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Euphony in Serbian: A comparison to Slavonic and other world languages

Abstract. Serbian belongs to the southern subgroup of the Slavonic group of the Indo-European language family. Until several years ago it, was called Serbo-Croatian. Many linguists believe that there is little difference between Serbian and Croatian, although some linguists argue that they must have the status of separate languages. Others refuse to consider Serbian and Croatian as separate languages, pointing to their common structure on all levels. This investigation shows an important typological feature of Serbian, the degree of euphony in its speech sound chain, which helps to place it among the other Slavonic languages. Serbian may have some peculiarities in comparison to the world languages; however, despite the opinion that Serbian should be closer to Slovene, taking into account the degree of euphony in Serbian, we conclude that it is not closer to Slovene, but to Bulgarian.

Key words: euphony, melodicity, vocalo-sonorant quotient, maximum and minimum value of euphony, language group, language family, language taxa, genetic classification, typological classification, under-exploit vowels and sonorant consonants, over-exploit, the probable theoretical frequency, the actual mean frequency of euphony, ordered series, coefficient of variation, world languages, a language universal

Introduction[1]

By the sound picture of a language we mean the distribution of speech sounds in its speech sound chain. Every language has its own sound picture which displays a certain degree of euphony (Tambovtsev, 1994). By the sound picture of a language we mean the distribution of its speech sounds in the speech sound chain. It is very interesting to find the languages which

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are euphonic, i.e. melodical, and which are not. Euphony is a measure of the total of the vowels and sonorant consonants in the speech sound chain of a language. By the degree of euphony we mean the total of the frequency of occurrence of the vowels and sonorant consonants in the language speech sound chain (Tambovtsev, 1991). It is also possible to call this total the vocalo-sonorant quotient. Thus, the degree of euphony (melodicity) is the value of this quotient.

Vowels and sonorant consonants constitute the vocalo-sonorant structure of the sound picture of any language. Therefore, we take into consideration the basic features of sound classes and groups. The basic features consist of the frequency of occurrence of vowels (i.e. class) and sonorant consonants (group) in the speech chain. These basic features may be found in any world language. Thus, it can be said that melodicity (euphony) is one more language universal. By analysing the value of euphony, one can construct the typology of distribution of language taxa according to this universal characteristic. The typology of distribution of some elements of the speech chain which we studied may to some extent indicate the time of separation of the languages.

We begin our analysis with Serbian and the Slavonic language family. Nevertheless, we also compare the degree of euphony in Serbian to that of other language families and languages in order to determine the universal trends in world language euphony. Thus, for instance, it is compared with the Sino-Tibetan language family.

We computed texts in Sino-Tibetan, Turkic and many other languages to obtain the frequency of occurrence of their speech sounds to compare to our Serbian and Slavonic data. The vocalo-sonorant quotient turned out to be greater in the following language taxa: the Sino-Tibetan family (Burmese - 75.67%), Bantu (Swahili - 76.29%), Afro-Asian (Neo-Aramaic- 81.47%), Austronesian (Hawaiian- 83.29%), the languages of Australian aboriginals (Nunggubuyu- 85.14%). This means that 85.14% of the Nunggubuyu speech

sound chain consists of vowels and sonorant consonants.

On the other hand, some of the world languages have a minimum concentration of vowels. So, in the Itelmen language (Paleo-Asiatic family) vowels comprise only 32.61%. Let us consider the minimum of the vocalo-sonorant quotient. In the Adygian language (Caucasian family) this quotient reaches only 54.07%. It should be mentioned that on the average the Caucasian language family has a rather low vocalo-sonorant quotient — 61.66%.

The ordered series of the average of the vocalo-sonorant quotient in different language taxa is the following: the Baltic group of the Indo-European family — 62.76%; the Iranian group of the Indo-European family — 63.95%); the Slavonic group — 64.64%; Germanic — 64.78%; the Samoyedic family — 65.16%; Finno-Ugric — 65.57%; Mongolic — 66.06%; the Balkan language unity — 66.18%; the Indic group of Indo-European — 66.77%; the Turkic family — 66.99%; Paleo-Asiatic — 67.58%; Sino-Tebetan — 67.63%; the Roman group of Indo-European — 68.57%; Afro-Asiatic — 68.96%; the Manchu-Tungusic family — 69.54%; Austronesian — 73.16%; Bantu — 73.40%; the languages of Australian aboriginals — 80.51%.

