti* (1890), *V samotách* (1893), *Z příkopů* (1892), *Doma i jinde* (1899); Jiří Karásek ze Lvovic: *Zazděná okna* (1894), *Kniha aristokratická* (1896), *Sexus necans* (1897), *Hovory se smrtí* (1904), *Endymion* (1909), *Ostrov vyhnanců* (1912), *Nad obrazem Marie Magdalény v hradčanské Loretě* (1925), *Písň tulákovy o životě a smrti* (1930), *Hvězdy nad Prahou* (1939), *Poslední vinobraní* (1946); Karel Hynek Mácha: *Máj* (1836); Antonín Jaroslav Puchmajer: *Fialky* (1833); Julius Zeyer: *Griselda* (1883), *Poezie* (1884), *Kronika o svatém Brandanu* (1886), *Nové básně* (1907).

<sup>6</sup> Monosyllabic prepositions proper are the following: na, nad, pod, před, do, za, u, po, přes, ve, se, ze, ku, ke, od, ob, při, zpod, bez, dle, o, pro.

2.2. Quantity in Czech is phonological, vocalic, moveable and its position in a word/unit is independent of stress, as well as word or sentence boundaries.<sup>7</sup> In some languages vowels in stressed syllables are longer than in unstressed syllables; in Czech, however, the vowels in stressed syllables are shorter than in unstressed syllables, as demonstrated by tests on a long series of meaningless syllables (Janota and Palková 1974). As regards the length of Czech vowels, the analyses carried out so far seem to imply that “it is not the phone neighbourhood that has a decisive role but the position of the syllable (that contains these vowels) within a word, unit, utterance” (Dohalská 2005: 242).

There are two categories of long vowels in Czech: simple (á, é, í, ó, ú) and diphthongs (ou, au, eu), e.g.: “stála” [sta:la] (“she stood”) vs. “stálá” [sta:la:] (“permanent”) (adj. fem.) vs. “stala” [stala] (“she became”).<sup>8</sup>

3. What Czech poetry has in common with certain other poeties in Europe is the fact that several versifications were used (in certain periods several versifications were, in fact, used simultaneously): syllabic, syllabotonic and quantitative (and, of course, even free verse; however, in the Czech tradition this is not regarded as a separate versification system – see Červenka 2001). A pure accentual system is possible in Czech but its use in the history of Czech poetry is short and limited to selected works. We do not aim at analyzing the reasons why this is so, suffice it to say that even verse that was intended by the author to be accentual was perceived by a Czech reader as irregular, loose or free.

Old literary documents were written in syllabic verse (which sometimes had traits of regular syllabotonic verse but in reality it was only syllabotonic *avant la lettre*); in Humanism quantitative verse became prevalent in high literature; at the end of the 18<sup>th</sup> century a syllabotonic reform took place, which induced a theoretical (and also partly practical) protest by the proponents of Czech quantitative verse; at the end of the 19<sup>th</sup> century free verse appeared in Czech poetry. Despite certain attempts to implement quantitative verse, 19<sup>th</sup>-century Czech poetry can be described as poetry written in more or less regular syllabotonic verse.

The way in which authors/generations/schools respected the metrical norm, and how this relationship developed, should now be considered. Early Revival

<sup>7</sup> It should be pointed out that “a distinct vowel lengthening as a stress signal is not acceptable in Czech because a long-short vowel distinction has a phonological function” (Palková 1994: 279). Palková also states that the difference in sound length can create an impression of syllable prominence; however, it tends to involve isolated words with no meaning (ibidem).

<sup>8</sup> Note that in the word “stálá” there are two long vowels, one immediately following the another, which is very common in Czech but somewhat unusual in Slovak where the “rhythmical law” is codified.

verse was dominated by an effort to strictly adhere to norms. Next, the “syllabifying” period gained prominence, which meant that the accentual component of syllabotonic verse was weakened and conflicts with the norm were very common. This demonstrates the popularity for folk creation at that time as well as the fact that the syllabotonic system was dominant and thus could be violated without being destroyed. The syllabifying period was also a period in which there was greater theoretical activity among the proponents of Czech quantitative verse, which is extremely important for our material. The middle of the 19<sup>th</sup> century was associated with the appearance of a new, modern generation with a cosmopolitan outlook, the Máj-poets, whose verse is characterized by its increasing regularity. The Máj-poets were followed by the Lumír-poets, who shared the same worldviews and whose verse, being highly regular, is reminiscent of the beginnings of Czech syllabotonic verse. The end of the century saw the rise of Modernism, which on the one hand (however polemically it may sound) followed the views of the Lumír-poets, yet on the other hand, the writing itself was influenced by verselibristic experiments that must have impacted on the regularity of modernist stressed verse.

Despite the absolute dominance of syllabotonic over quantitative verse during the 19<sup>th</sup> century voices emerged calling for quantitative versification, or more precisely, for a compromise between quantitative and syllabotonic versification. At the end of the 19<sup>th</sup> century these prosodic disputes were put an end to by the classical philologist and theoretician of verse, Josef Král, who absolutely refused to consider quantitative verse as a prosodic principle applicable to Czech language. In the 20<sup>th</sup> century there are very few poems written in quantitative verse; instead, syllabotonic verse, free verse and transitional forms co-existed (e.g. iambic-trochaic verse with irregularities, see Červenka 2001).

