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Sense as A Socio-psychological Phenomenon

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ABSTRACT

The content of the paper refers to the field of interdisciplinary scientific research, lying at the intersection of information theory, psychology and social sciences. The material of the paper is formed on the basis of previous author's publications and is a thematic report of the authors on the study of the problem of sense.

Relevance: The problem of sense is relevant in many scientific fields. But, first of all, this problem is relevant in psychology and psychiatry. Sense, like nonsense of human speech or texts, are indicators of mental disorders.

Objective: Theoretical justification of the probabilistic approach to the evaluation of the sense contained in a person's speech or text message.

Methods: A theoretical analysis of the probabilistic and activity approaches to the problem of sense in psychology; the method of calculating the amount of information proposed by K. Shannon; the technique of comparative analysis of the source text with its probabilistic presentation, developed by the authors.

Results: The justification of the probabilistic nature of sense is given; a psychometric criterion for quantifying the sense is proposed; a scale of probabilistic estimation of sense that can be used in the diagnosis of mental disorders in psychiatry and psychology is proposed.

KEYWORDS

Sense; Information; Entropy; Speech incoherence; Schizophasia.

INTRODUCTION

Sense is an interdisciplinary concept, which is studied primarily in the humanities: linguistics, philosophy and psychology. But, in linguistics and philosophy, the meaning of the word "sense", as a rule, has a derivative character from this concept, for example, "sense of the text", "sense of the world-view of a person". In psychology, the meaning of the word "sense" reflects the animation of a person's activity aimed at achieving a certain goal. According to some psychologists, the concept of sense "... can claim a new, higher methodological status, the role of the central concept in a new, non-classical or postmodern psychology" [1, p. 4].

Thus, the subject of this research is sense as one of the

basic concepts of psychology. Sense is a reflection of a person's thinking activity. One of the forms of existence of thought is speech or – in writing – text. Therefore, the object of this research is text as the result of the purposeful creative activity of a person (an author of a text).

In dictionaries, sense is often defined as a synonym for the word "meaning". In the Russian language, the concepts of "sense" and "meaning" designate different etymologies. Russian "sense" means "with thought," what is the result of a person's thinking activity. In this publication, the authors consider the phenomenon of sense in this context.

Sense also refers to the imaginary or real purpose of any things, words, concepts or actions, laid down by a specific person or community. Sense can mean goal-setting, as well as the result of some action. The opposite of sense is nonsense, that is, the absence of a specific purpose. In psychiatry, examples of nonsense are speech disorders such as speech incoherence and schizophrenia.

The separation of the concepts "meaning" and "sense" was introduced by F. L. G. Frege in the work "Sense and denotation" [2]. In this work, Frege explores the related phrase "meaning-sense". According to him, the denotation (meaning) of the sign (word) is a certain thing in the widest sense, which the sign denotes; sense is a way of representing a denotation, connecting signs into a single whole (sensible text).

The topic of sense, in addition to the publications cited, is represented by extensive references, for example, [3-12] and publications by other authors. This paper is the result of a generalization of authors' studies on the topic of sense, which are published in Mathews Journal of Psychiatry and Mental Health [13-15], and in other journals: [16-19].

The basic hypothesis of this study of the phenomenon of sense can be formulated as follows. Sense is the thought of a person encoded by certain linguistic signs or signals of some events and phenomena in the process of his/her purposeful special activity. Signs and signals form a chain of sense (semantic) links - the code that encodes the thought and the sense accordingly. Sense carries information about its denotation and has a probabilistic nature. From the point of view of information theory, the task is to decode the code of the chain of sense links. The information received during the decoding will be the sense as described in this paper.

As the key to the solution of the problem posed, the following set of assumptions was used

1. Meaning and sense are essentially two different concepts.
2. Sense is information that a sign carries about its denotation.
3. Words of a person's speech or text message form a chain of semantic connections.
4. A chain of semantic links is a code containing sense.
5. Sense has a probabilistic nature.

MATERIALS AND METHODS

The method for assessing the value of sense is based on the following premise: since a person's purposeful activity is of a probabilistic nature, then its sense must also be of a probabi-

listic nature. Purposefulness means awareness of this activity, i.e., text as a result of the purposeful creative activity of a person (author) must a priori contain sense.

Proceeding from this premise, the main provisions of the methodology for probabilistic assessment of sense are formulated as follows. In the process of composing the text (pronunciation of speech), the selection by the author of words that are suitable for the meaning is a random event. The successive aggregate of these random events forms a chain of related words: "a chain of sense links" [1]. In order to reveal the meaning, it is necessary to set a quantitative measure of these sense links. As such a measure, the authors proposed the Shannon entropy (H) [20]. After calculating the entropy of each individual word, the entropy difference (ΔH) between two adjacent words throughout the text is found. As a result of this action, the denotation of two adjacent words is identified and the sense that will be contained in the remainder is highlighted. Since the choice of words is a random process, then ΔH is also a random variable.

