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THE STUDY OF SOUND SYMBOLISM BASED ON PHONOSEMANTIC ASSOCIATION EXPERIMENT WITH THE VOWELS OF THE UKRAINIAN LANGUAGE

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The research deals with the relationship between sound symbolism and the theory of natural origin of the language.There is a certainassociation between particular sound sequences and different meanings in speech.

But such a definition of sound-meaningdoes not explain fully the properties of wordsnot only to represent some meaning but also deal with perception caused by different sounds. It is important to demonstrate this mechanism in theory and practiceto examine correspondence between sounds and the meanings the sounds are associated with. Scholars have studied onomatopoeiaand inner meaning of words in different languages since ancient time. Most of their lexical-semantic explorations are devoted to the correlation between sounding and meaning of short onomatopoeic words on the basis of the statistical review. Chronology of the sound semantic explorations in linguistics, philosophy and psychologyis analyzed in the article with a detailed description of experimental studies.

The scientific methods used to study associations arising between the proposed colors and Ukrainian sound-letters are as follows: psycholinguistic, mathematical, descriptive, inductive and method of semantic differential.

The analysis of the data received finds out the presence of a sound symbolic component in all the vowels of the Ukrainian language and the correspondence of a certain color to each examined sound-letter. The term 'sound-letter' is first used in psycholinguistics and is determined as a unit of speech, realized in a text which forms the speaker's certain mental image.

The conclusions made on the basis of this research confirm the interconnection betweensounding, speech perception, general perception, and the speaker's individual comprehension. Further study is needed to justify sound symbolism of vowels in different positions of short words, through series of practical experiments with a larger number of speakers.

Key words: *phoneme, sound-letter, speech perception, onomatopoeia, synesthesia, psycholinguistics*

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ДОСЛІДЖЕННЯ ЗВУКОВОГО СИМВОЛІЗМУ НА ОСНОВІ ФОНОСЕМАНТИЧНОГО АСОЦІАТИВНОГО ЕКСПЕРИМЕНТУ З ГОЛОСНИМИ УКРАЇНСЬКОЇ МОВИ

Власова Т. В.

У статті представлено дослідження взаємозв'язку між звукосимволізмом і теорією природного походження мови. Існують певні асоціації між окремим звуковим рядом та різними значеннями в мовленні. Таке визначення звукосимволізму не пояснює повністю властивості слів не лише виражати певне значення, але й ураховувати відчуття, які вони виражають завдяки звукам. Важливо показати цей механізм у теорії та практиці для дослідження відповідності між звуками та асоціативними відчуттями.

Від античності й досі в центрі уваги вчених ономатопея та внутрішнє значення слів різних мов. Більшість їхніх лексико-семантичних досліджень присвячено кореляції між звучанням та значенням коротких ономатопічних слів на основі статистичного огляду. У статті подано хронологію звукосемантичних досліджень із докладним описом експериментів у лінгвістиці, філософії та психології.

Для вивчення асоціацій, що виникають між запропонованими кольорами та українськими звукобуквами, було використано такі наукові методи: психолінгвістичний, описовий, індуктивний та метод семантичного диференціалу.

Отримано аналіз даних про звукосимволічний компонент усіх голосних української мови та відповідність певного кольору кожній звкобукві. У психолінгвістиці вперше визначено термін "звукобуква" як одиницю мовлення, реалізовану в тексті, яка формує певний психічний образ у мовця.

Висновки досліджень підтверджують взаємозв'язок між звучанням, сприйняттям мовлення, загальним сприйняттям та індивідуальним розумінням мовців. Подальші дослідження потребують підтвердження явища звукосимволізму за допомогою практичних експериментів із більшою кількістю інформантів для вивчення голосних звуків у різних позиціях коротких слів.

***Ключові слова**: фонема, звукобуква, мовленнєве сприйняття, ономатопея, синестезія, психолінгвістика.*

Introduction. Sound symbolism is a natural, phonetically motivated relationship between the phonemes of the word and the non-sound or non-acoustic distinctive feature of denotatum based on the process of nomination. It is also known as sound-meaningfulness and phonetic symbolism [2]. This mechanism is based on psycho-physiological criteria common to all languages, which indicates the existence of universal properties of associative connection.

The fundamental principles underlying the mechanism of sound symbolism have always been controversial, because they often appear to be wrong. "The Sound Symbolic Hypothesis is that the meaning of a word is partially affected by its articulation. If the sound of a word affects its meaning, then you should be able to tell what a word means just by hearing it. There should be only one language. In spite of this, there has always been a fairly substantial group of linguists who do not dismiss the possibility that the form of a word somehow affects its meaning" [8: 34].