It is the phonological quality of Czech vowel length, but at the same time the obvious weakness of Czech stress, or even its potentiality (i.e. a phenomenon without a binding phonological realization) that can be used as an argument by Czech supporters of quantitative versification. On the other hand, it could be argued that length in Czech is a segmental (vocalic), and not suprasegmental (prosodic), matter and that Czech is not one of the “mora-timed” languages (see Palková 2012).

One of the frequently repeated arguments voiced by the supporters of quantitative verse was that syllabotonic verse was rhythmically monotonous: with respect to the initial stress placement it was only possible to write verse with a limited number of units, with the unit and word boundaries always overlapping (but not *vice versa*). Even the greatest supporters of Czech syllabotonic verse were aware of these characteristics. Thus, from the beginning of the syllabotonic reform there were attempts to eliminate this (actual or presumed) monotony of verse rhythm. One method used to diversify syllabotonic verse was the use of quantity.

3.1. The founder of the reform, Josef Dobrovský, himself regarded quantity as a means to increase in number the various types of feet in Czech syllabotonic verse; thus, depending on which syllable is marked by length, we may distinguish four types of trochaic feet:

All we can add at this point is that the four trochees, with their rather more rapid and then slower courses, can be compared with the previously mentioned Latin word – feet [Note (PP-RI): spondee, pyrrhus, trochee, iamb]. Thus, the trochee *stává* is slow and calm, almost like a spondee. *Vstala* passes quickly on both occasions. *Stála* first lingers and then rapidly falls. *Malá* initially rushes but then lingers just as it is about to decrease (Dobrovský 1795/1953: 235).

3.2. Josef Dobrovský was followed by Antonín Jaroslav Puchmajer, the leader of the second of the 19<sup>th</sup>-century Czech poetry groups, editor of five poetic almanacs and himself an active poet. Puchmajer was a zealous supporter of syllabotonic reform, who, like Dobrovský, at first regarded quantity as a means to increase in number the various types of feet in Czech syllabotonic verse, and as a means to provide syllabotonic verse with a certain melodiousness. More importantly, he was the first to formulate a method for the possible absorption of stress by length (if the stressed syllable is short and the following unstressed syllable is long, then this long syllable is prosodically ambiguous and may be regarded either as strong or weak).<sup>9</sup>

3.3. The possibility of compensating for the lack of stress with the following long syllable also appears in *Poetics*, written by one of the most significant Czech aestheticians of the 19<sup>th</sup> century, Josef Durdík. He supported a mutual tolerance between quantitative and syllabotonic versification. However, what seems somewhat modern is his idea that stress is the dominant feature in syllabotonic verse, which can be diversified by quantity (in quantitative versification the opposite is true). On the basis of aesthetic theories concerning a “re-gained” harmony, Durdík regarded quantity as a means that is capable of restoring the deliberately violated harmony of the Czech syllabotonic verse (the harmony is violated but subsequently restored – one rule is violated, yet it is immediately substituted by another. According to Durdík, this effect has “a strange charm, it gives the impression of the refined, precious feminine delicacy,” Durdík 1881: 357). Thus, quantity can on occasions become a substitute for stress and serve as a means of enlivening the rhythmical monotony, with which regular syllabotonic verse can easily be affected.

<sup>9</sup> Puchmajer repeatedly commented on prosody (Puchmajer 1797, 1802, 1820/1833) and his opinions developed considerably over time. Nevertheless, it is not our aim to discuss this development. What we consider important is that shortly after the syllabotonic reform, yet before the appearance of *Počátkové českého básnictví* (1818), the supporters of syllabotonic reform were strongly in favour of the view that assigned great importance to quantity in syllabotonic verse.

3.4. Josef Král, who is mentioned above, clearly disagreed with Durdík, as he refused to acknowledge the rule for the compensation of stress by length and regarded it as a violation of rhythm. He also disagreed with Durdík regarding the fact that poets would actually use this rule.

3.5. Roman Jakobson, however, was a critic and opponent of Josef Král. (In fact, Jakobson's polemics were actually polemics against Král's work, rather than against the author himself, since Král died in 1917, i.e. before Jakobson arrived in Czechoslovakia). According to Jakobson, quantity played a much greater role in Czech syllabotonic verse than Král was willing to admit. Thus, the attempts of Czech poets at a reconciliation of stress and length seemed entirely natural to Jakobson.

When analyzing the rhyming practices of 19<sup>th</sup>-century Czech poets Jakobson highlighted that poets from the first half of the 19<sup>th</sup> century took quantity into consideration, whereas poets from the second half of the 19<sup>th</sup> century did not (Jakobson 1926: 66ff.). For our study it is very important that Jakobson questions the basic rule concerning the accentuation of monosyllabic prepositions proper (we may, of course, find exceptions in reference books, e.g. “**na** letišti” x “**na** mezinárodním letišti”). Furthermore, he observed a tendency to move the stress from a preposition to a noun. Jakobson reminds us of the voices of the purists, who accused Czech poets of spreading this unfortunate habit. For example, Jan Jakubec (Jakubec 1917) explicitly connected this phenomenon with the increasing popularity of iambic verse in the second half of the 19<sup>th</sup> century and he quoted the line by Jaroslav Vrchlický, “**na** skráně sahá šedinou nám stáří,” as a model example of what should be avoided. According to Jakubec, the correct accentuation is violated in this line due to the metre (Jakubec suggests “**na** skráně,” the metre in fact is “**na** **skráně**”). Besides such poetic licence, Jakubec also views in a less than positive light three-syllable words in an iamb, where due to the nature of the metre the stress on the first syllable is suppressed, if the syllable is short (unfortunately, Jakubec fails to mention whether the second syllable of this word has to be long). Even Jakobson notes the shift of stress from the first to the second syllable (especially if this syllable is long) in a three-syllable word in Czech verse, and uses it as proof to demonstrate the validity of his argument concerning the two-syllable expiratory wave of Czech word stress.

