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Stanislav Voronin's Universal Classification of Onomatopoeic Words: a Critical Approach (Part 1)

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Introduction. The universal classification of onomatopoeic words was first introduced in 1969 by Stanislav V. Voronin. In the course of the following fifty years it has been tested on the material of typologically different languages both by the author himself and by other researchers. The aim of this article is to provide a full description of the classification (which has never been published in English before) and to examine its key points critically. The bulk of empirical data collected in the recent years calls for yet another update on the classification. There is a logical contradiction between such classes of onomatopoeic words as frequentatives and frequentatives-(quasi)-instants-continuants. They overlap typologically. This and other minor issues are solved in the present paper.

Methodology and sources. The method discussed and applied in the classification is the method of phonosemantic analysis introduced by S. V. Voronin. Empirical data from English and other relevant languages are used for supporting the proposed changes into the classification.

Results and discussion. The critical analysis of the Voronin's universal classification of the onomatopoeic words revealed the presence of overlapping classes and hyperclasses within it, as well as other minor inconsistencies. The empirical typological data allowed to introduce some minor corrections while retaining the main principles of the classification.

Conclusion. Introduced half a century ago, Stanislav Voronin's classification of onomatopoeic words still remains a useful tool of typological research. Critical additions and proposed changes do not lessen its impact on studies in linguistic iconicity.

The first part of this paper is devoted to the description of the classification and to the discussion of its advantages and limitations. In the second part of the article some possible solutions to the detected problems are suggested.

Keywords: onomatopoeia, universal classification of onomatopoeic words, iconicity, phonosemantics, language universals, S. V. Voronin.

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Универсальная классификация ономатопов С. В. Воронина: критическое осмысление (часть 1)

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Введение. С момента публикации «Универсальной классификации звукоподражательной лексики» Станиславом Васильевичем Ворониным в 1969 г. прошло 50 лет. За это время классификация была опробована на материале ряда (в том числе неродственных) языков, изменена и дополнена (как самим автором, так и рядом других исследователей-лингвистов). Целью настоящей статьи является полное описание принципов и параметров классификации (которая впервые полностью публикуется на английском языке), а также критическое осмысление ее отдельных положений. Общий объем лингвистических данных, собранных за последние годы, требует внесения некоторых изменений в классификацию. Так, нами было выявлено логическое противоречие между классом ономатопов-фреквентативов и гиперклассом фреквентативов(квази)-инстантов-континуантов. Подклассы внутри этих выделенных С. В. Воро-ниным категорий оказались пересекающимися. Эта, а также ряд других незначительных проблем подробно освещаются в настоящей статье.

Методология и источники. Метод, использованный при анализе классификации – это метод фоносемантического анализа, предложенный самим С. В. Ворониным. В статье также приводятся эмпирические данные английского и других языков, необходимые для иллюстрации выдвигаемых положений.

Результаты и обсуждение. Критическое осмысление принципов, заложенных в основу рассматриваемой классификации, обнаружило ряд существующих внутри нее логических противоречий и других незначительных недочетов. Выявленные сложности, однако, не противоречат теоретическим основам классификации, а новые типологические данные позволяют внести в нее некоторые необходимые коррективы.

Заключение. Универсальная классификация ономатопов (звукоподражательных слов), предложенная С. В. Ворониным уже более полувека назад, продолжает быть действующим инструментом фоносемантики и лингвистической типологии. Предложенные изменения, на наш взгляд, позволят сделать ее применение более эффективным.

В первой части статьи приводится сама классификация С. В. Воронина, обсуждаются ее достоинства и недостатки. Во второй части статьи (будет опубликована в одном из ближайших номеров) предлагаются возможные решения выявленных проблем.

Ключевые слова: звукоподражания, универсальная классификация ономатопов, иконичность, фоносемантика, языковые универсалии, С. В. Воронин.

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Introduction. In 1969 Stanislav V. Voronin published the ‘Universal classification of onomatopoeic words’ in his doctoral thesis *English onomatopes: types and structure* [1]. The

approach towards onomatopoeia used by the author was, undoubtedly, novel as he based his classification not on the semantic principle as it was widespread at that time (and still is) but on the principle of iconic relation of onomatopoeic words to their (psycho)acoustic denotata. Such approach allowed to classify all English words denoting sounds into five major groups (those denoting pulses, dissonances, non-pulses etc.) disregarding their specific semantic affiliation (sounds of nature, bird calls, human sounds, mechanical sounds etc.).

Almost immediately it became evident that such approach made the classification applicable not only to the material of the English language, but to other languages as well. The universality of the classification was tested on Indonesian [2, 3], Bashkir [4], Estonian [5], Georgian [6] and Turkish [7]. The division of onomatopoeic words proposed by Voronin holds true even for invented languages [8].

However, the classification has been updated several times after it was first published in 1969. The majority of innovations were introduced by S. V. Voronin himself [9, 10, 11] and [12], some were added by other researchers [13]. The main aspect in which the current version of the classification [14, p. 44–66] differs from the original one is that in 1969 Voronin did not distinguish onomatopoeic and sound symbolic words. In the later version the author made a clear-cut distinction between acoustic imitation (onomatopoeia) and articulatory imitation (sound symbolism).

Currently, new synchronic [7, 8] and diachronic [13] data calls for yet another update on the classification.

1. Universal classification of onomatopoeic words.

The main challenge of the 'Universal classification' was revealing the principal acoustic parameters (properties) of sound-denotata which define the choice of type of phonemes comprising an onomatopoeic word [14, p. 39]. Studying the (psycho)acoustic properties of various types of denotata allowed S. V. Voronin to create the classification of onomatopoeic words based on iconicity principles.

1.1. Parameters of acoustic denotata.

S. V. Voronin defines five main parameters of acoustic denotata of onomatopoeic words in the following way [14, p. 40]:

– Parameter I – ***pitch*** (in a broad sense); reflects both the basic frequency and the specter of sound (psycho-acoustically, pitch as such and the tone quality of a sound).

– Parameter II – ***volume***; the acoustic correlate of the volume of a sound and its intensity.

– Parameter III – ***time***; it enables to outline 'instant' sounds (pulses) and non-instant ones (non-pulses).

– Parameter IV – ***periodicity*** (the periodicity of sound waves); according to this parameter, sounds split into tones (tonal non-pulses) and noises (non-tonal non-pulses).

