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# THE MEASUREMENT OF EUPHONY

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The euphony is a complex phenomenon which may be objectively measured in various ways according to the form in which it appears. It may manifest itself (1) as the total phonic composition of the text or of its parts; (2) as an emphasis of some phonemes in some formation mainly in the line, regardless of their position; (3) as a repetition of the same phonemes in some positions, and (4) in the form of various phonic patterns which may also show a tendency for some regularity. We ascribe a euphonic effect to the phoneme (combination of phonemes, sequence of phonemes) that is emphasized by its non-random occurrence. The difference between some currently used level  $\alpha$  (say, 0,05) and the (smaller) probability of the observed number of the emphasized phoneme in the line is considered the euphonic value of the phoneme. We take, naturally, into account those phonemes only that occur in the line at least twice. To make up an index which would measure the euphonic value of each phoneme in the line (occurring at least twice) we proceed as follows: We divide the phonemes of the line always into the class of the phoneme investigated (A) and into the class of all other phonemes ( $\bar{A}$ ) whereby we cancel all contrasts in the  $\bar{A}$  class, so that only the contrast A: $\bar{A}$  remains. Thereby the distributional relations will be decomposed to such an extent that one cannot operate with them any more. After this adjustment we may automatically exclude the dependences among phonemes, since the transitional probabilities are, in fact, the relative frequencies of distributional (and functional) relations. Now we may compute the probability of the occurrence of the given phoneme in the line by means of the binomial distribution. The result is subtracted from  $\alpha$ . Thus, firstly, the index will contain only the euphonic values and, secondly, it will be the greater the smaller will be the computed probabilities. In order to get greater numbers, we multiply the difference by 100. The result is the binomial index of euphony (BIE)

$$\text{BIE} = 100 \left[ \alpha - \binom{n}{k} p^k q^{n-k} \right] \quad \text{for } P > \alpha$$

where  $n$  is the number of phonemes in the line,  $k$  is the number of the investigated phoneme and  $p$  is its probability computed from the population. By adding the particular BIEs and dividing by the number of lines we get the average BIE of the poems. The formula is

$$\overline{\text{BIE}} = \frac{100}{N} \sum_{j=1}^N \sum_{i \in A} \left[ \alpha - \binom{n}{k} p_{i,j}^k q_{i,j}^{n-k} \right] \quad \text{for } P < \alpha$$

where  $N$  is the number of lines of the poem,  $j$  is the index of the given line ranging from 1 to  $N$  and  $i$  is the index of the given phoneme from the set  $A$  whose members fulfill the given condition.

One may compute the euphonic value of the line as a whole in a similar way. The probability of the occurrence of a line of a particular phonic composition may be computed by means of the polynomial distribution. In order to get a suitable index we subtract the computed probability from some conveniently chosen value and multiply it by a number  $C$ . Thus, the polynomial index of euphony (PIE) may be computed according to the formula

$$\text{PIE} = c \left[ \alpha - \frac{n!}{k_1! k_2! \dots k_r!} p_1^{k_1} p_2^{k_2} \dots p_r^{k_r} \right] \quad \text{for } P < \alpha$$

where  $n$  is the number of phonemes in the line,  $k_i$  are the observed numbers of particular phonemes, and  $p_i$  are their probabilities of occurrence computed from the population. The average PIE ( $\overline{\text{PIE}}$ ) is the sum of all PIEs divided by the number of lines of the poem.

In using these indices, it must not be forgotten that they cover only a special type of euphony. Their zero value does not mean that the poem entirely lacks euphony. The total evaluation of the euphony can be represented by the sum (or the average) of all possible relevant indices which are to be elaborated in the future. The elaboration of indices will enable us to ascertain the relation of the euphony to other measurable qualities of the poem.

## MERANIE EUFÓNIE

Eufónia sa dá objektívne merať podľa toho, v akej forme sa objavuje. Eufóniu, ktorá vzniká zo zdôraznenia určitých foném vo verši, možno vyhodnotiť pomocou binomického indexu eufónie (BIE); eufóniu, ktorá vzniká z určitej špeciálnej fonickej skladby verša, možno vyhodnotiť pomocou polynomickeho indexu eufónie podľa uvedených vzorcov. Tu  $n$  je počet foném vo verši,  $k$  je počet skúmanej fonémy,  $p$  je príslušná pravdepodobnosť,  $q$  je  $p - 1$ ,  $N$  je počet veršov básne.

## ИЗМЕРЕНИЕ ЭВФОНИИ

Эвфонию можно объективно измерять в зависимости от того, в какой форме она появляется. Эвфонию, которая возникает путем подчеркивания в стихе определенных фонем, можно измерять при помощи биномического индекса эвфоний (BIE); эвфонию, возникшую из определенной специальной фонической структуры стиха, можно определить при помощи полиномического индекса эвфоний по приведенным формулам. Там  $n$  является количеством фонем в стихе,  $k$  — количество исследуемой фонемы,  $p$  — соответствующая вероятность,  $q$  это  $p - 1$ ,  $N$  количество стихов в стихотворении.

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