At the beginning of his *Základy českého verše* (Jakobson 1926), Jakobson provides a short questionnaire regarding basic questions about Czech prosody. Let us consider the answer from one of the poets under consideration, namely the Czech modernist, Jiří Karásek. Karásek claims that he wanted to bring quantity and stress “into accord, if possible.” This tendency is, in his view, most evident in his collection of poems entitled *Endymion*. Karásek also admits that he tried to avoid trochaic feet in which the first syllable is short but the

second long, and that he also strove to make a syllable with overlapping stress long (Jakobson 1926: 10).

3.6. Jan Mukařovský conceived quantity as one of the components that diversify rhythm (similarly to Josef Durdík). He demonstrated the use of quantity as an accompanying (i.e. secondary) rhythmical factor in an analysis of syllabifying (i.e. irregular) syllabotonic verse in Čelakovský's *Ohlasy písní českých* (this is a collection of poems that imitate folk poetry, which is where the author's attempts at irregularity stem from). A graph illustrating the accentuation of individual strong positions and, at the same time, showing how these positions are supported by length demonstrates that "the lack of stress is usually compensated for by length in individual cases." (Mukařovský 1934/2007: 170)

3.7. A separate study on quantity in Czech syllabotonic verse was undertaken by Julie Nováková (Nováková 1948), a classical philologist strongly influenced both by Jan Mukařovský and structuralism. Compensation by quantity is, however, a marginal topic in her study. Since her analysis was also based on a relatively small sample, we will not include her work in the present study.

3.8. Julie Nováková's study was extended by Miroslav Červenka (Červenka 1972), who analyzed quantity in Czech syllabotonic eight-syllable iambs and trochees. Červenka was interested in how the frequencies of long syllables were distributed, posing the question: "To what extent are these frequencies conditioned by the language system, and [...] by the degree of accentuation of individual syllables in the verse, and finally by the position of a particular syllable in a string of syllables composing a line. If this conditioning is not proven, we may presume that in a given text the way in which the frequencies of long syllables are distributed is likely to be the result of deliberate stylization." (Červenka 1972: 293)

Having completed the historical outline we will briefly summarize what is probably already clear from the discussion above:

i) the use of quantity as a means to compensate for a violation of the metrical norm suggests itself, since quantity, being phonological in Czech, plays a significant role in Czech language awareness;

ii) the use of a preposition as a means to compensate for a violation of the metrical norm suggests itself, since a preposition is graphically separated from a noun by the word boundary and so is potentially more likely to lose its stress (Červenka 2006: 92).

4. We decided to verify the hypotheses H1, H2, H3 and H4 (see paragraph 1) based on the work of twelve authors from the KČV. We analyzed 43,090 iambic and 24,594 trochaic lines in total:



	Number of excerpted lines			Number of excerpted lines	
	Iamb	Trochee		Iamb	Trochee
<b>Antonín Jaroslav Puchmajer</b> (1769-1820)	628	2055	<b>Vítězslav Hálek</b> (1835-1874)	14017	1199
<b>Josef Vlastimil Kamarýt</b> (1797-1833)	426	3033	<b>Adolf Heyduk</b> (1835-1923)	2243	6239
<b>Josef Krasoslav Chmelenský</b> (1800-1839)	198	1948	<b>Julius Zeyer</b> (1841-1901)	8975	4327
<b>František Ladislav Čelakovský</b> (1799-1852)	–	1200	<b>Bohdan Kaminský</b> (1859-1929)	8838	1352
<b>Karel Hynek Mácha</b> (1810-1836)	742	–	<b>Otokar Březina</b> (1868-1929)	482	–
<b>Josef Václav Frič</b> (1829-1890)	1441	3241	<b>Jiří Karásek ze Lvovic</b> (1871-1951)	5100	–

**TAB. 1.1:** The list of authors and the number of analyzed lines.

As was mentioned in section 2.2, the occurrence of long syllables in Czech is not directly dependent on their position within the superordinate language units (words/stress group), nor on the length/shortness of the neighbouring syllables. However, this does not mean that the occurrence of long (L) and short (S) syllables are entirely accidental in relation to the superordinate units. For instance, when considering two-syllable stress groups, types such as “malá” (SL), “stála” (LS), “vstala” (SS) and “stává” (LL) will not have the same likelihood of occurrence. Firstly, this is due to the fact that in Czech the frequency of long syllables is lower than the frequency of short syllables (Palková 1994: 193 states the ratio is 3:1 in favour of short syllables) and secondly, there are certain types of morphemes which show a tendency to cumulate quantity (this primarily involves the endings of nouns, adjectives and present tense verbs), or possibly to suppress it.