– Parameter V – ***dissonance***; it is a type of sound when the pulse series is long enough to be perceived as a durative sound but is too rapid for the ear to distinguish the individual pulses.

These defined five main parameters, according to [14, p. 41], constitute the base for an objective evaluation of sound and revealing classes and types of sounds relevant to the onomatopoeic subsystem of the language:

– In accordance with Parameter I (*pitch*), a sound of any type may be classified quantitatively as 'low' or 'high'.

– Parameter II (*volume*) defines a sound (also quantitatively) as ‘loud’ or ‘quiet’.

– Parameter III (*time*) enables to outline two qualitatively different classes of sound: ***pulses*** and ***non-pulses***. If applied to non-pulses, this parameter involves the distinction of short and long sounds (the parameter of duration).

– According to Parameter IV (*periodicity*), non-pulses split into two qualitatively distinct classes – ***tone*** and ***noise***.

– The dissonance (pulse series) – together with its antithesis, the non-dissonance – is constituted in accordance with parameter V (***dissonance***).

1.2. Types and characteristics of acoustic denotata.

Upon analyzing these parameters S. V. Voronin [14, p. 42] came to distinguish the following classes of sound denotata:

A. Pulse (Non-dissonance).

B. Non-pulse (Non-dissonance).

C. Pulse series (Dissonance).

Or, in a shorter version [ibid.]:

A. Pulse.

B. Non-pulse.

C. Dissonance.

He distinguished three kinds of dissonance (pulse series): 1) dissonating pulse (quasi-pulse); 2) pure dissonance (pulse series proper), and 3) dissonating non-pulse (quasi-non-pulse); the latter may be either noise or tonal non-pulse, while noise non-pulse can be defined as pure noise or tonal noise.

Considering that non-dissonance includes pulse and non-pulse, while the latter is subdivided into noise and tone (the noise can be both pure noise and tonal noise), S. V. Voronin arrived at nine types of sound denotata:

I. Pulse.

II. Tonal Non-pulse.

III. Pure Noise Non-pulse.

IV. Tone-Noise Non-pulse.

V. Quasi-pulse.

VI. Pure Dissonance.

VII. Tonal Quasi-non-pulse.

VIII. Pure Noise Quasi-non-pulse.

IX. Tone-Noise Quasi-non-pulse.

According to Voronin [14, p. 42], a sound that belongs to any of the listed nine types is perceived as an elementary, simple psycho-acoustic event. Acoustically, however, these nine types of sound denotata can be structurally complex.

Voronin, thus, distinguishes ‘simple’ sounds and ‘complex’ ones [14, p. 43]:

Pulse (Type I), Tonal Non-pulse (Type II), Pure Noise Non-pulse (Type III), and Pure Dissonance (Type VI) are ***simple*** sounds both acoustically and psycho-acoustically, as they are indivisible into elementary, simpler sounds with contrasting properties. We would suggest a sound of a hit as an example of a simple sound (Type I. Pulse). Other types are acoustically ***complex***, decomposable into elementary simple types with contrasting properties. As an example of a

complex sound the author gives the sound of buzzing: it is perceived as a simple sound, irreducible to other elements; nevertheless, this type of sound is acoustically complex – it is a Tone-Noise Non-pulse having appreciable elements of the both tone and noise).

1.3. Types of onomatopoeic words.

According to Voronin [14, p. 44], 'the properties of the acoustic denotatum of an onomatopoeic word are defined by its characteristics and the properties of its source'. Thus, 'a classification of onomatopoeic words [should be done] according to their correlation with denotata' [*ibid*.].

To the main three classes of denotata defined in the previous section (A. Pulses; B. Non-Pulses; C. Dissonances (or a rapid series of pulses)) correspond three classes of onomatopoeic words:

A. Instants.

B. Continuants.

C. Frequentatives.

In addition, there are two hyper-classes of onomatopoeic words which render two hyper-classes of sound denotata (AB. Pulse-Non-Pulses; CAB. Dissonances-Quasi-Pulse-Non-Pulses):

AB. Instants-Continuants.

CAB. Frequentatives-Quasi-Instants-Continuants.

To describe the types of onomatopoeic words Voronin introduces a concept of an exemplary ***structural model*** [14, p. 47]. It is 'a model which reflects all common and salient phonological traits necessary for sound imitation which are found in onomatopoeic words of compared languages' [ibid.].

Below I list the types of onomatopoeic words defined by the author:

– Class A. Instants.

Instants are both a class and a type (I) of onomatopoeic words.

Type I. Instants.

They denote pulse-like sounds, that is, sounds which are instantaneous (or a 'super-short') noises or tones which are perceived as acoustic 'hits' by a human ear [14, p. 46-47].

The examples of instants given in [14, p. 46–47] are: English: *tap* 'to strike (something) lightly'; *chack* to bite or snap the teeth or beak'; *click* 'a short light often metallic sound'; Bashkir: *tap* 'an abrupt sound accompanying a fall of a heavy body'; *kelt-kelt* 'to tick (about a clock)' Indonesian *tuk* 'a knocking sound'; Tajik *maқ-maқ* [tak-tak] 'a knock on the door'; Chuvash *nam* [pat] 'an imitation of something popping'.

The structural model for the English instants is [14, p. 56]:

$$^{(S)}\text{PLOS} + (\text{SON}^{\text{LAT/NAS/DENT}})/\text{AFFR} + \text{VŎC} + \text{PLOS}.$$

The structural models for words of one onomatopoeic class differ from language to language. Voronin [14, p. 48] suggested that for languages with CONS + VOC syllabic structure, general model of instants shall be:

$$\text{PLOS/AFFR/CLICK} + \text{VŎC}.$$

Class B. Continuants.

Continuants is a class of onomatopoeic words denoting non-pulse natural sounds, that is, sounds of 'prolonged' and 'coherent' duration (which are not divided into shorter segments). Such

sound denotata are perceived either as tonal or noise phonations. Continuants, therefore, can be divided into tonal continuants (Type II) or noise continuants; the latter are sub-divided into pure noise continuants (Type III) and tone-noise continuants (Type IV) [14, p. 48–49].

Type II. Tonal continuants.

Tonal continuants render tonal non-pulse sounds or tones in their purest form. The examples of tonal continuants given in [14, p. 49] are: English: *hoot* 'the mournful wavering cry of some owls'; *bleep* 'a high-pitched signal made by an electronic apparatus; beep'; Bashkir *saj-saj* 'screech'; Buryat *nuuɔ̀* [piid] 'peeping, squeaking', Indonesian *dengung*, *dengong* 'imitation of a siren'.