The above mentioned definition of the sound symbolism doesn't explain the nature of all the words to describe their meaning and to understand the interpretation of sounds. Further research of sound and semantic forms of the sound is possible afterthe analysis of theories of the language origin.

Analysis of study and publications.

The ancient Greek philosopher Heraclitus, the founder of the natural theory of the language origin, believed that the first words were sound imitative or arose as unconsciously silenced sounds that expressed different states of the soul, the human mood [3]. Then these screams became names of realities, which expressed feelings, physical and moral states.

In the 3rd century A.D. the Stoics began to explore the relationship between the sound form and the meaning of the sound imitative words, creating the theory of Fusey, according to which the language arose as a phenomenon of nature, and was not created by people. So the connection of the material form of the word with the contents was explained as inheritance of sounds.

In the dialog "Cratylus" Plato describes the principle of imitation, which is the basis of the primary name, refuted the divine origin of the root words. The author considers that the origin of only some words is a consequence of the sound imitative theory, because the names which were initially imitational over time lose the visible connection between the sound of the name and the subject. Natural kinaesthetic imitation is carried out due to non-verbal means (voice, language, lips, teeth, nasopharynx) [8].

The problems of phonosemantics were considered by philosophers of the age of Enlightenment and The New time, mainly by the representatives of German philosophy. In particular, symbiosis of the word meaning and sound were considered; the study of "sound interpretation" was analyzed on examples of fiction; hypothesis of existence of the connection between the meaning and the form of the word in a certain language is adopted [5: 36].

Wilhelm von Humboldt, the researcher of the theory of motivation between sound and its meaning determined three types of concepts: picturesque (voluntary imitation, when the sound of the subject imitates the word as much as the sounds are capable of transmitting indeterminate concepts), symbolic (imitation not of the sound or subject directly, but certain internal features), similar (similarity of sounds and concepts, as a result of two above-mentioned concepts) [6: 52].

Baudouin de Courtenay became the founder of phonosemantics. The linguist distinguished the anthropophonics, related to a physical, materially expressed sound substance, and the psychophonetics, which means the sound forms of a language as a mental, and therefore functional phenomenon. He determined the basic unit of psychophonetics as a phoneme [3].

In the 21st century, the study of the relationship "sound – meaning" is divided in two directions: lexico-semantic and psycholinguistic. Edward Sapir started a series of sound symbolism experiments to study additional meanings of vowels and consonant sound-letters. The researchers interviewed about 500 informants – adults and children, used the wording "What is more or less?" with the pairs of one-syllable words [7].

S. Newman explored the symbolic characteristics of consonants. M. Shasten studied the symbolic significance of voiced and voiceless consonants related to words for the designation of gravity, softness, longitude. J. Weiss found out the sound correspondence of the concepts of size, shape and color with the differentiation of the deep and front vowels [3]. These experiments with artificially created words, in general, confirmed an intuitive hypothesis about the existence of a psychological correlation between the sounds of the language and certain concepts.

The same results of studies based on different languages were confirmed by other researchers: J. Olport (Hungarian); R. Brown (Chinese), A. Black (Czech), Tsur-Frise (Japanese);

A. Horowitz (Hindi) [7]. As a result, they all made conclusions about the universality of phonosemantic tendency.

In the early 1950s, Charles Osgood, analyzing the public speeches of politicians, concluded that among two candidates with identical programs the one who uses a more melodic language becomes more successful. The researcher formed 24 scales to evaluate the sensations caused by different sounds: strong – weak – dark – large – small, etc. The researcher took into account even the order of syllables in words. He concluded that one of the defining features of phonosemantics, determining its role, is suggestive influence. The method of Semantic Differential by Charles Osgood was used by A. P. Zhuravlev [1: 16]. He describes the experiment, where he got quantitative characteristics of "sound-lettermeaning" matches and the order of criteria, which most vividly express the denotative properties of the object. Of course, the probability of subjective interpretation of the final connotative unit remains.

Ukrainian philologists began to study phonosemantics only in the 17th century.

V. Levitsky explored the semantics of sound in synchronous and historical aspects. He supposed that sound symbolism in linguistics means the presence of an involuntary connection between a sound and the meaning of a sound. At the same time, the scholar noted some differences between subjective symbolism (it turned out to be experimental by linking certain sounds and meanings in the human psyche) and objective symbolism (the connection of certain sounds and meanings in words of each language). The linguist applied experiments to show that the meaning of names is based on the transposition of some kinds of feelings into others: visual in the motor skills, motor skills in acoustic [2].

The main **purpose** of the article is to compile information about studies of sound symbolism in different languages theoretically and to compare them with our own experimental results.

The present study is the first to examine the acoustic drivers of two distinct types of sound symbolism – specifically color symbolism and compliance of main colors to the most common vowels – within the same experimental setup on the basis of Ukrainian sound-letters.