For these reasons, a preference for vocalic quantity cannot be postulated on the basis of findings that in the case of the accentuation of a W-position, a configuration with a short syllable in the W-position and a long syllable in the following S-position (example 1) in the iambic verse of a particular author is *x*-times more frequent than a configuration in which the order of long and short syllables is reversed (example 2):

Example 1:

S L

Kde borový *zaváněl* háj

W S W S W S W S

Example 2:

L S  
Se vinuly v *soumraku* klín  
W SWS W SW S

An analysis must be based on comparing the frequency of the analyzed configuration, regarding the accentuation of the W-position, with the frequency of this configuration in other contexts. In the case of Mácha quoted above, we can infer his preference for quantity only on the basis of the finding that the frequency of quantity ( $f(L)$ ) on the second syllable of three-syllable stress groups, whose stress is placed on a W-position, does indeed significantly differ from the frequency of quantity on the second syllable of three-syllable units in neutral contexts, i.e. in cases where the stress in the first syllable of three-syllable units is not placed on a W-position.

Miroslav Červenka points to the limits of such a procedure:

The frequency of stress groups classified according to the position of a long vowel in a syllable varies significantly from text to text. Under these circumstances we cannot expect stabilized language awareness capable of identifying and stylistically assessing the deviation in  $f(L)$  unless they reach a particularly high degree. (Červenka 1972: 293-294)

Nevertheless, it should be noted that Červenka's scepticism stems from a comparison of only three samples (his analysis involved just two Czech writers; the samples contained 3,000 units in total). Therefore, we decided to analyze the frequency of long syllables within superordinate units once again, based on the material available in the KČV. We did not select a phonetic stress group (i.e. a group of syllables joined to a stressed syllable, including possible proclitics) as the basic unit but we opted instead for an interstress interval, i.e. a unit beginning with a stressed syllable<sup>10</sup> and ending with a syllable before the stress, or before the verse boundary. In order to avoid confusion with the mathematical use of the term "interval," from now on these units in this article will be referred to as "sections."

Example: Nač zahálet? Ať vrčí kolovrat  
stress groups: [natʃ 'zaf̩a:lɛt] [ʔac 'vr̩tʃi:] ['kolovrat]  
sections: [zaf̩a:lɛt ʔac] [vr̩tʃi:] ['kolovrat]

<sup>10</sup> The usual delimitation of an interstress interval (within the Czech theory, see Červenka 2001) does not include the initial stressed syllable. In such cases the monosyllabic intervals are, quite confusingly, considered as the basis of the binary rhythm and two-syllable intervals are regarded as the basis of ternary rhythm.

When analyzing the works of the individual authors (the authors' subcorpora), we focused on the frequency of long syllables ( $f(L)$ ) in particular positions within the most frequent sections, i.e. two-, three- and four-syllable sections. The section had to be attested in the author's subcorpus in at least 1,000 instances in order to be included in the analysis. Thus, two-syllable sections were studied in the subcorpora of 338 different authors, three-syllable sections in the subcorpora of 238 different authors and four-syllable sections in the subcorpora of 214 different authors. It was discovered that in the works of the analysed authors the  $f(L)$  in the individual syllables of the two-, three- and four-syllable sections fluctuated within the following intervals, although the occasional extreme case that could be explained only through a detailed analysis of the particular works was not included:

	1 <sup>st</sup> syllable	2 <sup>nd</sup> syllable	3 <sup>rd</sup> syllable	4 <sup>th</sup> syllable
2-syllable sections	$f(L) \in <0,14; 0,3)$	$f(L) \in <0,22; 0,43)$	–	–
3-syllable sections	$f(L) \in <0,08; 0,21)$	$f(L) \in <0,15; 0,31)$	$f(L) \in <0,22; 0,51)$	–
4-syllable sections	$f(L) \in <0,05; 0,16)$	$f(L) \in <0,12; 0,25)$	$f(L) \in <0,18; 0,38)$	$f(L) \in <0,16; 0,43)$

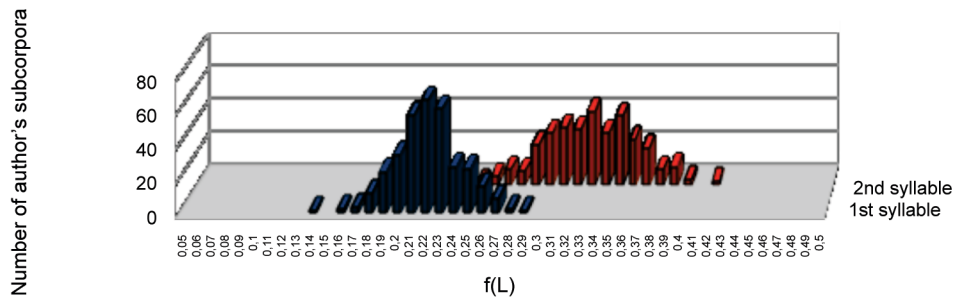
**TAB. 1.2:** Frequency of long syllables ( $f(L)$ ).