The English tonal continuants have the following structural model [14, p. 49]:

$$[\text{CONS } (+\text{SON}^{\text{LAT/LAB}}) +] \text{ VŌC}^{\text{L/H, S/W}} (+ \text{PLOS}).$$

The, for example, Indonesian tonal continuants, have another structural model [14, p. 50]:

$$\text{SON}^{\text{NAS, GUTT}} + \text{VŎC}^{\text{L/H, S/W}} (+ \text{VŎC}) + \text{SON}^{\text{NAS, GUTT}}.$$

Thus, the main and the only iconically valent component of the English tonal continuants is a (historically) long vowel. Structural models for tonal continuants of other languages differ as well. Voronin notes [14, p. 49] that apart from (long) vowels several types of phonemes have *tonal characteristics* – vowels, sonorants (especially nasal sonorants) as well as /j/ and /w/, and voiced consonants (especially voiced fricatives). Therefore, all of these phonemes can be used for rendering natural tones.

Type III. Pure noise continuants.

Pure noise continuants denote noise-like non-pulse sounds, in other words, a noise in its purest. The examples of noise continuants given in [14, p. 50] are: English *hiss* 'a voiceless fricative sound like that of a prolonged *s*'; *flash* 'a sudden rush of water down a river or watercourse'; Bashkir *byðlau* 'to hiss, crackle (e.g. about wet firewood)'; Turkish *fiš-* 'hissing'; Ossetian *syf-syf* 'rustling'. The structural model for noise continuants in English is [ibid.]:

$$\text{FRIC}^{\wedge} /(\text{CONS}) + \text{VŎC}^{\text{L/H, S/W}} + (\text{CONS}) / \text{FRIC}^{\wedge}.$$

Type IV. Tone-noise continuants.

Tone-noise continuants imitate tone-noise non-pulses, which combine traits of pure noises together with noticeable tonal elements. Some examples of tone-noise continuants given in [14, p. 52] are: English *buzz* 'a rapidly vibrating humming sound, as that of a prolonged *z* or of a bee in flight'; *whizz* 'to make or cause to make a loud humming or buzzing sound', Bashkir *syz* 'sizzling of fat on a frying pan'. The structural model of the English tone-noise continuants (which also can be applied to Bashkir) is:

$$\text{CONS} + \text{VŎC}^{\text{L/H, S/W}} + \text{FRIC}^{\text{v}}.$$

Class C. Frequentatives.

Frequentatives are a class of onomatopoeic words denoting a rapid series of pulses where each pulse is hardly perceived separately yet there is no complete fusion of pulses into one tone. Such rapid sequence of pulses is highly irritative for acoustic perception. Such sequences of pulses are perceived as dissonances; therefore, one can also name the class of frequentatives 'onomatopes-dissonances' [14, p. 53].

Type V. Frequentatives quasi-instants.

Frequentatives quasi-instants are onomatopoeic words denoting quasi-pulse sounds [14, p. 54]. Examples of words belonging to this type given in [14, p. 53] are: English *crack* 'to break or cause to break with a sudden sharp sound; snap'; *chirp* 'to make a short high-pitched sound'; Indonesian *rik* 'a sound of a broken twig or bone'.

The structural model of the English frequentatives quasi-instants is [11, p. 84]:

(s)PLOS/AFFR + R + VOC + PLOS.

The structural models for frequentatives quasi-instants in different languages differ. Thus, for Indonesian onomatopes Voronin suggests a model with R-formative (on RL-formatives see [15]) outside the root:

R_f + PLOS + VŎC$^{L/H,\ S/W}$ + PLOS.

Type VI. Pure frequentatives.

Frequentatives denoting pure dissonances (sounds perceived as a rapid series of pulses, thrills) Voronin calls 'pure frequentatives' 14, p. 55]. His examples of pure frequentatives are: English *jar* 'to make or cause to make a harsh discordant sound'; Bashkir *byrr* 'a noise made by the vibration of wings of small birds when they fly up'; Chuvash *мырр* [tyrr] 'sounds of movement, whirling', Indonesian *rai* 'a sound of multiple corns falling'.

According to Voronin [14, p. 55] dissonances are in-between pulses and non-pulses; consequently, pure frequentatives are in-between instants and continuants. The rapid alternation of pulses leads to irritation of hearing perception and such series of pulses are deciphered as dissonant sounds. That's why there is the phoneme /r/ in a phonetic structure of onomatopes-pure frequentatives. Structural model for pure frequentatives in English and Bashkir is the following [14, p. 55]:

CONS + VŎC$^{L/H,\ S/W}$ + R.

It should be noted that in the present-day British English the model is only historical as /r/ is not encountered in the post-vocal position.

In Indonesian pure frequentatives have the following structural model:

R + VŎC.

There is also another structural model for Bashkir onomatopoeic words – with an R-formative [14, p. 56]:

CONS + VŎC + CONS + R_f.

Type VII. Frequentatives tonal quasi-continuants.

Frequentatives tonal quasi-continuants denote tonal quasi-non-pulses, a type of natural sound denotata containing elements of pure dissonances and tonal non-pulses at the same time [14, p. 56]. The examples are: English *screak* '(dial.) to scream, to creak'; Bashkir *lar(r)* 'a roar'. The common structural model of the English and Bashkir onomatopes belonging to type VII is:

CONS + VŎC$^{L/H,\ S/W}$ + R.

An additional, specifically English, structural model is [14, p. 57]:

CONS+ R + VŌC$^{L/H,\ S/W}$ + (CONS).

Type VIII. Frequentatives pure noise quasi-continuants.

Frequentatives pure noise continuants denote pure noise non-pulses which contain elements of both dissonances and pure noises [14, p. 57]. Voronin's examples for Type VIII onomatopoeic words are: English: *whirr* 'to fly, revolve, or move rapidly with a humming sound'; Bashkir *šyptyr-šyptyr* 'rustling of leaves, dry grass'; Indonesian *ras* 'imitation of the sound made by dry leaves touching each other'.