Phonosemantic associative experiment.

To explore sound symbolism in the Ukrainian language we engaged research participants in an associative experiment. There were 400 informants aged from 16 to 23, native speakers, 1-5 year students of Zhytomyr Ivan Franko State University and Kyiv National Aviation University.

Object of research: 10 Ukrainian vowels.

Subject of research: printed colored paper graphic palette with 10 colors of the common range; timer.

Methods: psycholinguistic, mathematical, descriptive, inductive and method of semantic differential.

Parts of experiment.

The first part: preparation.

a) Preparation of materials:

– preparation of the list of Ukrainian vowels: А, Е, Є, И, І, Ї, О, У, Ю, Я.

We will not change writing of Ukrainian vowels in this article as the main aim is the research of associations to the native sounding. Please, find below detailed description of their correct pronunciation in English:

А – like the [a:] in the American pronunciation of the word “car”.
Е – like the short [e] in the American pronunciation of “let”.
Є – like the [je] in a word “yellow”.
И – like the short [ɪ] in “kill” or “live”.
І – like the long [i:] in “keep”.
Ї – like [ji:] in “yield”.
О – like the short [ɔ] in “lot”.

У – like the [u:] in “cool”.
Ю – like [ju:] in “you”.
Я – like the [ja:] in “yard”.
– preparation of printed colored paper graphic palette with 10 colors of the common range: red, blue, purple, black, green, light-blue brown, orange, yellow, white.

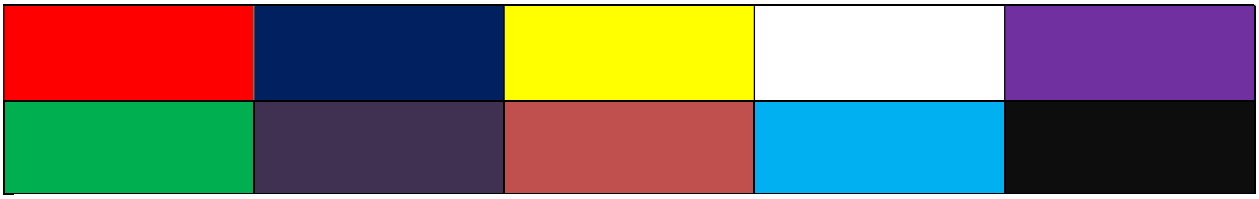

Fig.1

b) Preparation of the experimenter:
– text of instruction:
”1. Sound-letter is a unit of speech, realized in text which forms the speaker’s certain mental model. Please, write down each heard sound-letter on the palette near the color you associate this sound-letter with”.

c) Preparation of the informants:
– the experimenter gives palettes with colors to all the informants. Then he asks informants if they know all the colors depicted on the palettes. In the case if any informant does not distinguish the depicted colors, or does not differentiate them from the others in the spectrum, they can’t take part in the experiment. Such informants were not found during our experiment.

The experimenter explains to the informants what a sound-letter means, then reads the text of the instruction.

The second part: realization of experiment.

a) Explanation of the task. After the experimenter pronounces each of the 10 sound-letters within 10 seconds, the informants should write it under one, several or none color, depending on the color they associate with this vowel.

b) Experiment. After the experimenter is convinced of the readiness of the informants to perform, he clearly pronounces the first sound-letter. The informants write down each vowel under one or more color circles, depending on the color they associate with. After 10 seconds, the experimenter pronounces the next letter and so on until they all are pronounced.

In order to obtain the reliable data, the informants do not communicate with each other. The experimenter pronounces all the sound-letter, trying to avoid their emotive meaning by individual articulation or intonation. Then he takes all records from the informants for further systematization and analysis of the results.

The third part: systematization and calculation of data received.

The experimenter calculates the number of sound-letter according to the chosen color and put down this number into the table in terms of numbers and percentages.

Table 1

	А	**Е**	**І**	**И**	**О**	**У**	**Є**	**Ї**	**Ю**	**Я**
	334			24	2	1	16	14	2	152
%	*83,5*			*6*	*0,5*	*0,25*	*4*	*3,5*	*0,5*	*38*
	30	8	8	3	4		54	22	18	192
%	*7,5*	*2*	*2*	*0,75*	*1*		*13,5*	*5,5*	*4,5*	*48*
	11	37	11	29	126		8	29	28	12
%	*2,75*	*9,2*	*2,75*	*7,25*	*31,5*		*2*	*7,25*	*7*	*3*
	5	4	2	14	169	4	26	22	1	
%	*1,25*	*1*	*0,5*	*3,5*	*42,25*	*1*	*6,5*	*5,5*	*0,25*	