The histograms FIG. 1.1, FIG. 1.2, FIG. 1.3 below show that:

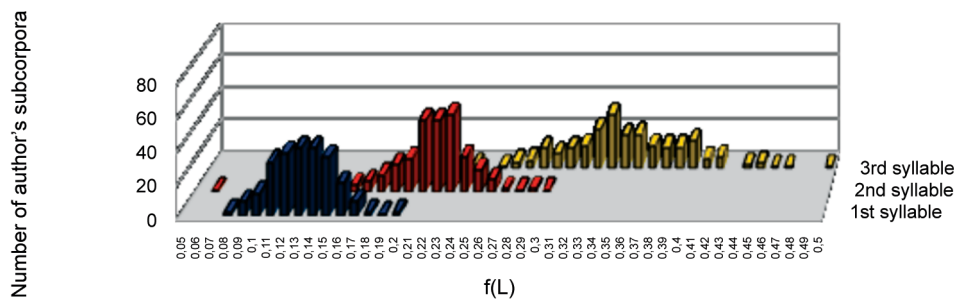
With increasing syllable length in a section the upper and lower interval limit, within which all  $f(L)$  of the  $n$ -th syllable of a section can be found, in most cases decreases. If other factors are excluded this can be ascribed to a higher distribution of prepositional phrases (see below); Czech monosyllabic prepositions proper consist exclusively of short syllables and could be considered to push the morphemes potentially associated with quantity to the next possible position.

In accordance with Červenka's analysis (1972: 294) our material also reveals an increasing tendency towards  $f(L)$  as the section progresses. We (as does Červenka) attribute this tendency to an accumulation of quantity in nominal, adjectival and verbal endings.

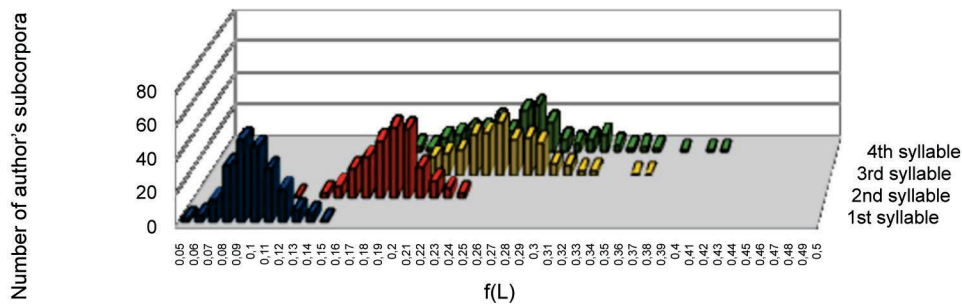
Also as a section progresses, there is a widening of the interval within which the  $f(L)$  can be found and a flattening of their distributions, together with an increase in the syllable length. This can possibly be ascribed to the unstressed clitics which can appear at the end of (primarily longer) sections and which can thus be viewed as pushing long endings to the non-final position of a section.



**FIG. 1.1:** Frequency of long syllables ( $f(L)$ ) in individual positions of two-syllable sections in the subcorpora of 338 different authors.



**FIG. 1.2:** Frequency of long syllables ( $f(L)$ ) in individual positions of three-syllable sections in the subcorpora of 238 different authors.



**FIG. 1.3:** Frequency of long syllables ( $f(L)$ ) in individual positions of four-syllable sections in the subcorpora of 214 different authors.

Thus, it seems that based on the majority of the instances discussed, the relatively small interval range and the relatively low variability within the data there is a specific neutral background, with which the values obtained from the instances of W-position accentuation can be compared.

Furthermore: i) the sections where the W-position is stressed represent only a fraction of all the data analysed above; hence, they should not skew the results significantly. ii) with regard to the analyzed material the above-mentioned characteristics only apply to verse, not to the Czech language in general.

Since the focus is primarily on cases, where after the accentuation of a W-position, quantity could be said to replace the stress which is missing in an S-position, we will, therefore, now concentrate only on the second syllable of the three-syllable sections. What can be inferred from the accentuation of a W-position is that: i) a monosyllabic section implies that the following S-position is stressed; therefore, this is not a case of so-called replacement, ii) even-syllable sections imply (with the exception of line-endings) the accentuation of the next W-position and, therefore, their frequency is in this case negligible, iii) longer odd-syllable sections (5-, 7-syllable) are rare in Czech and their frequency is in this context also negligible.

We compared the frequency of quantity on the second syllable of three-syllable sections accentuating the W-position in the analyzed samples with data attested in the KČV. If the observed frequency in the sample was within the range of the delimited interval it was considered identical with the expected frequency. If the observed frequency in the sample exceeded the upper interval limit, we considered the highest value attested in the KČV ( $\in 0,3$ ) as the expected frequency.

In order to verify whether the difference between the observed and expected frequency given the sample size can be generalized, we used the test  $\chi^2$ ; the significance level is conventionally set at  $\alpha = 0,05$ . In order to measure the association strength of the given S-positions and the quantity we used the  $\varphi$  coefficient, modified to compare the observed with previously known expected frequencies.

The coefficient is calculated as  $\varphi_p = \sqrt{\frac{\chi_p^2}{2n}}$ , where  $\chi_p^2 = \sum \frac{(f(O) - f(E))^2}{n}$ ,

$f(O)$ : the observed absolute frequency,  $f(E)$ : the expected absolute frequency,  $n$ : sample size (see Wallis 2012);  $\varphi_p = 0$  marks zero association,  $\varphi_p = 1$  maximum association.

As the first W-position in iamb has in Czech versification different characteristics than in other W-positions (see note 3), it was classified as a separate category (I(INC)), together with the non-initial W-positions in iamb (I(INT)) and the W-positions in trochee (T). The observed values are summarized in Table 1.3.

