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ALGORITHM FOR IDENTIFYING PSYCHOLINGUISTIC
MEANINGS OF LEXICAL UNITS AND VERBAL
COMMUNICATIVE BEHAVIOR

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Abstract

The article describes the methods for identifying psycholinguistic meanings of lexical units according to the algorithm developed in Voronezh scientific theoretical and linguistic school. The term psycholinguistic meaning is the representation in the minds of native speakers. It is opposed to the lexicographic meaning – the representation in dictionaries. The traditional lexicographic description of the semantics is carried out in accordance with the principle of reductionism, which involves the minimization of features included in the meaning with a limited volume of the dictionary entry. The psycholinguistic description of semantics makes it possible to identify numerous semantic components (both denotative and connotative) that are not represented in dictionaries, but relevant for native speakers. The psycholinguistic meaning allows presenting the content of words in the form of psychological reality. The algorithm for identifying psycholinguistic meanings includes three main stages: 1) identification of verbal associative fields of lexemes; 2) integration of verbal associative fields into a single associative field; 3) semantic interpretation of a single associative field (linguistic representations of semes are presented by associative reactions); 4) attribution of semes by individual meanings. The results of the study of the psycholinguistic structure of semantics of the toponym "Voronezh" are presented as a sample. The seme composition and meanings were revealed, and their brightness indices were calculated. All semes and meanings were distributed by the semantic zones (the core and peripheral zones).

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1. Introduction

The anthropometric approach to linguistic phenomena is evidence of the change in the paradigmatics and the transition to anthropological linguistics, which entails the studies of language in its relation to a person, his consciousness, thinking, spiritual and practical activities” (Serebrennikov et al., 1988).

The issues of changes in the basic paradigmatics of linguistics have been studied in (Norimatsu & Kozima, 2016; Popov & Popova, 2020). Issues about the foundations of anthropological linguistics have been analyzed in (Kelly, 1990).

Within the anthropocentric approach, linguists use the term "linguistic consciousness".

The Voronezh scientific theoretical and linguistic school defines linguistic consciousness as a set of mental mechanisms for generating and interpreting speech acts and storing language in consciousness. Linguistic consciousness is a set of mental mechanisms for supporting speech activities.

It is possible to build both a simple and a complex model of linguistic consciousness.

The simple model of linguistic consciousness is an associative field of lexical units, an ordered set of verbal responses (R) received to verbal stimuli (S) during the linguistic associative experiment and located in associative dictionary entries in decreasing frequencies (R_n).

The complex model of linguistic consciousness is a set of psycholinguistic meanings of lexical units, as “an ordered unity of all semantic components that are actualized in the minds of native speakers, all of which are connected with a given sound shell (lexeme)” (Sternin, 2011, p. 7).

Due to the expansion of interethnic contacts, the reconstruction of verbal communicative behavior, as a component of the behavior of a linguocultural community, is relevant.

Verbal communicative behavior is “a set of norms and traditions of communication related to the subject matter and peculiarities of communication in certain communicative conditions” (Sternin, 2000, p. 10).

A description of communicative behavior has been provided in (Sternin, 2000).

2. Problem Statement

When compiling dictionaries, the systemic method involved the study of linguistic phenomena within the language system (i.e., within the established paradigms). The result of this work is lexicographic (dictionary) meanings of words, compiled on the basis of essential semantic components, which reflect the main content.

An alternative to the systemic method is the psycholinguistic one, which allows giving a more voluminous (complex) description of the semantics of lexical units. **It takes into account additional**, insignificant semantic components and allows obtaining psychologically relevant meanings of lexical units (Leontyev, 1969) – psycholinguistic meanings.

The psycholinguistic meaning allows solving one of the most important methodological problems of lexicography. This is the problem of complex interpretation of the semantics of lexical units. It takes into account the mental factor expressed by the analysis of the language in its close relation to the thinking of a person, his spiritual and practical experience.

The lexemes in their psycholinguistic interpretations reflect real meanings of words in the linguistic consciousness of native speakers. They allow determining new semantic components which are not recorded in explanatory dictionaries. Moreover, they allow revealing the degree of their relevance for native speakers and determining the features of the verbal communicative behavior of the linguistic and cultural community.