	3	4	13	76	7	28	46	9	71	
%	*0,75*	*1*	*3,25*	*19*	*1,75*	*7*	*11,5*	*2,25*	*17,75*	
	8	7	6	130	2			27	28	
%	*2*	*1,8*	*1,5*	*32,5*	*0,5*			*6,75*	*7*	
	4	320	3	19		8	102	42	30	26
%	*1*	*80*	*0,75*	*4,75*		*2*	*25,5*	*10,5*	*7,5*	*6,5*
	3	8	21	36		68	108	88	152	14
%	*0,75*	*2*	*5,25*	*9*		*17*	*27*	*22*	*38*	*3,5*
			313	32	21	171	40	78	39	
%			*78,25*	*8*	*5,25*	*42,8*	*10*	*19,5*	*9,75*	
		4	21	17	56	111		55	29	4
%		*1*	*5,25*	*4,25*	*14*	*27,75*		*13,75*	*7,25*	*1*
–	2	8	2	20	13	9		14	2	
%	*0,5*	*2*	*0,5*	*5*	*3,25*	*2,2*		*3,5*	*0,5*	

The fourth part: analysis

After analyzing the information, we will describe qualitative characteristics of the results.

Most of the informants confirmed the same associations between colors and vowels. In the experiment there was no informant without color-sound sound-letter associations. Of course, not all speakers have sound compliance with all ten sound-letter of the Ukrainian alphabet. Anyway, during the experiment 96,75% of the informants demonstrated clear and unambiguous answers.

It is important that the majority of the informants, namely 95%, in general, consistently and fairly unanimously established a fully defined associative connection between sound and color, even at the subconscious level.

The experiment showed that a maximum of 5% of the informants were not determined with a choice or claim that the pronounced vowel did not suggest them any color associations.

Especially unambiguous opinions are about the thre evowels – A, I, E. Sound-letter A is associated with red (83,5%), E – is clearly green (80%), I – blue (78,25%). Sound-letter O is considered light byalmost everyone (87,75%), although the majority calls it white (42,25%), quite often speakers choose yellow (31,5%).

The names of the main colors are used in the Ukrainian language quite often, and sound-letters A, O and E are the most popular among all the vowels of the Ukrainians. And they are associated with the three main colors: red, yellow, green respectively. Other 7 sound-letters vowels are mostly associated with derivative colors. Such a connection can be traced less often, because opinions of the informants are variable. For example, У is associated with dark shades of blue: actually blue and violet (59,25%). Sound-letter Ю also "tones" in blue" (55 %).

Я – is similar to A, it's also red (38 %), but in most cases it's orange (53 %), so it's perceived brighter and lighter.

It should be noted that the linguists A. Zhuravlev, L. Vygotsky, L. Prokofyeva consider sound-letters A, O, E, I as basic for the speakers'organs of articulation and "basic" vowels in all languages. Some physicists (Isaac Newton, Thomas Young, etc.) consider blue, red, yellow to be the primary colors – the colors corresponding mentioned above vowels, in a similar way to our phonosemantic experiment. Their combinations create all other derived colors and shades. During the study of the optical combination of colors, the German mathematician Hermann Grassmann formulated the laws of the color formation: each color can be formed or created by combining three separate colors (red, green and

blue) by mixing or applying. This law is a main principle for RGB (red-green-blue) system and CMYK (cyan – blue, magenta – red, yellow and black) system. This property is used in the creation of color photography and TV live programme, social networks. It is important that in many languages there is a phenomenon of human "collective intuition": the color system of the world is sounds with associative color and language behavior.

Conclusions and research perspectives. During centuries the scientists studied the origin of language and its units to find out inner meaning of the sound. A number of researchers advocated the idea of sound symbolism and considered the semantic configuration of the vocal tract or the sound itself through acoustic analysis. In this article such analysis is called phonosemantic association experiment. We thus removed correlations between the sound effects of the Ukrainian vowels and color associations. In consequence ofthe data received it is possible now to establish a connection between the auditory, visual and associative perception of the speakers and semantics of sound-letters; to ascertain the presence of a sound-symbolic component, the correspondence of a certain color to each vowel of the Ukrainian language.

An important feature of the study is the demonstration (on the actual material) of the unanimity of thoughts, in particular the choice by most of the same or similar colors as associative reactions to each sound-letter by the speakers of the Ukrainian language. The perspectives for further research are to confirm the existence of a sound-symbolic component (in particular color and emotion) and the theory of the natural origin of languages exemplified invowels in strong position of short Ukrainian words. With the aim of pursuing the study of sound symbolism, synaesthetic aspects must also be closely examined, since language on the whole is a result of mental and emotional activity of human brain.

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