		Puchmajer	Kamarýt	Chmelenský	Čelakovský	Mácha	Frič	Hálek	Heyduk	Zeyer	Kaminský	Březina	Karásek
<b>I</b> <b>(INT)</b>	<i>n</i>	15	40	41	–	248	182	1046	28	588	176	54	232
	<i>f(L)</i>	0,73	0,35	0,44	–	0,35	0,56	0,4	0,32	0,28	0,28	0,28	0,22
	$\chi^2$	13,41*	0,48	3,77	–	2,58	58,78*	46,62*	0,06	0	0	0	0
	$\varphi_p$	<b>0,43</b>	0,05	0,14	–	0,05	<b>0,26</b>	<b>0,1</b>	0,02	0	0	0	0
<b>I</b> <b>(INC)</b>	<i>n</i>	43	53	44	–	300	426	1961	149	979	730	98	1193
	<i>f(L)</i>	0,35	0,34	0,2	–	0,25	0,32	0,32	0,27	0,22	0,25	0,24	0,21
	$\chi^2$	0,05	0,39	0	–	0	1,16	3,63	0	0	0	0	0
	$\varphi_p$	0,08	0,04	0	–	0	0,02	0,02	0	0	0	0	0
<b>T</b>	<i>n</i>	54	215	326	227	–	725	67	449	320	33	–	–
	<i>f(L)</i>	0,48	0,4	0,29	0,49	–	0,49	0,4	0,3	0,18	0,3	–	–
	$\chi^2$	8,46*	10,24*	0	38,61*	–	118,82*	3,38	0,01	0	0	–	–
	$\varphi_p$	<b>0,18</b>	<b>0,1</b>	0	<b>0,19</b>	–	<b>0,19</b>	0,1	0	0	0	–	–

**TAB. 1.3:** The observed and the expected frequency of quantity on the second syllable of three-syllable sections accentuating the initial W-position in iamb (I(INC)), the non-initial W-position in iamb (I(INT)) and the W-position in trochee (T) (*n*: the number of three-syllable sections accentuating the W-position; *f(L)*: frequency of quantity;  $p < \alpha$  ( $= 0,05$ ) is marked by the \* symbol in the  $\chi^2$  value and in bold in the  $\varphi_p$  value).

Table 1.3 clearly demonstrates the preference for quantity in our material, which is seen particularly in I(INT) and T of the first six authors. Now, we will attempt to analyze the use of prepositional phrases in a similar manner.

5. Similarly to *f(L)*, the frequency of prepositional phrases (*f(P)*) in two-, three- and four-syllable sections in the works of all the authors also has a relatively small interval range (see FIG. 2). In the case of two-syllable sections the interval is  $<0,01; 0,06$ ), in the case of three-syllable sections the interval is  $<0,05; 0,27$ ), and in the case of four-syllable sections the interval is  $<0,07; 0,29$ ), or more precisely  $<0,07; 0,23$ ), when the two extreme values are not included.

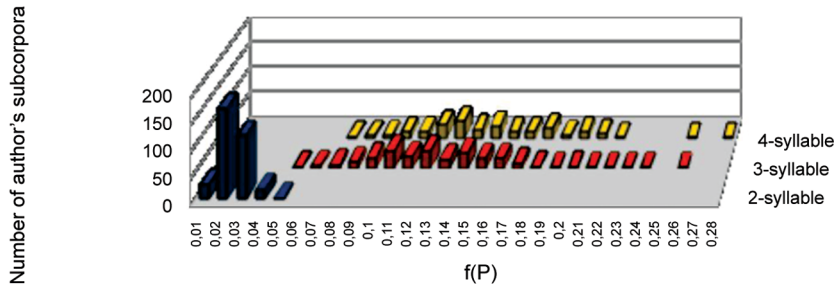


FIG. 2: The frequency of prepositional phrases ( $f(P)$ ) in two-syllable sections (the subcorpora of 338 different authors), in three-syllable sections (the subcorpora of 238 different authors) and in four-syllable sections (the subcorpora of 214 different authors).

If once again we set the upper limit of the expected frequency in the three-syllable intervals as the highest value attested in the KČV ( $\in 0,26$ ), we obtain the following results:

		Puchmajer	Kamarýt	Chmelenský	Čelakovský	Mácha	Frič	Hálek	Heyduk	Zeyer	Kaminský	Březina	Karásek
I (INT)	$n$	15	40	41	–	248	182	1046	28	588	176	54	232
	$f(P)$	0,33	0,18	0,13	–	0,15	0,21	0,31	0,36	0,47	0,56	0,27	0,22
	$\chi^2$	0,42	0	0	–	0	0	13,46*	1,37	129,68*	80,59*	0,12	0
	$\varphi_p$	0,07	0	0	–	0	0	<b>0,05</b>	0,09	<b>0,21</b>	<b>0,3</b>	0,02	0
I (INC)	$n$	43	53	44	–	300	426	1961	149	979	730	98	1193
	$f(P)$	0,56	0,28	0,19	–	0,18	0,13	0,24	0,33	0,82	0,34	0,23	0,21
	$\chi^2$	19,87*	0,15	0	–	0	0	0	4,42*	1596,99*	26,66*	0	0
	$\varphi_p$	<b>0,3</b>	0,02	0	–	0	0	0	0,08	<b>0,56</b>	<b>0,08</b>	0	0
T	$n$	54	215	326	227	–	725	67	449	320	33	–	–
	$f(P)$	0,33	0,24	0,33	0,18	–	0,2	0,3	0,18	0,51	0,36	–	–
	$\chi^2$	1,51	0	9,37*	0	–	0	0,52	0	106,04*	1,84	–	–
	$\varphi_p$	0,07	0	<b>0,07</b>	0	–	0	0,04	0	<b>0,26</b>	0,1	–	–

TAB. 2: The observed and the expected frequency of prepositional phrases in three-syllable sections accentuating the initial W-position in iamb (I(INC)), the non-initial W-position in iamb (I(INT)) and the W-position in trochee (T) ( $n$ : the number of the three-syllable sections accentuating the W-position;  $f(P)$ : frequency of prepositional phrases;  $p < \alpha$  ( $= 0,05$ ) is marked by the \* symbol in the  $\chi^2$  value and in bold in the  $\varphi_p$  value).