The euphony of a language is close to the notion of euphony in poetry (Tambovtsev, 1979). Usually, the euphony of a language is the euphony of a speech sound chain of this language which means the degree of beauty it bears. However, until now nobody tried to measure the degree of melodicity (i.e. euphony) of a language in the exact numbers by one and the same method. We proposed to measure the degree of euphony of a language on the basis of the most melodical elements of the sound speech chain that is vowels and sonorant consonants long ago (Tambovtsev, 1977). Usually, people have no difficulty to distinguish sonorant consonants from the other types of consonants or vowels (Tambovtsev, 1976). Usually, when a euphonic language comes to mind, Italian is named. Our measurements showed that Italian is not a world champion in the degree of euphony since its value is

69.53%. However, it is not even the champion in its own group of Romance languages. In fact, its degree of euphony is less than that of Romanian — 69.91% in the group of the Romance group of Indo-European family, not to speak of many others in other language taxa. However, in Serbian the degree of euphony is much greater — 70.19%. Euphony, i.e. the total proportion of vowels and sonorant consonants, may be considered a language universal.

The goal of this paper is to compare the value of euphony of Serbian to 12 Slavonic languages and some other world languages. It is important to find the maximum and minimum of euphony not only in Slavonic, but also in the world languages taken for this study to see what place the Serbian language takes among them.

Euphony in Serbian and other languages and groups

Serbian belongs to the southern subgroup of the Slavonic group of the Indo-European language family. Until several years ago it was usually called Serbo-Croatian (JDM, 1982: 20). Many linguists believe that there is little difference between Serbian and Croatian though some linguists argue that they must have the status of separate languages (Crystal, 1992: 350). O.S. Shirokov refuses to talk about Serbian and Croatian as separate languages pointing to their common structure on all levels (Shirokov, 1985: 121). More often than not, it is hard to separate a dialect and a language. We tried to put forward some characteristics of the speech sound chain in a language to do it (Tambovtsev, 1983). In this way, we learned which dialects are close to the Karelian language of the Finno-Ugric family and which are not (Tambovtsev, 1984).

The Serbian language may have some peculiarities in comparison to the world languages. However, in Popova's opinion, Serbian is closer to Slovene (Popova, 1986: 7). One can see if that is so, based on the degree of euphony in Serbian, by comparing them (see Table 1). In fact, it is closer not to Slovene, but to Bulgarian.

World language subgroups, groups, unities, or phyla are united in various language taxa.

Therefore, one can estimate the degree of euphony of this or that language but also the language taxa, by their mean values. We begin our analysis with the Slavonic group of the Indo-European language family (Pan'ko-Tambovtsev, 1991). Next we deal with Sino-Tibetan, Turkic, and other language families, to define the peculiarities of Serbian and the other Slavonic languages (Tambovtsev, 2001-a).

We begin our analysis with the Sino-Tibetan language family. We take Sino-Tibetan languages for comparison with the Slavonic languages because they are rather different from the Slavonic languages in their phonetic features. This difference may reflect the common universal phonetic characteristics more vividly (Tambovtsev, 2001- b). In the Sino-Tibetan language family we make a particular emphasis on Chinese (Mandarin). Chinese enters the Sinitic branch of the Sino-Tibetan language family (Crystal, 1992: 62). It is well-known that this family includes Chinese, Dungan, Burmese, Thai, Tibetan and some other minor languages (Tambovtsev, 2001-c). Nevertheless, it should be emphasized that many linguists do not recommend including the languages mentioned among the Sino-Tibetan languages in one language family (Benedict, 1975). S.E. Jahontov insists that the time of separation of these languages is more than 10 thousand years, which would account for whey they are so different, if they really did spring from the same root (Jahontov, 1979). David Crystal correctly points out that the classification of Sino-Tibetan family is still controversial (Crystal, 1992: 355). Our data can show whether the degree of the euphony of the speech sound chains of its members are similar.

We computed texts in these four Sino-Tibetan languages to obtain a solid basis to compare their sound pictures. We can compare the coefficient of variance of the Slavonic and Sino-Tibetan taxa in order to see if Slavonic languages are more similar to each other than Sino-Tibetan languages. Fortunately enough, no linguist doubts that Slavonic languages are typologically similar.

Vowels and sonorant consonants constitute the vocalo-sonorant structure of the sound picture of any language. We take into consideration the basic features of sound classes and groups. The basic features consist of the frequency of occurrence of vowels and sonorant consonants in the speech chain. These basic features may be found in any world language. This is why, euphony is one more language universal. It is possible to call it a language universal, since a language universal is a property claimed to be characteristic of all languages (Crystal, 1992: 405). By analysing the value of euphony, one can construct the typology of distribution of language taxa according to this universal characteristic.