The structural model for frequentatives pure noise continuants of these three languages is [14, p. 58]:

$$\text{FRIC}^{\wedge} + \text{VŎC}^{\text{L/H, S/W}} + \text{R}.$$

The author also gives a number of Bashkir and Indonesian models with R outside the root, where itis an R-formative [14, p. 58], for example:

$$\text{FRIC}^{\wedge} + \text{VŎC}^{\text{L/H, S/W}} + \text{PLOS} + \text{R}_{\text{f}}.$$

Type IX. Frequentatives tone-noise quasi-continuants.

Frequentatives tone-noise quasi-continuants denote tone-noise non-pulse sounds which combine elements of pure dissonances and tone-noise non-pulses [14, p. 58]. Voronin's examples for Type VIII onomatopoeic words are: English *frizz* 'to fry with a sputtering, hissing noise; sizzle'; Bashkir: *zyr(r)* 'a prolonged monotonous sound of something swirling noisily'. The structural models for Type IX words in both languages is [14, p. 59]:

$$(\text{FRIC}^{\wedge} +) \text{ R} + \text{VŌC} + \text{FRIC}^{\text{v}} / (\text{FRIC}^{\text{v}} +) \text{ R} + \text{VŎC} + \text{FRIC}^{\wedge}.$$

Hyper Class AB. Instants-continuants.

Instants-continuants are a hyper-class of onomatopoeic words denoting pulse-like sounds combined with an immediately following non-pulse [14, p. 59].

Type X. Tonal 'post-pulse' instants-continuants.

Tonal post-pulse instants-continuants denote tonal 'post-pulse' sound sequences of a pulse followed by a non-pulse; that is, of a sound abruptly beginning with pulse and ending in a tonal non-pulse [ibid.]. Voronin distinguishes (a) short tonal post-pulse instants-continuants (English *dump* 'to throw down or out roughly'; *plump* 'to throw down or out roughly'; *clank* 'an abrupt harsh metallic sound'; *Bashkir dömp* 'a muffled sound of an abrupt hit') and (b) long tonal post-pulse instants-continuants (English *tang* 'a loud, ringing sound; twang'; *clang* 'to emit a loud resonant ringing sound as of pieces of metal struck together'; Bashkir *taŋ* 'a sound of something wooden hitting metal surface').

The structural model for the English tonal post-pulse instants-continuants is [14, p. 60]:

$$\text{PLOS/AFFR} + \text{VŎC}^{\text{L/H, S/W}} + \text{SON}^{\text{nas}}.$$

Type XI. Pure noise 'post-pulse' instants-continuants.

Onomatopoeic words belonging to this type denote pulse-like sounds followed by a pure-noise non-pulse [14, p. 60]. Voronin's examples of Type XI onomatopoeic words are: English *piff* 'a sound of a flying bullet'; Bashkir *byð(ð)* 'a sound of an airflow coming through a narrow opening'; Uzbek *nuu* [pish] 'a sound of a burst tire'. A common structural model for pure noise 'post-pulse' instants-continuants in English and Bashkir is [14, p. 61]:

$$\text{PLOS/AFFR} + \text{VŎC}^{\text{L/H, S/W}} + \text{FRIC}^{\wedge}.$$

Type XII. Pure noise 'pre-pulse' instants-continuants.

Onomatopoeic words belonging to this class denote pulse-like sounds preceded by a pure noise [14, p. 61]. The examples of pure noise 'pre-pulse' instants-continuants are: English: *flap* 'to move or cause to move noisily back and forth or up and down'; *whit* 'a shrill abrupt sound, as a bird's chirp'; Bashkir *sabuy* 'to mow the grass'; Buryat *шаб* [shab] 'an imitation of swishing of a whip'. A structural model for Type XII onomatopoeic words in English is [14, p. 62]:

$$\text{FRIC}^{\wedge} + \text{VŎC}^{\text{L/H, S/W}} + \text{PLOS}.$$

Type XIII. Tone-noise 'pre-pulse' instants-continuants.

Tone-noise 'pre-pulse' instants-continuants imitate pulse-like sounds preceded by a tone-noise non-pulse [14, p. 62]. The examples of Type XIII onomatopoeic words are: English *zip* 'a light sharp sound such as that produced by a bullet or other small or slender object passing rapidly through the air or through some obstacle'; Bashkir *wyăt* 'a whoosh of air accompanying a swift movement'. The model for the English tone-noise 'pre-pulse' instants-continuants is [14, p. 62]:

$$\text{FRIC}^{\text{v}}/\ \text{SON}^{\text{LAB}} + \text{VŎC}\ (+\text{FRIC}^{\text{v}}) + \text{PLOS}.$$

Type XIV. Pure noise-tonal 'pre- and post-pulse' instants-continuants.

Onomatopoeic words belonging to this type denote pulse-like sounds preceded by a pure noise and followed by a tone (which is a resonance 'ending' of the pulse) [14, p. 63]. Voronin distinguishes (a) short pure noise- tonal 'pre- and post-pulse' instants-continuants (English *thump* 'the sound of a heavy solid body hitting or pounding a comparatively soft surface', *slump* 'to sink or fall heavily and suddenly', *whump* 'a dull thud') and (b) long pure noise- tonal 'pre- and post-pulse' instants-continuants (*whang* 'to strike or be struck so as to cause a resounding noise'; *whing* 'a sharp high-pitched ringing sound'). The model for the English pure noise- tonal 'pre- and post-pulse' instants-continuants is [14, p. 63]:

$$\text{FRIC}^{\wedge}\ (+\text{SON}^{\text{LAT/LAB}}) + \text{VŎC}^{\text{L/H, S/W}} + \text{SON}^{\text{NAS}}\ (+\text{PLOS}).$$

Type XV. Tone-noise tonal 'pre- and post-pulse' instants-continuants.

Onomatopoeic words belonging to this type denote pulse-like sounds preceded by tone-noise non-pulses and followed by a tonal non-pulse [14, p. 63]. Voronin distinguishes (a) short (English *zonk* '(slang) an imitation of a short resonant blow') and (b) long (English *sing* '(slang.) to whoosh with a buzzing, whistling sound, usually said about bullets') subtypes. The onomatopoeic words of this type have the following structural model [14, p. 63]:

$$\text{FRIC}^{\text{v}} + \text{VŎC}^{\text{L/H, S/W}} + \text{SON}^{\text{NAS}}\ (+\text{PLOS}).$$

Hyper Class CAB. Frequentatives quasi-instants-continuants.