Thus, our analysis also demonstrates the preference for prepositional phrases, particularly in the verse of Antonín Jaroslav Puchmajer, Julius Zeyer and Bohdan Kaminský.

6. Graphs 3.1 and 3.2 illustrate the information provided in tables 1.3 and 2. In addition, graph 3.3 illustrates the ratio of the number of W-positions accented by stress in a three-syllable unit to the total number of verses.

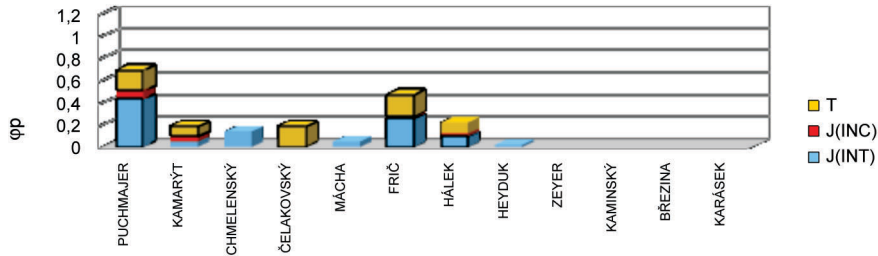


FIG. 3.1: The values  $\phi_p$  (quantity);  $p < \alpha (= 0,05)$  are marked by the highlighted edges of the particular parts of the column.

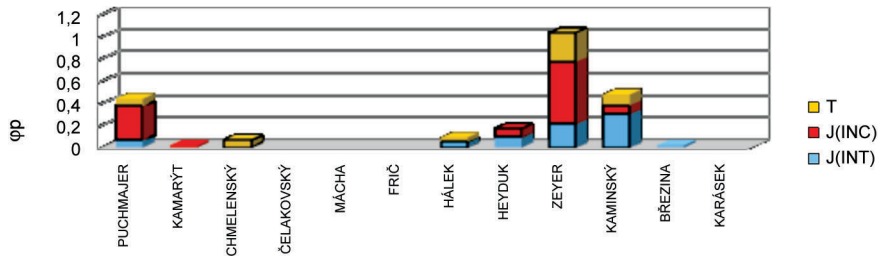


FIG. 3.2: The values  $\phi_p$  (prepositional phrases);  $p < \alpha (= 0,05)$  are marked by the highlighted edges of the particular parts of the column.

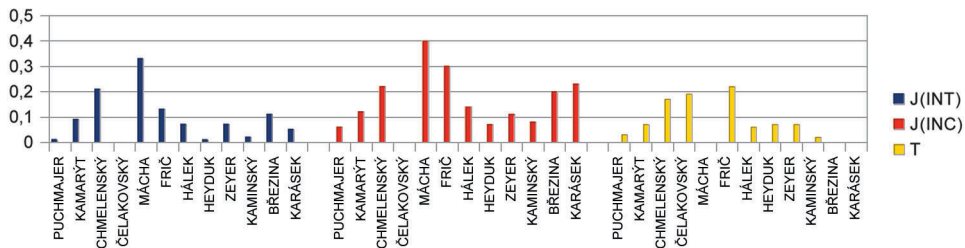


FIG. 3.3: The ratio of the number of W-positions accented by stress in a three-syllable section to the total number of verses.



7. The graphs seem to imply the following tendencies:

In the first half of the 19<sup>th</sup> century a violation of the metrical norm tended to be compensated by quantity in the position following the violation. With authors from the second half of the 19<sup>th</sup> century, this tendency was not observed. The results reflect the level, intensity and influence of the quantitative revolt against poets from the first half of the 19<sup>th</sup> century, or more precisely, it reflects the tendency to use quantity as a diversifying factor in syllabotonic rhythm based on stress. In addition, the use of quantity in cases of metrical conflict in fact shows that the authors were aware of this conflict and wished to nullify it, a fact that also demonstrates their attempt to reduce the undesirable monotony of syllabotonicism, rather than to eliminate it. The tendency to compensate by quantity was not observed in a dactylic incipit of iambic verse. This implies that if the authors did not find it necessary to mitigate the conflict, they probably did not consider it a conflict and regarded the dactylic incipit as a fully sanctioned metrical norm. It was typical of the authors from the Máj- and Lumír-generations not to violate the norm too much; in this respect, the verse employed by the Lumír-poets can be viewed as having achieved a peak of regularity, even though this was imaginary. The more regular the verse, the more likely it is that a violation of the norm will be compensated, i.e. nullified. This was demonstrated in the verse of Zeyer and Kaminský, who, however, use prepositional phrases instead of quantity (quantitative verse favouring quantity is simply passé at this point). At first sight (and really only at first sight) it is surprising that Puchmajer, an author from the Early Revival period, joins Zeyer and Kaminský in this regard. However, the explanation is simple: Puchmajer's iambs (and trochees) are metrically the most orthodox iambs (and trochees) in Czech poetry (see Červenka 2006: 89). Hence, the author (as well as his future Lumír-colleagues) compensates for the occasional violations of the metrical norm, making use not only of quantity but also prepositions. Hence, this can be seen as further "evidence of the affinity between the conception of rhythm as understood by Puchmajer and the Lumír-poets" (Červenka 2006: 158). An extreme preference for prepositional phrases in the dactylic incipit of Zeyer's iamb demonstrates that in comparison with the authors from the first half of 19<sup>th</sup> century Zeyer regards the dactylic incipit in iamb as non-metrical.