3. Research Questions

The subject of this research is psycholinguistic meanings as phenomena of linguistic consciousness.

4. Purpose of the Study

The purpose of the research is to describe the method for identifying psycholinguistic meanings developed in Voronezh scientific theoretical and linguistic school. This method was tested in the research by the laboratory of philology and cultural studies of Ibragimov Complex Research Institute of the Russian Academy of Sciences, the Dagestan psycholinguistic circle, Dagestan Federal Research Centre of the RAS (Makhachkala) and the Centre for Communication Research of VSU guided by Professor Sternin (Makhaev et al., 2019; Makhaev et al., 2020).

Psycholinguistic meanings are identified within the semic semasiology, where the semantics of lexical units is analyzed as a set of discrete semantic components (semes).

In addition, seminal semasiology entails the application of the field approach to the analysis of the structure of meanings, assuming the distribution of semes over the zones of the field (core and peripheral zones).

The toponym "Voronezh" was used as a model.

5. Research Methods

The identification and description of psycholinguistic meanings presupposes the appeal to the native speakers and their linguistic consciousness.

In order to provide the most adequate and complete presentation of the content and structure of psycholinguistic meanings in the unity of nuclear and peripheral semantic components, experimental research methods are used (Makhaev et al., 2019).

The psycholinguistic experiment "allows reconstructing various relations of linguistic units in consciousness and revealing the nature of their interactions in various processes of understanding, storing and generating speech works" (Sternin, 2002, p. 45).

Voronezh scientific theoretical and linguistic school in Voronezh and Grozny conducted psycholinguistic experiments from September 2018 to January 2019. The subjects were 330 male and female students from Voronezh universities, and 300 students from Grozny universities aged 16–30.

The following methods were used in this study. The free non-chain associative experiment was used in order to find free associative reactions (the instruction was "Answer with any word that comes to

mind when you hear this word"). The directed chain associative experiment was used in order to find directed associative reactions ("X – what is it famous for?", "X where is it?").

When using the first method, only the first reaction was recorded (therefore, it is called non-chain).

In the directed chain associative experiment, the number of reactions was not limited.

The experiments were conducted in lecture halls of local universities according in the following manner: the subjects got experimental forms of A4 format with 10 toponym stimuli (Chechnya, Vladikavkaz, Volgograd, Voronezh, Grozny, Dagestan, Derbent, Ingushetia, Moscow, St. Petersburg) and instructions: "Answer with any word that comes to mind when you hear this word" / "X – what is famous for?", "Where is X?"

Before the experiment, the instructor told the subjects how to fill out the forms. The time was unlimited (the students spent about 15 minutes on this work).

The data was processed manually.

6. Findings

When the obtained associative reactions were processed, 3 associative fields were developed for each toponym (this is a surface model of linguistic consciousness).

The associative fields of the toponym "Voronezh" based on the results of the experiments in Voronezh and Grozny are briefly described below. The entries of dictionary include the reactions with a frequency of at least 5.

The entries were as follows:

- Headword (the stimulus lexeme in bold);
- Number of subjects in the experiments (number after the headword);
- Lexemes-reactions and their frequency (numbers after the lexemes-reactions); refusals¹; untreated reactions.²

Associative field with free associative reactions:

Voronezh – 330: house 30; Voronezh State University 19; birthplace 14; courage city 13; The Black Earth Region capital 12; Military Glory City; you will not catch up; native city; study – 9; courage 8; navy; black soil – 7; kitten on Lizyukov street; Peter I River; university; Black earth – 6; city 5 ...

Refusals – 5

The associative fields with directed associative reactions:

Voronezh. What is it famous for? – 330: City of Military Glory 29; the capital of the Black Earth Region 15; Voronezh State University 14; a kitten from 11 Lizyukov Street; Heroic City 10; cradle of the Russian navy 8; ship construction 7; navy 5 ...