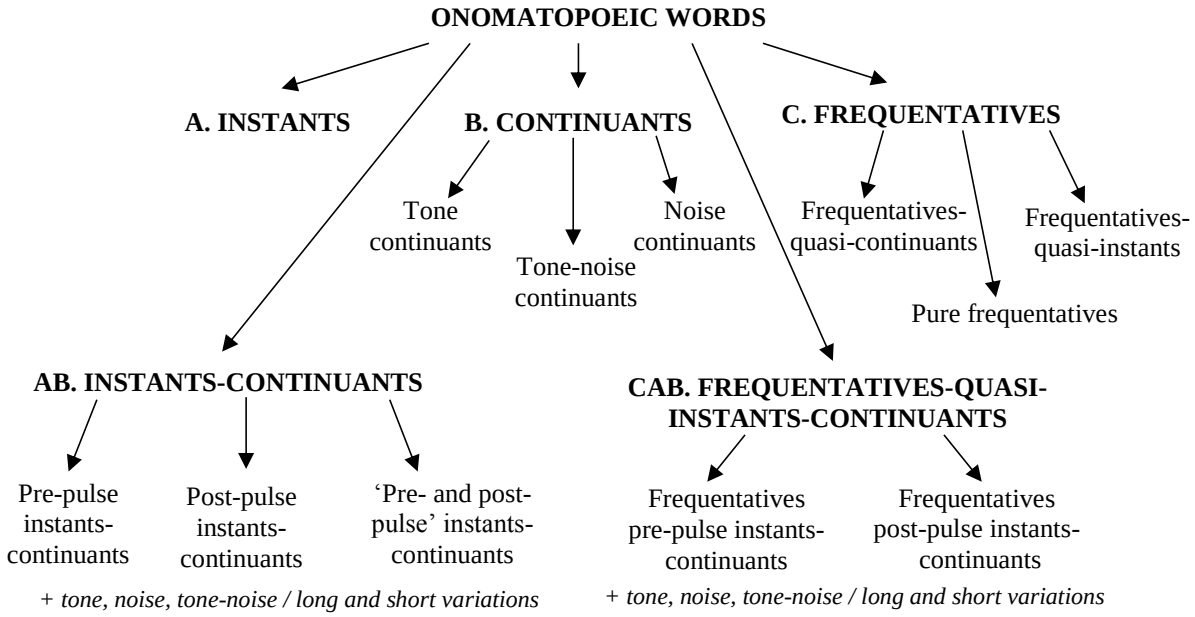
This hyper class of onomatopoeic words denotes complex natural sounds combining the traits of dissonances and pulses preceded or followed by non-pulses [14, p. 64].

Type XVI. Frequentatives tonal 'post-pulse' quasi-instants-continuants.

Frequentatives tonal 'post-pulse' quasi-instants-continuants reflect quasi-pulses followed by tonal (resonant) non-pulses [14, p. 64]. Voronin distinguishes subtype (a) frequentatives short tonal 'post-pulse' quasi-instants-continuants (English *tramp* 'to walk, tread, or step especially heavily'; *crink* 'an imitation of a noise combining traits of chirring and ringing sounds') and subtype (b) frequentatives long tonal 'post-pulse' quasi-instants-continuants (English *strum* 'to cause to sound

vibrantly', Russian *треньь* [tren'] 'an imitation of the sound produced when pulling a string of a musical instrument'; Bashkir *syltyr* 'ringing, e. g. of an alarm clock'). A structural model for the English onomatopoeic words of this type is the following [14, p. 65]:

$$CONS + R + V\breve{O}C^{L/H,\ S/W} + SON^{NAS}.$$



S. V. Voronin's universal classification of onomatopoeic words (according to [11, sapplement 2])

Type XVII. Frequentatives pure noise 'post-pulse' quasi-instants-continuants.

Onomatopoeic words belonging to this type denote quasi-pulse sounds followed by pure-noise non-pulses [14, p. 65]. For example: English: *crash* 'to break violently and noisily'; *thrash* 'to beat soundly with or as if with a stick or whip', Bashkir *görš* 'a munching sound cattle makes while chewing hay'. The structural model for onomatopoeic words of these languages is [14, p. 66]:

$$(CONS +)\ R + V\breve{O}C + FRIC^{\wedge} / (CONS +)\ V\breve{O}C + R + FRIC^{\wedge}.$$

Type XVIII. Frequentatives pure noise 'pre-pulse' quasi-instants-continuants.

Onomatopoeic words of this type denote a quasi-pulse preceded by a non-pulse; and this non-pulse is always a noise (English *flirt* 'to move in a jerky manner') [14, p. 66]. The onomatopoeic words of this type have the following structural model [ibid.]:

$$FRIC^{\wedge} + SON^{LAT} + V\breve{O}C + R + PLOS.$$

The whole classification is schematically presented in figure 1 (after [11, supplement 2]).

2. Limitations of the classification.

The universal classification of onomatopoeic words (UCO), undoubtedly, was a breakthrough in the field of phonosemantic studies. However, in the course of work on [16] and, later, on [17] I came across several problems regarding its implementation (listed below from major to minor):

Problem 1. Place of frequentatives in the classification.

The frequentatives as a class of onomatopoeic words, according to the parameters of the UCO, render 'a rapid series of pulses where each pulse is hardly perceived separately yet there is no complete

fusion of pulses into one tone' [14, p. 53]. Thus, they are in the intermediate position between instants and continuants and in their purest describe 'a harsh, dissonant sound' [ibid.].

S. V. Voronin distinguishes three types of sound denotata with salient acoustic traits which form a basis for classification (A) Pulse, (B) Non-pulse (tone or noise) and (C) Dissonance [14, p. 42]. These three types of sound are '*simple* sounds' [14, p. 43], whereas 'other types are acoustically *complex*, decomposable into elementary simple types with contrasting properties' [ibid.].

Thus, Voronin arrives to the basic contrast of three 'simple' sound types to which correspond three major classes of onomatopoeic words:

A. Pulses	↔	A. Instants
B. Non-pulses (tone/noise)	↔	B. Continuants (tone/noise)
C. Dissonances	↔	C. Frequentatives

These correspondences match (1) the 'high' points of the (psycho-)acoustic contrast division of the sounds perceived by a human ear and processed by a human brain and (2) the most *contrast* units of phonemic inventories of the languages which are chosen for the imitation of the perceived acoustic phenomena in onomatopoeic words. Thus, the groups three 'simple' sounds correspond to the groups of onomatopoeic words belonging to 'pure' classes.