With regard to modern authors, none of the analyzed tendencies employed to compensate for metrical conflict was observed. This is probably associated with the fact that together with the concurrent penetration of free verse into Czech literature the conflicts with metrical verse norms are considered not worthy of attention and so it is unnecessary to nullify them.

8. As our study utilized a relatively extensive body of material we aimed at proving the hypotheses stated in the introduction. The results confirm our

intuitive assumptions that were based on our experience of 19<sup>th</sup>-century Czech verse. Still, we consider intuition should be verified: in section 3.5 we quoted Karásek when commenting upon his own work. The author confesses that he takes into consideration not only stress but also quantity in syllabotonic verse, that his verses are a reaction to the non-melodic verse of the Lumír-generation and finally that he wants “the syllable with overlapping stress to be long” (Jakobson 1926: 10). As an example he provides his collection of poems entitled *Endymion*. When analyzing the poems from a perspective which views using quantity and prepositional phrases as a means of compensation for a violation of the norm, it seems Karásek gave preference to prepositional phrases, rather than quantity; thus, his work is not dissimilar from the verse created by the Lumír-poets.<sup>11</sup>

The results of the present study are based on a relatively extensive, but certainly not exhaustive, body of material. We were interested in general tendencies; particular works (with the one exception mentioned above) were not taken into account. However, we intend to analyze further material in order to modify what was determined in this study and also to produce more specific results. In addition, we hope to address the assumptions mentioned in the studies of J. Nováková and M. Červenka (see the sections 3.7 and 3.8), which could not be discussed here due to the limited scope of our study.

(translated by Gabriela Brůhová)

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<sup>11</sup> For more on Karásek and his complicated relation to the verse employed by the Lumír-poets (his debut verse resembles the verse of the Lumír-poets; it is followed by a period of [not only] verselibristic experiments, but in later editions he rewrites his poems and returns to the verse employed by the Lumír-poets) – see Červenka 1991.

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### Phonological and Morphological Means Compensating for Non-Metricality in 19<sup>th</sup>-Century Czech Verse

**Keywords:** generative metrics, vowel length, Czech 19<sup>th</sup>-century verse, computational prosody

#### S u m m a r y

Drawing on an analysis of 70,000 verse lines by twelve selected authors, the study attempts to analyze the context in which violations of the metrical norm in 19<sup>th</sup>-century Czech syllabotonic (i.e. accentual-syllabic) trochee and iamb occur. First, basic information concerning Czech quantity and stress is provided; next, attention is turned to the history of 19<sup>th</sup>-century Czech verse, especially with regard to the prosodic struggles between the supporters of syllabotonic and quantitative versification. The main aim is to examine whether the violation of a metrical norm may result in compensation for this violation, either by quantity or a prepositional phrase. The study demonstrates that: i) the distribution of long syllables in *n*-syllable units of 19<sup>th</sup>-century Czech verse is not accidental, ii) the violation of a metrical norm is compensated for by quantity or a preposition; iii) the preference for a specific compensation type depends on additional factors, e.g. the author's style or the historical context, i.e. on an overall tolerance for the frequency of violation of the metrical norm.

**Fonologiczne i morfologiczne sposoby rekompensowania niemetryczności  
w XIX-wiecznym wierszu czeskim**

**Słowa kluczowe:** metryka generatywna, iloczasa, XIX-wieczny wiersz czeski, prozodia komputerowa

**S t r e s z c z e n i e**

Na podstawie 70 tysięcy wersów napisanych przez dwunastu wybranych autorów, studium podejmuje analizę warunków kontekstowych, w których zdarzały się odstępstwa od metrycznej normy XIX-wiecznego czeskiego sylabotonicznego trocheja i jambu. Najpierw zostają podane podstawowe informacje dotyczące czeskiego iloczasa i akcentowania. Następnie uwaga przenosi się na historię XIX-wiecznego wiersza czeskiego, szczególnie koncentrując się na prozodyjnych bataliach pomiędzy zwolennikami sylabotonicznej i kwantytatywnej wersyfikacji. Celem artykułu jest sprawdzenie, czy odstępstwa od metrycznej normy mogą być rekompensowane dzięki iloczasowi lub wyrażeniu przyimkowemu. Studium dowodzi, że: 1) rozkład sylab długich w  $n$ -sylabowych jednostkach XIX-wiecznego wiersza czeskiego nie jest przypadkowy, 2) odstępstwa od normy metrycznej są rekompensowane w iloczasiu lub przyimku, 3) preferencja dla danego sposobu rekompensowania zależy od czynników dodatkowych, takich jak styl autora lub kontekst historyczny, czyli od ogólnego stopnia tolerancji dla częstotliwości odstępstw od metrycznej normy.