We can calculate the theoretical expected frequency of euphony in a language. If we follow the way the great Hungarian-born American mathematician, G. Polya, proposed to find the theoretical expected frequency of a linguistic element, we must determine the number of groups. When G. Polya wanted to know the theoretical expected frequency of a letter, he divided 100% by 26, because there were 26 letters in the inventory (Polya, 1954: 316-317).[2] Since euphony consists of the frequency of vowels, we must reserve 50% for vowels. The rest 50% out of 100%, we reserve for consonants. We have 3 groups of consonants defined from the point of view of the manner of articulation: sonorant, occlusive and fricative. Therefore, we must divide 50% by 3. In this way we obtain 16.67%. Thus, we reserve 16.67% for the sonorant consonants as the probable theoretical frequency in a language speech sound chain. Consequently, the euphony is equal to 50% + 16.67% = 66.67%. We can reason in the following way: if the value of the melodicity of some language is greater than 66.67%, then the language in question over-uses the vowels and sonorant consonants in its speech sound chain. It means that this language puts too great a load on vowels and sonorants. So, vowels and sonorants overrun the limits of the theoretical

[2] As far as his method, he could have taken 26 or any other number. The other weak point is that he took letters but not sounds. We can also mention the lower degree of correspondence between phonemes and letters in English and many Slavic languages, and to an extent Chinese, depending on how it is romanized. The main thing is that one must find the mean theoretical frequency of occurrence.

frequency, i.e. probability of occurrence. We can claim that they are over-exploited. Therefore, as far as Serbian is concerned, it over-exploits the use of vowels and sonorants in its speech sound chain (c.f. 70.19% and 66.67%). From Tab.1 we can see in general the Slavonic languages under-exploit the use of vowels and sonorants since their mean euphony is only 64.64%.

It is possible to determine the mean degree of euphony in the Sino-Tibetan taxon. It is equal to 67.63%. In fact, it is rather close to the theoretical mean of 66.67%. Thus, it can be seen from Tab.2 that Chinese (67.95%), Dungan (68,20%), Thai (69.85%) and Burmese (75.67%) especially overexploit vowels and sonorants in their speech sound chain. So, degree of euphony in Dungan is similar to that of Chinese. Tibetan is quite different from the three languages mentioned above. It is the only Sino-Tibetan language which underexploits vowels and sonorants. In fact, its degree of euphony is very low — 56.50%.

We can also compare Serbian to the Turkic languages. In the ordered series of the Turkic languages. Kirgiz is in the middle with the frequency of occurrence of 66.68%. It means that Chuvash, Jakut and the other Turkic language overload their speech sound chains. It is possible to call these languages melodical or euphonic from the point of view of Turkic languages. However, to understand what the euphony is in general, one should take into account the mean degree of euphony in world languages. We found this euphonic mean in 226 world languages to be 67.03%. It is very close to the theoretical value 66.67%. To a human ear in general the languages with the euphony greater than 67.03% should sound melodic. Consequently, Kirgiz with its vocalo-sonorant quotient (66.68%) cannot be recognised as a euphonic language from the point of view of world languages.

Why should we bother to spend so much time and energy to obtain the mean value of euphony in world languages? It is as simple as that: the theoretical probability may be much greater or much lower than the real euphonic probability. It this case, the theoretical

probability is rather close to the actual probability of euphony. Is it just a lucky chance? If not, then there may be some unknown reasons for it. Nevertheless, it is the first time that somebody discovered it. Naturally, one can suppose that any human language tends to use enough of vowels and sonorant since it is easier to hear them in conditions bad for communication.

However, we agree with those linguists who object that theoretical probability of linguistic elements are too abstract to say anything about real world languages. Therefore, a linguist must spend much time and effort to count the actual phonemic frequencies of occurrence in different languages to draw some solid conclusions about languages. We had to calculate the empirical mean of the euphony (melodicity) of 226 world languages which turned to be equal to 67.03% of the speech sound chain. We repeat this value because it is very important. It shows how a human language works. It is advisable to use the value of this characteristic to find out the melodic or euphonic languages in the mass of world languages.

The mean degree of euphony of the 26 Turkic languages is a bit less than 67.03%. It is 66.99%. It means that on the average Turkic languages are not very melodical. However, the mean melodicity of Mongolian language family (66.06%) is even less than 67.03%. Thus, Mongolian languages under-use vowels and sonorant consonants in their speech sound chain. Now let us consider what language taxa do not use enough euphonic elements in their speech sound chain. In fact, Caucasian (61,66%), Finno-Ugric (65.57%), Samoyedic (65.16%) American Indian languages (65.09%), Indic (66.77%) are examples of language taxa which also under-exploit vowels and sonorant consonants. One can see in detail which language taxa under-exploit in the ordered series of the means of euphony. We discuss it in detail later.