This principle works as far as instants and continuants are concerned: pulses (abrupt sounds) are rendered by instants (which contain plosives imitating abruptness and forcefulness: E. *tap*, Russ. *тук* [tuk] 'knock' etc.); tones are rendered by continuants (tonal: English *too-too, beep* – by vowels of certain quality; noise: English *hiss*, Turkish *fiš-* 'hissing'– by fricatives and sibilants).

But when it comes to frequentatives (see figure) the principle is not applied fully. Frequentatives are divided, according to [14, p. 53] into frequentatives quasi-instants; pure frequentatives; and frequentatives tonal quasi-continuants.

Thus, 'complex', 'mixed sounds' (frequentatives quasi-instants; and frequentatives tonal quasi-continuants) appear already *on the same level* of classification with the simple ones. Instants and continuants do not 'cross' with each other, their 'hybrid' is ascribed to a separate hyper-class – AB. Instants-Continuants. On the other hand, both the hybrids of (1) frequentatives and instants and (2) frequentatives and continuants do not form hyper-classes of their own, but are placed on the same level as 'pure' frequentatives [14, p. 53], which leads us to the second major problem of the UCO.

Problem 2. What are pure frequentatives?

'Pure' frequentatives apart from being placed on the same level with frequentatives of 'mixed' types themselves present a problem. According to [14, p. 55] they denote 'pure dissonances (sounds perceived as a rapid series of pulses, thrills)'. Thus, as instants, pure frequentatives should be sole representatives of the class and have no elements in their structure juxtaposed other 'pure' classes.

However, the examples of pure frequentatives given by the author are puzzling. He suggests such English words as *chirr*, *birr*, *burr*, *jar(r)* as well as Bashkir *byrr* 'a noise made by the vibration of wings' and Chuvash *мырр* [tyrr] 'sounds of movement, whirling' as representatives of pure frequentatives. Thus, he draws up a structural model with the core element bearing an imitative function (R) in auslaut: CONS + VŎC + R.

This model describes both English and Bashkir onomatopoeic words from his sample. However, Voronin gives no arguments for this particular model with R in auslaut neither in [1], nor in [14] or in [11] editions of his UCO. Thus, a pure frequentative is an onomatopoeic word denoting a vibrant, harsh, dissonant sound which contains (1) any consonant apart from r; (2) any (short) vowel and (3) R of some quality. However, such a model for pure frequentatives presents several problems:

(1) Initial consonants – in the given examples plosives or affricates – also have some onomatopoeic function (rendering abrupt, pulse-like sounds – see above), which is for some reason overlooked in pure frequentatives.

(2) Even in modern (British) English – VR is a prohibited combination of phonemes, thus the whole class 'pure frequentatives' is only hypothetical in modern synchrony (even if it was not in the 16th century before the start of the regular sound change which made it impossible). Thus, as a candidate for a model describing the whole class in a universal classification the CONS + VŎC + R model is a poor candidate. It is not only inapplicable to English, but also to a number of languages with CV- syllable structure as well.

Voronin solves a similar problem with instants by omitting the second plosive: cf. $^{(S)}$PLOS + (SON$^{LAT/NAS/DENT}$) / AFFR + VŎC + PLOS and PLOS/AFFR/CLICK + VŎC discussed above.

He attempts to do the same for Indonesian pure frequentatives: R + VŎC. Here, R unexpectedly (!) moves to the anlaut position. In English, however, frequentatives quasi-instants and frequentatives quasi-continuants and not pure frequentatives have R in anlaut position (see above).

(3) R itself (whether a trill, a tap or a retroflex) might not be a phoneme in certain languages, but an allophone, thus its second allophone or another consonant phoneme from a phonemic inventory might take its imitative function of conveying harsh, thrill-like dissonant sounds in onomatopoeic words. This hypothesis, however, requires verification as all languages subjected to the UCO so far, contained a rhotic consonant of some quality.

(4) Voronin introduces an R-formative to the models of pure frequentatives in Bashkir onomatopoeic words: CONS + VŎC + CONS + R$_f$. And this is our Problem 3 (see below).

Thus, pure frequentatives are not only placed on the same level as frequentatives of 'mixed types' in the classification, but also are not given a clear model – their core element (R) is (1) placed in the very unusual (for many languages, including the present-day British English) or even non-existent auslaut position; (2) is combined with core elements of other classes (e. g. plosives) or even (3) is placed outside the root (as an R-formative).

Problem 3. Frequentatives and R-formatives.

First of all, it should be clarified what R-formatives actually are. N. V. Bartko [15, p. 3] defines R-formatives (more broadly, RL-formatives) as 'affixes of [imitative] words containing -*r*- or -*l*-'.

In his monograph *Fundamentals of Phonosemantics* Voronin devotes a whole chapter to the discussion of their origin, meanings and semantics [14, p. 111–118]. RL-formatives, according to Voronin (who followed the argumentation of [18, p. 273]), not only are encountered in imitative (especially, onomatopoeic) words, but also themselves are (1) of imitative origin [14, p. 111] and (2) render the meanings of plurality, iteration and repetition on par with their onomatopoeic function [14, p. 118].

Some Voronin's examples of words with RL-formatives (suffixes and infixes) are [14, p. 112–117]: English *chatte**r***, *crack**l**e*, German *plätsche**r**n* 'to splash'; Old High German *floga**r**on* 'to flutter'; Dutch *knette**r**en* 'to crackle'; Tajik *гулду**р*** [guldur] 'rumbling'; Indonesian *ke**r**(e)tap* 'a sound of the door slamming'; *ke**r**etak* 'a sound of a branch or twig creaking'; *ge**l**etar* 'a repeated vibration' (while *getar* 'to vibrate, shake').

Natalia Bartko's [19, p. 9–10] examples of RL-formatives are: Chuvash *тăнкă**р** тăнкă**р*** [tankar tankar] 'driving on a road with pits and bits of frozen soil'; *чыты**р*** [tʃytyr] 'sparrow's chirping'; *мĕнĕ**р** мĕнĕ**р*** [teper teper] 'a noisy stumping of human feet or horse's hooves'; Kumyk *шапы**р** шапы**р*** [ʃapyr ʃapyr] 'to hiss repeatedly'; Yakut *тыбыы**р*** [tybyyr] 'to snort'; *кычы**р**-даа* [kytʃyr daa] 'to crackle'; *бары**л**аа* [barylaa] 'to burble' (from *бар* [bar] 'an abrupt, harsh sound'); Turkish *buldu**r** buldu**r** etmek* 'to rumble'.