To quantify the sense of the source text, one must have a reference text. As the reference text, the same source text is serving, reduced to a probabilistic form by random distribution of words in it. A probabilistic text is a text without sense. In fact, this is nonsense, or, in terms of psychiatry, a verbal manifestation of delirium. The difference between the entropies of two adjacent words is calculated for both the source and probabilistic texts.

The histogram of the entropy difference shows that ΔH as a random variable has an exponential distribution dependency. Therefore, to assess the value of sense, it is convenient to use such a parameter of this distribution as the differential entropy $H(\Delta H)$. A comparative analysis of the source and probabilistic texts by $H(\Delta H)$ made it possible to establish the following regularity: the larger $H(\Delta H)$, the greater the sense and vice versa. The revealed regularity gives grounds to use the differential entropy $H(\Delta H)$ for quantitative assessment of sense as a psychometric criterion M : $M = H(\Delta H)$.

With the probabilistic assessment of sense, the values of the criteria for assessing the senses of the source M_s and probabilistic M_p texts are compared and analyzed:

if $M_s > M_p$, then, most likely, the source text contains sense;

if $M_s \leq M_p$, then, most likely, the source text does not contain sense.

When comparing the source texts with each other, the value ΔM_s can be used by sense: $\Delta M_s = M_s - M_p$. The greater the value of ΔM_s , the greater the sense in the source text and vice versa.

RESULTS AND DISCUSSION

The psychometric criterion M makes it possible to perform a probabilistic assessment of the sense contained in the text or speech of a person, according to a special scale (Figure 1). The threshold values of the assessment scale are speech incoherence and schizophasia as anomalies of human speech and thinking activity.



Figure 1: Assessment scale of the sense of human speech activity.

Speech incoherence is a speech disorder, in which grammatical connections are broken and speech consists of a disorderly set of words. The grammatical structure is completely broken. The answers are inadequate to the questions, and in the sentence it is impossible to understand even a distant connection. The vertex of speech incoherence ("verbal salad") is a set of words or even senseless neologisms.

Schizophasia, or speech rupture, is a symptom of mental disorders, expressed in violation of the structure of speech, in which, unlike speech incoherence, phrases are constructed correctly, but do not carry any semantic load.

With speech incoherence, a person's speech is similar to the probabilistic text the authors introduced into consideration. In this case, the assessment criterion M will tend to the minimum value and indicate the absence of meaning. In schizophasia, the criterion M will tend to the maximum value and also indicate the absence, more precisely, "overabundance" of sense. It should be borne in mind that the minimum and maximum values of the criterion M correspond to speech incoherence and schizophasia, but are not their symptoms. These concepts of psychiatry are used to denote threshold values of the assessment scale of sense.

To test the adequacy of the authors' theory of probabilistic assessment of sense of real practical examples, more than 50 texts have been analyzed. In terms of the increase in the emotional and mental state of their authors, all texts were divided into the following groups:

- News;
- comments on current public issues;
- texts in case of mental disorders.

The results of the calculations are presented in Table 1.

Table 1: The results of the sense assessment of control texts.

Text group	Ms	Mp	ΔMs
Comments on current public issues	1.11915	1.04545	0.07369
News	1.08868	1.02043	0.06825
Texts in case of mental disorders	1.08186	1.05241	0.02945

The calculated data in Table 1, presented by the level of decrease in sense, show that the greatest sensibility of texts corresponds to the most emotional group of their authors. These are the authors of comments on current public issues. The least sense is contained in the texts in case of mental disorders. The news texts, characteristic for their authors in a state of neutral emotions, occupy an intermediate position in terms of the level of sensibility.

Thus, the results of the calculations presented in Table 1 confirm the main hypothesis of the conducted research: sense is encoded in a chain of sense (semantic) links of purposeful conscious human activity and has a probabilistic nature.

CONCLUSIONS

The main results of the study are as follows

- The justification of the probabilistic nature of sense has been given;
- The psychometric criterion M has been proposed for quantitative assessment of sense;
- A method for probabilistic assessment of sense has been developed.

Despite the results, it should be noted that the problem of sense remains unresolved. Using the popular metaphor in recent times, one can say: "The very meaning is of the nature of Proteus - it is volatile, fluid, multifaceted, not fixed within its boundaries" [1]. This is the peculiarity and difficulty of studying sense as a socio-psychological phenomenon.

The results obtained may be, with appropriate modification, of theoretical interest to psychiatrists, psychologists and developers of artificial intelligence.

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