On the other hand, one can find individual languages in whose speech sound chain the vowels and sonorant consonants do not occur as often as 67.03%. One can analyse the ordered series of the Turkic languages taken for the study. Such languages as Tofalar, Kazah

and the other Turkic languages whose vocalo-sonorant quotient is less than the threshold, under-exploit (under-use) vowels and sonorants. Thus, their vowels and sonorants do not occupy the speech sound chain in great numbers. Taking into consideration the mean of euphony in the languages undergone our investigation, it is possible to state which languages are euphonic languages and those which cannot be called euphonic languages by our classification.

The other important question is how close the euphonic values are crowded around the mean in this or that language taxa. That is, how high is the quotient of its compactness. It can be measured by the coefficient of variance or the coefficient of variation (Herdan, 1966: 93-94). The lower this coefficient, the tighter the values around its mean. If the coefficient of variation is great, the values of euphony are distributed sparsely. Christopher Butler is correct to warn linguists that it is not possible to compare two or more means of different samples without testing for homogeneity of variance (Butler, 1985: 127). If the coefficient of variation is too great, then we can say that there is no homogeneity of data. In this case, the samples cannot be compared. Or should be compared with great caution. Studying many languages we can come to a conclusion that if the coefficient of variation is greater than 33%, there is no homogeneity (Tambovtsev, 2003: 12 — 16).

Let us consider the value of the coefficient of variation in different language taxa. First of all, the attention should be paid to the dispersion of Slavonic languages So, the dispersion of Slavonic languages, expressed by the coefficient of variance (4.24%), is not great if compared to that of the Sino-Tibetan family (10.29%). It is possible to construct the following ordered series of the language taxa under investigation: Romance (1.53%); Mongolic (1.83%); Samoyedic (1.98%); Bantu (2.28%); Iranian (2.25%); Indic (2.29%) Manchu-Tungusic (2.66%); Baltic (3.06%); Turkic (3.36%); Germanic (3.81%); Australian Aboriginal (3.90%); Slavonic (4.24%); Finno-Ugric (5.02%); Caucasian (7.01%); Paleo-

Asiatic (7.28%); Austronesian (8.02%); American Indian (8.13%); Afro-Asian (9.61%); Sino-Tibetan (10.29%). One can see that all the language taxa have the values of the coefficient of variation which are much less than 33%. Nevertheless, one should bear in mind that Sino-Tibetan language family is not very compact from the point of view of the degree of euphony, while the Slavonic taxon is compact enough.

Conclusions

The concentration of vowels in Serbian is 45.13%. This is greater than the mean use of vowels in the 12 Slavonic languages (42.82%). The maximum is found in Bulgarian — 48.72%. This is much lower than in some world languages.

Austronesian languages have a great concentration of vowels in the speech sound chain (e.g. maximum - 65.24% in Hawaiian and 69.75% in Samoan).

American Indian languages have the maximum concentration of vowels in Iquito — 58.84% which is not so great.

The degree of euphony in Serbian is 70.19%.

Let us consider the maximum and minimum value of euphony in all the language taxa under investigation. The maximum of euphony is in the Australian Aboriginal language of Nunggubuyu (85.14%), the minimum in the Caucasian language of Adygian (54.07%).

Let us consider the maximum value of euphony in different language taxa. Among American Indian languages the maximum of euphony is found in Odjibwe — 64.32%. It is possible to put the maximum values of the quotient of euphony, that is, vocalo-sonorant quotient in an ordered series: Latvian (Baltic of Indo-European) — 64.11%; Kurdish (Iranian of Indo-European) — 65.79%; Georgean (Caucasian) — 66.25%; Nenets (Samoyedic) — 66.38%; Buriat (Mongolic) — 66.84%; Norwegian (Germanic of Indo-European) — 67.80%; Marathi (Indic of Indo-European) — 68.59%; Romanian (Romance of Indo-European) — 69.91%; Serbian (Slavonic of Indo-European) — 70.19%; Salarian of the Turkic family —

71.75%; Evenk (Manchu-Tungusic) — 71.98%; Choockchee (Paleo-Asiatic) — 72.84%; Finnish (Finno-Ugric) — 72.85%; Burmese ((Sino-Tibetan) — 75.67%; Swahili (Bantu) — 76.29%; Neo-Aramaic Afro-Asiatic) — 81.47%; Hawaiian (Austronesian) — 83.29%; Nunggubuyu (Autralian Aboriginal) — 85.14%.