Refusals – 30

Unprocessed reactions – 3 (illegible handwriting)

Voronezh. Where is it? – 330: Russia 27; Voronezh region 28; central Russia 22; central part of Russia 17; Black earth 15; Central Federal District 15; The Black Earth Region capital 8; The Black Earth

¹ The number of refusals corresponds to the number of unfilled places in tasks.

² Some reactions were not processed due to various reasons: illegible handwriting, incorrect task completion, etc.

Region center 8; Central Black Earth region; Russian center – 6; in the heart of Russia; Western Russia; here; in the European part of Russia – 5;

Refusals – 31

The associative field with free associative reactions:

Voronezh – 300: Crow 20, Medical Institute 17, Scarlet Sails 7, Chizhov Gallery 5 ...

Refusals – 77

Unprocessed reactions – 6 (illegible handwriting)

The associative fields with directed associative reactions:

Voronezh – what is it famous for? –300: Victory square 7, homeland of the Airborne Forces 7, Voronezh Sea 6, chernozem soils 6, Chizhov gallery 5, fish 5, chernozem soils 5 ...

Refusals – 129

Unprocessed reaction – 2 (illegible handwriting) + 1 (misbehaving) + 1 (unfinished phrase)

Voronezh – where is it located? –300: in Russia 49, Voronezh Region 19, in the southern part of central Russia 17, on the banks of the Voronezh River 17, not far from Moscow 15, in the RF 12, the RF 10 ...

Refusals – 91

Unprocessed reactions – 2 (illegible handwriting)

The associative fields were then integrated into one single associative field as follows:

1) free associations were generalized by the method of semantic interpretation: different metalanguage designations of the same feature in different experiments were reduced to one semantic component and formulated as a separate seme; the frequency of reactions generalized by this component was summed up (for example, the reactions "the capital of the Chernozem region" 12 and "Chernozemye" 6 were summarized by one family "Central Black Earth Economic Region" ($12 + 6 = 18$));

2) the reactions of directed associative experiments were added to the results of the free associative experiment to obtain an integrated associative field. The total frequency of actualization of each seme was summarized. For example, the reaction "capital of Chernozem region 15" was added to the seme "Central Chernozem economic region" ($18 + 15 = 33$). If individual reactions turned out to be isolated, they were subject to seminal interpretation; but they were given at the end of the psycholinguistic description of the meaning in a single list.

A description of the psycholinguistic meaning consists of two basic macrocomponents: denotative (includes denotative semes, indicating the properties and signs of a denotation) and connotative (includes connotative semes, expressing an emotional and evaluative attitude to the denotation³). It is also possible to include a functional macrocomponent in dictionary entries (indicates the specifics of the use of a lexeme in speech).

Using the method of semantic interpretation of the single associative field, two versions of the psycholinguistic meanings of the toponym "Voronezh" were obtained: Voronezh (Vr) and Grozny (Gr). The indices of brightness of semantic components were calculated by formula: Index of brightness = n/N ,

³ The evaluative components of the meaning are expressed by marks "approvingly" or "disapprovingly" (for example, such evaluative reactions to the stimulus "Voronezh" as "beloved 3, city of love 1", "love 1" are generalized by the "approving" connotative seme "beloved 5"; indices of brightness of all "approving" connotative semes are summed up, and information about the connotative macrocomponent of meaning is revealed).

where: n is the subjects who actualized this seme in the experiments; N is the total number of subjects. For example, the brightness index of the seme "Central Black Earth Economic Region" in the Voronezh semantic variant was equal to 0.30 (99/330);

On the basis of the brightness indices, the position of these semes in the semantic structure was determined (Table 01, 02).

Table 1. The field position of semes in the Voronezh semantic variant of the toponym "Voronezh"

Semes	Core (brightness index not less than 0.12)	Near periphery (brightness index = 0.11–0.04)	Far periphery (brightness index = 0,03–0,02)	Exteme periphery (brightness index not more than 0,01)
Denotative integral	–	–	–	1
Denotative differential	5	9	10	116
Connotative	–	1	–	4

Table 2. Field position of the semes in the structure of the Grozny semantic variant of the toponym "Voronezh"

Semes	Core (brightness index not less than 0.12)	Near periphery (brightness index = 0.11–0.04)	Far periphery (brightness index = 0,0–0,02)	Exteme periphery (brightness index not more than 0,01)
Denotative differential	–	–	1	–
Denotative integral	1	12	8	56
Connotative	–	–	–	2

As can be seen, most of the denotative semes occupy the extreme periphery of the field by the brightness index.