RL-affixes in these languages have the following functions [14, p. 117–118]:

(1) conveying the repetition of a denoted sound or action (cf. *twit* and *twitte**r***, *chat* and *chatte**r***);

(2) indicating intensiveness of meaning (German *klappe**r**n* 'to make a rattling noise');

(3) conveying an iterative nature of a denotatum (Indonesian *ke**r**etak* 'the sound of footsteps on a wooden floor');

(4) designating the notion of plurality or multiplicity (Indonesian *ge**r**bak* 'the sound of small fruit falling on the ground'; *ge**l**ebak* 'the sound of several small fruit or books falling').

Voronin, thus, on the one hand, describes RL-formatives as imitative affixes having a specific set of meanings of their own [14, p. 111–118] and, on the other hand, incorporates them into his UCO. Thus, following Voronin, English *chat* is an instant [14, p. 47]; but *chatter* is a frequentative-(quasi)-continuant. The majority of the Indonesian examples given in [14] for frequentatives of various types are examples with R-formatives.

A. V. Krasnova [7, p. 80] following Voronin [14] also classifies Turkish onomatopoeic words with *-ır* (*-ir, -ur, -ür*) affixes as pure frequentatives (e.g. *ciyi**r** ciyi**r** etmek* 'to screak'), and such words as *fıkı**r** fıkı**r*** 'imitation of a bubbling sound', *foku**r** foku**r*** 'imitation of a burbling sound', *foşu**r** foşu**r*** 'imitation of sounds made by water in a stream', *haşı**r** haşı**r*** 'imitation of a sound of breaking dry twigs' as frequentatives-(quasi)-continuants [7, p. 82].

One of the questions arising is: if R-formatives are included into structural models and accounted for in the classification, why L-formatives are not accounted for as well, as they have exactly the same four imitative functions listed above?

The other, more fundamental, question is – why affixes are included into the classification at all?

More specifically, why are they accounted for the frequentatives only and not for other classes?

Does it not undermine the main principle of the classification – the presence of iconic correspondence onomatopoeic *root* / *a type of natural sound*? Why one should include affixes, even if they are (presumably) imitative in origin into the classification? And why these particular affixes? RL-formatives are not universal (e. g. they are not encountered in Slavonic languages). Also, there are other language-specific imitative affixes (e.g. English intensification prefixes *ker-* / *ka- /cha-* as in *ka-boom*!). Should they be included into the models as well? And here we arrive at our fourth major problem – structural models.

Problem 4. Structural models are language-specific and reflect phonotactic conventions of a language (applied to monosyllabic words).

The 'Universal classification' was first developed for the English and the structural models (the number of which grew up to 30 [11] were intended to account for all (at least, the majority) of onomatopoeic words in the language. Indeed, they cover 86 % of English words marked as 'onomatopoeic' in etymology dictionaries [14] (or 69 % upon my calculations [13, p. 90]). However, several types of English onomatopoeic words do not 'fit in'. These groups of words are [13, p. 74–80]:

(1) onomatopoeic interjections (e. g., *pah-pa-ra*!, *badum-tish*!, *grrrrrr*!);

(2) borrowed words of onomatopoeic origin (e.g. *chime, curucui, didgeridoo*);

(3) polysyllabic imitative words (e. g. *katydid*, *kildee, foofaraw*);

(4) words touched upon by regular sound changes (e. g., *chirk* [tʃɪrk], AFFR + VŎC + R + PLOS > *chirk* [tʃɜ:k], AFFR + VŌC + PLOS) – see our Problem 5.

The classification of onomatopoeic words into instants, continuants, frequentatives, instants-continuants and frequentatives instants-continuants is valid for even genetically non-related languages (such as Indonesian [2], Bashkir [4], Estonian [5], Georgian [6] and Turkish [7]). However, structural models do not always coincide – cf. the structural models for pure frequentatives in English and Bashkir (CONS + VŎC$^{L/H,\ S/W}$ + R) and in Indonesian (R + VŎC) discussed above.

The question is, what do these structural models actually reflect? In [13, p. 90] I arrived to the conclusion that these structural models reflect *present-day phonotactic constraints of a language applied for one-syllable content onomatopoeic words*.

This means, that (1) imitative interjections which violate phonotactic constraints of a language (a salient property of imitative interjections widely discussed e. g. in [20] or [21]) are left out; (2) polysyllabic and (3) borrowed words cannot be described with these models; (4) 'old' as well as borrowed onomatopoeic words also 'fall out' of the UCO.

Problem 5. Structural models change in diachrony.

One of the main conclusions of [13] is that structural models for onomatopoeic words change over time [13, p. 91]. All 'atypical' content monosyllabic native onomatopoeic words of the English language were coined earlier then the 17th century [13, p. 92], and the number of 'atypical' onomatopoeic words increases with their 'age' [ibid.].

Thus, the structural models distinguished by Voronin are only applicable to SD-2 words (words on SD-3b are not accounted for in [14]). SD-2 words are words on the second stage of de-iconization [13, p. 126].

De-iconization is the gradual loss of iconicity caused by simultaneous acting of regular sound changes and regular sense development of the word [13, p. 120]. Altogether, I distinguish four stages of de-iconization:

– An ***SD-1*** word is an iconic interjection that may violate language's phonotactic constraints and vary in form (English *zzz*!, *cling-clang*!, *ding-dong*!).

– An ***SD-2*** word is a content word with conventional form which hasn't undergone any regular sound changes and still retains its original meaning related to sound (*to clap, a tap, to hoot*).

– A word on ***SD-3*** is a content word which has either undergone one or several regular sound changes (SD-3a) but retained its original meaning (*laugh, chirp, knock*); or it has an intact form (SD-3b) but has lost its original meaning (*clip, cliché*).

– An ***SD-4*** word is a content word indistinguishable from the rest of the 'conventional' vocabulary, and the discovery of its original onomatopoeic nature requires an etymological analysis as both its form and its meaning have changed dramatically (e.g. *gargoyle*).