Thus, one can see that the vocalo-sonorant quotient turned out to be bigger in five language taxa. Perhaps there is something special in the phonetic systems of the following languages of different language taxa: Burmese - 75.67%, Swahili- 76.29%, Neo-Aramaic- 81.47%, Hawaiian- 83.29%, Nunggubuyu- 85.14%.

On the other hand, some of the world languages have a minimum concentration of vowels. So, in the Itelmen language (Paleo-Asiatic family) vowels comprise only 32.61%.

Let us consider the minimum of the vocalo-sonorant quotient in different language taxa. In the Adygian language (Caucasian family) this quotient reaches only 54.07%. Therefore, the ordered series of the vocalo-sonorant quotient of the languages in different language taxa is the following: Kadeweu (American Indian) — 55.23%; Tibetan (Sino-Tibetan) — 56.50%; Itel'men (Paleo-Asiatic) — 59.52%; Sokotrian (Afro-Asiatic) — 60.32%; Belorussian (Slavonic of Indo-European) — 60.66%; English (Germanic of Indo-European) — 61.08%; Vepsian (Finno-Ugric) — 61.34%; Lithuanian (Baltic of Indo-European) — 61.40%; Tadjic (Iranian of Indo-European) — 61.60%; Chalkan (Turkic) — 62.83%; Sel'kup (Samoyedic) — 63.34%; Kalmyk (Mongolic) — 64.66%; Gujarati (Indic of Indo-European) — 65.14; Indonesian (Austronesian) — 66.01%; Oroch (Manch-Tungusic) — 66.09%; Romanian (Romance of Indo-European) — 67.37; Moore (Bantu) — 70.90%; Ngandi (Australian Aboriginal) — 76.84%.

In the American Indian languages it is rather low — 55.23% in Kadeweu, which is second to the world euphonic minimum.

Let us consider the average value of euphony of the Slavonic languages in comparison to different language taxa. It should be mentioned that on the average the Caucasian language family has a rather low vocalo-sonorant quotient — 61.66%. The ordered series of the average of the vocalo-sonorant quotient in different language taxa is the following: Baltic group of Indo-European family — 62.76%; Iranian group of the Indo-European family — 63.95%); Slavonic group — 64.64%; Germanic — 64.78%; American Indian languages — 65.09%; Samoyedic family — 65.16%; Finno-Ugric family — 65.57%; Mongolic family — 66.06%; Balkan language unity — 66.18%; Indic group of the Indo-European family — 66.77%; Turkic family — 66.99%; Paleo-Asiatic family — 67.58%; Sino-Tibetan family — 67.63%; Roman group of I-E family — 68.57%; Afro-Asiatic family — 68.96%; Manchu-Tungusic family — 69.54%; Austronesian family — 73.16%; Bantu — 73.40%; Languages of Australian aboriginals — 80.51%.

Euphony, i.e. the total proportion of vowels and sonorant consonants, which may be considered a language universal, can place Serbian, or any other language, at a particular place in the typological scale of euphony.

Table 1
Euphony of the languages of Slavonic group of the Indo-European language family

№	Language	Vowel %	Sonorant %	Euphony %
1.	Belorussian	39.96	20.70	60.66
2.	Polish	40.86	21.10	61.96
3.	Czech	41.20	21.39	62.59
4.	Mecedonian	44.29	18.68	62.97
5.	Ukrainian	42.20	21.42	63.62
6.	Slovak	43.58	20.25	63.83
7.	Old Russian	44.57	19.44	64.01
8.	Russian	42.18	23.07	65.25
9.	Slovene	41.25	24.04	65.29
10.	Sorbian	39.90	27.12	67.02
11.	Bulgarian	48.72	19.54	68.26
12.	Serbian	45.13	25.06	70.19
	Mean	42.82	21.82	64.64
	Standard (S)	2.56	2.53	2.74
	Coefficient of variation (V%)	5.98	11.59	4.24

Table 2
Euphony of the languages of the Sino-Tibetan language family

№	Language	Vowel %	Sonorant %	Euphony %
1.	Tibetan	34.17	22.33	56.50
2.	Chinese	44.41	23.54	67.95
3.	Dungan	43.63	24.57	68.20
4.	Thai	39.71	30.14	69.85
5.	Burmese	44.66	31.01	75.67
	Mean	41.32	26.32	67.63
	Standard (S)	4.46	3.98	6.96
	Coefficient of variation (V%)	10.79	15.12	10.29

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