The psycholinguistic meaning is formulated by a combination of integral (given at the beginning of the dictionary entry) and differential denotative semes. Information about the connotative macro component of meanings is given at the end of the dictionary entry.

There are two possible options for describing the psycholinguistic meaning: research (it contains semes along with reactions that are summarized by these semes) and lexicographic (only semes are given).

The article presents the lexicographic version of description of the meaning in an abbreviated form: a combination of integral and differential denotative and connotative semes of the core, near and far peripheries (semes with a brightness index of at least 0.02 are given, with the exception of the integral seme "city" in Vr).

The entries were as follows: 1) headword (in bold); 2) variant of the meaning (Vr or Gr); 3) coherent definition with integral semes at the beginning and differential semes after indicating the brightness indices (numbers in brackets); 4) information about the aggregate brightness index (calculated by summing the brightness indices of all semes); 5) information about the connotative semantic macrocomponent ("approving" means a positive attitude towards the object).

Voronezh (Vr) is the city (0.01) in the central (0.10), European (0.02), western (0.02) parts of the Russian Federation (0.08), in Voronezh region (0.08), included in the Central Federal District (0.04) and the Central Black Earth Economic Region (0.30), located on the shores of the Voronezh reservoir (0.02); is the place where the Russian Navy was found (0.26), there is a historical copy battleship "Goto

Predestination" of the era of Peter I (0.02), it is the place of military glory (0.17) and a hero city (0.05), hostilities were fought in the city during the Second World War (0.03), it is the scene of the cartoon "Kitten from Lizyukov Street" (0.13), my birthplace (0.09), residence (0.12) and study (0.03), the city appears in common phrases "Voronezh is a city of courage" (0, 08), "Moscow–Voronezh, you can't catch up" (0.02), a student city (0.02) – there are various universities (0.04), for example, Voronezh State University (0.10), it has chernozem soils (0.06), the shipbuilding industry is developed here (0.04), there are often traffic jams (0.02). The cumulative brightness index = 1.95.

Approving is 0.04.

Voronezh (Vr) is the river (0.02) in the Russian Federation (0.08), in Voronezh region (0.08). The cumulative brightness index = 0.9.

Voronezh (Gr) is the city (0.03) in the center (0.07) of the southern part (0.02) of the Russian Federation (0.27) in Voronezh region (0.06), on the Voronezh River 0.09, not far from Moscow (0.06), in Moscow region (0.02), where crows live (0.08), there are chernozem soils (0.07), a reservoir (0.05), the Chizhov Gallery Center (0.04), Victory Square (0.03), Scarlet Sails Park (0.03), Temples (0.02), Chalk Caves (0.02); it is the site of the domestic navy (0.06) and the Airborne Forces (0.04), the city is provincial (0.02). The cumulative brightness index = 1.08.

Voronezh (Gr) is the river (0.02) in the Russian Federation (0.27) in Voronezh region (0.06). The cumulative brightness index = 0.35.

The meanings themselves in the structure of the polysemantic word based on their cumulative brightness indices were also distributed over the field zones (Table 03).

Table 3. Field position of meanings in the structure of the polysemantic toponym "Voronezh"

Semantic variants	brightness index not more than 0.50)	Near periphery (brightness index is 0.49–0.20)	Far periphery (brightness index is 0.19–0.03)	Extreme periphery (brightness index is 0.02–0.01)
Vr	1	–	1	–
Gr	1	1	–	–

7. Conclusion

The studies identified the semic composition of the psychologically relevant structure of the toponym, determined the brightness of each seme and its place in the field, identified the number of meanings and determined their place in the field.

The data obtained made it possible to understand the significance of certain semantic features for linguistic consciousness.

The linguoculturological commentary can describe the verbal communicative behavior of native speakers.

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