The reason why the structural models are valid only for SD-2 (and SD-3b) words id simple. As the models reflect the phonotactic constraints of a language in modern synchrony, any changes in phonemic inventories and phonotactic rules automatically lead to:

(1) the change of these models in diachrony (e.g., the model for frequentatives-(quasi)-instants has changed from (s)PLOS/AFFR + VŎC + R + PLOS to (S)PLOS/AFFR + VŌC + + PLOS for the British English and to (s)PLOS/AFFR + VOC^{R} + PLOS for the American English [11, p. 85];

(2) the fact that single words which have undergone regular sound changes cease to 'fit into' existing models (e.g. *knock* /nɒk/ after the *kn* > *n*/#_ conditioned change does not currently fit into the structural model of instants which is (s)PLOS + ($SON^{LAT/NAS/DENT}$) / AFFR + VŎC + PLOS).

Problem 6. Unnecessary high number of types and structural models which complicates the classification.

According to the UCO, there are:

– for English: altogether three classes, two hyperclasses, 18 types of onomatopoeic words described by 30 structural models [11];

– for Turkish: three classes, two hyperclasses and 16 types of onomatopoeic words [7];

– for Indonesian: three classes, two hyperclasses, 10 types and 21 structural models [2];

– for Georgian: three classes, two hyperclasses, 19 types of onomatopoeic words [6];

– for Bashkir: three classes, two hyperclasses, 15 types of onomatopoeic words [4].

The number of classes and hyperclasses remains stable in the studied languages and seems to be a language universal. They are applied to all onomatopoeic words of a language (including to polysyllabic if they are divided into segments). The number of types and models is different and reflects the present-day phonotactic constraints of a language applied for one-syllable content onomatopoeic words.

The structural models differ from language to language and describe only a part of an entire onomatopoeic lexicon of a language (69–86 % of the English onomatopoeic lexicon (see above), 68% of the Bashkir onomatopoeic lexicon [4]). They reflect language-specific structural characteristics of the studied languages.

The question is – should the UCO be based on the models (some of which describe only 2–3 words) or be only limited to the level of classes and hyper-classes? The structural models (the number of which is, in my opinion, unnecessarily large) *do not reflect the peculiarities of onomatopoeic words* – they merely describe the *boundaries* within which onomatopoeic imitation is possible at the synchrony of a particular language.

The six problems discussed above I consider the major problems of the classification. There is, however, a number of minor problems to be addressed:

Problem 7. The role of the affricates in the classification.

As known, affricates are a group of phonemes holding an intermediary position between stops and fricatives (they begin as stops and are released as fricatives). Their imitative function, according to Voronin [14, p. 67] equals that of stops. For this reason, they are included into the structural models of instants – $^{(S)}$PLOS + (SON$^{LAT/NAS/DENT}$) / AFFR + VŎC + PLOS. Thus, such English words as *chop* or *chuck* are instants, according to Voronin. However, 'pure', easily definable sounds should not be rendered by phonemes of 'mixed' nature (according to the principles of the UCO).

Problem 8. The role of the sonants, laterals and approximants in the classification.

This problem is similar to the one pointed above. Sonants (*m, n*) are either included as 'extra' elements with no clear imitative function (see the models for instants above) or are ascribed the imitative function of rendering prolonged sounds (for example, in tonal post-pulse instants-continuants: PLOS/AFFR + VŎC$^{L/H,S/W}$ + SON^{NAS}). The same problem is with the approximant /w/ and its semivowel quality. It is not reflected in the models but is ascribed the function of rendering a tone.

Problem 9. The role of voice in the classification.

The models proposed in the UCO sometimes make a distinction between voiced and voiceless fricatives (e. g. cf. models for pure noise continuants (FRIC$^{\wedge}$ / (CONS) + VŎC$^{L/H,\ S/W}$ + + (CONS) / FRIC$^{\wedge}$) and tone-noise continuants (CONS + VŎC$^{L/H,\ S/W}$ + FRIC^{v})). However, voice is never a distinctive phonosemantic feature in plosives. The question is to what extent is the *voiced: voiceless* opposition is phonosemantically significant in onomatopoeic words and should it be included in the classification?

Another side-issue is the distinction of tone-noise continuants (*whizz, buzz)* which have the model CONS + VŎC$^{L/H,\ S/W}$ + FRIC^{v} and pure noise 'post-pulse' instants-continuants (*piff*) with the model PLOS / AFFR + VŎC$^{L/H,\ S/W}$ + FRIC$^{\wedge}$. We see that they only differ in the presence and absence of voice (the same refers to frequentatives (quasi-)instants-continuants and frequentatives tone-noise quasi-continuants). Pure tone and pure noise continuants (of which tone-noise continuants are supposed to be a cross), however, imply other means of imitation, which leads us to the next problem.

Problem 10. Vowel length as a distinctive feature of tonal continuants.

Vowel length is not a universal feature of phonetic systems of various languages (even for English it is now only historical), yet it is a core element for the English tonal continuants – [CONS (+SON$^{LAT/LAB}$) +] VŌC$^{L/H,S/W}$ (+ PLOS). For the languages lacking the *long*: *short* vowel opposition it appears that any vowel is a core element of an onomatopoeic word-continuant.

The question is then, how to classify the [CONS]+VOC+[CONS] structures in such languages?

Also, Voronin [14, p. 49] states that apart from (long) vowels several other types of phonemes have tonal characteristics – vowels, sonorants as well as /j/ and /w/, and voiced consonants. However, these consonants are not always included in the models or included as 'extra' elements – see the discussion above.

The second part of the article is devoted to the possible solutions for the indicated problems.

ABBREVIATIONS

AFFR – affricate
DENT – dental
FI – frequentative-instant
FIK – frequentative-instant-continuant
FRIC – fricative
FRIC^{V} – voiced fricative
FRIC$^{\wedge}$ – voiceless fricative
gutt – guttural
I – instant
IK – instant-continuant
K – continuant
L/H – low/high
LAB – labial
LAT – lateral
NAS – nasal
PLOS – plosive
R – a rhotic phoneme (uvular, thrill etc.)
R_f – R-formative
S/W – strong/weak
SD-1 – first de-iconization stage
SD-2 – second de-iconization stage
SD-3 – third de-iconization stage
SD-4 – fourth de-iconization stage
SON – sonant
UCO – Universal Classification of Onomatopoeic words
VŌC – a long vowel
VŎC – a short vowel

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