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## PSYCHO- AND SOCIOLINGUISTIC TOOLS FOR RECONSTRUCTION OF INFERENCE / ASSOCIATION MECHANISM AS INDIVIDUAL COGNITIVE ABILITY

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### **Abstract**

*The present paper justifies the need to elaborate new methodology in psycholinguistics for the disclosure of such a complex cognitive mechanism of producing senses as an inference based primarily on various human associations. It was assumed that the tools of the empirical method of observation are the most appropriate for the reconstruction of this mechanism. It consists in obtaining data with the help of sensory organs, which are involved in the display of relations between things, objects, phenomena, processes and states both of the surrounding world and the inner subjective state of man. Therefore, the process of empirical study of reality is considered in detail, which provides for three main procedures: 1) actualization of the observed phenomenon, 2) its reflection in the form of scientific hypotheses, and 3) fixation of the obtained facts as the results of the study. Since the reflection process is the most significant, the article provides a critical review of the experimental methods and techniques for its analysis developed in psycholinguistics and partly in sociolinguistics tested in numerous cognitive-oriented works. It is proved that the most relevant results have been obtained by psycholinguists during the experimental study of reflected in native speakers' consciousness the association meaning of the word as an ordered set of all semantic components: more or less expressive, nuclear and peripheral things etc. The main of these experimental methods of observation (direct and indirect) were the following: free association experiment and targeted association experiment, during which the following methods were developed and applied: Osgood method of semantic differential, Levitsky method of multidimensional scaling, Sternin and Sternina comparative and parametric, Bendix method. As a result of numerous psycholinguistic studies, the experimenters pointed to the advantages (mostly) and disadvantages of the methods, which require further improvement of the developed experimental procedures.*

**Keywords:** cognitive mechanism of the inference, association meaning of the word, free association experiment, targeted association experiment, reflection process, empirical observation.

### **1. Introduction.**

Modern cognitive-oriented linguistics grounds on anthropocentrism as its basic principle, according to which the study of any linguistic phenomena and appearances must be carried out in close connection with consciousness and thinking of man, his culture, spiritual and social life, etc. with ethnic groups' values and their attitude to life in general being shaped.

Each social era has its own specificity, which is determined by analysing key ideas and concepts of society and builds its axiological scale on the basis of previous information knowledge of collective consciousness. From this point of view, every epoch has its own outlook and its limits, according to Lotman, are marked with bifurcation points giving impulses for unpredictable changes (Lotman, 1996: 341). The basis of the formation of value and world outlook of each ethnos, afterwards reflected in the layers of value-evaluative concepts, is the cognitive mechanism of inference (Zalevska, Kubriakova, Lakoff, Suvorova, Turner, Fauconnier et al.), which grounds on thinking processes of native speaker to produce unrealized logical connections in the evaluation of phenomena, items, events etc., which have not received language-rated objectivation. Based on own background knowledge, a person is able to make conclusions, including the ones of the evaluating nature, about the observed phenomenon on the basis of the associations arising in consciousness and those that can be disclosed by conducting various empirical observations and experiments with native speakers of a particular language.

### **2. Methodological Basis for Empirical Observation as a Tool of the Psycholinguistic Method.**

The methodological prerequisite for any psycholinguistic (experimental) research is an observation over the object under analysis. And depending on the research tasks Leontiev distinguishes three main types of such observation: 1) purposeful observation, when according to the plan of the researcher (experimenter) the situation with the participants of the experiment (recipients) is partially changed; 2) self-observation (introspection); 3) empirical observation (Leontiev, 2005: 73). In the collective monograph "Fundamentals of the theory of speech" one of its authors Iliasov states, "the empirical (primarily experimental) study of aspects of speech activity, which is the object of psycholinguistics, is carried out using a number of methods borrowed from the related sciences – psychology, physiology and linguistics. In his opinion, the empirical study of reality consists in obtaining data through the senses (with or without equipment), which are a reflection of the relations between things, objects, phenomena, processes, and states of both the external and, in fact, the internal subjective world of a human. Provided the acquisition of data on the properties of phenomena of material and spiritual culture is impossible, then their indirect study is carried out by means of empirical observation of other properties tangent to the object of scientific research. Data obtained in empirical studies is called facts (factual information)" (Iliasov, 1974: 106).

Referring again to Iliasov, there are no objections to his assertion that the theoretical stage of such a study is in the analysis of facts based on assumptions, in their systematization, generalization and, most importantly, in the formulation of new facts based on their principles in the form of hypotheses, models, which should subsequently be checked in an empirical study, and, in case of actual confirmation, hypotheses become theories (Iliasov, 1974: 107).

The facts can be obtained via a self-conducted empirical observation or can be borrowed from other authors with binding references and arguments. Proceeding from this methodological path, there are such types of scientific observations: "1) purely empirical (experimental), in which the method of obtaining facts is described, 2) purely theoretical, in

which there is a critical analysis of the facts (obtained either independently or jointly with other authors), formulation of hypothesis and models, or 3) mixed (most often) – the facts are obtained and analysed separately or together with the facts received by other researchers. At the next stage, as follows from the goal of empirical study of reality, three basic procedures are determined: 1) actualization of the studied phenomena, 2) their reflection in the scientific concept, and 3) fixation of the facts” (Iliasov, 1974: 107).

We fully agree with this researcher, who assumes that “in the empirical study of various aspects of subjective and objective reality, the scholar must perform the procedure of actualization, in particular those properties of the phenomenon under investigation, [...] which should be monitored and reflected in the process of research and then recorded” (Iliasov, 1974: 108).

The procedure for displaying the properties of the investigated phenomena is a selective process on the part of the researcher (or recipients, in case of the study of mental phenomena) that occurs either directly by the senses or on the basis of internal reflection, or indirectly, by means of assumptions involving the identification of certain logical relations between the properties of phenomena to be empirically observed.

This procedural stage is the basis of selection of two main types of empirical observation method: direct and indirect.

The next third procedure – the record of facts through natural language or other sign systems is a transitional methodological step from the empirical stage to the theoretical one. At the same time, the most significant of the three above-mentioned interrelated procedures of empirical research, according to Iliasov, is a reflection (Iliasov, 1974: 108). And, as the results of numerous psycholinguistic cognitive-oriented studies show, this does not raise objections, in which various combinations of ways and means of reflection of the facts analysed were applied.

The important role in the organization of direct reflection is performed by correctly compiled protocols for recording individual indicators. They contain the list (concluded in advance) of what is to be reflected, which is a reliable way of organizing its results, which helps to make it consistent and systematic. At the same time, this list is also a way of fixing the data obtained, which later become a subject to statistical processing, which is the first procedure of the next theoretical stage of the study (Iliasov, 1974: 109).

It is assumed that the direct method of empirical observation is the most effective methodical tool for obtaining data about the properties of various mental processes and human conditions. For this purpose, when analysing certain mental processes, it is worthwhile for the recipients, who will reflect phenomena under study, to be well-prepared for such a reflection. The respondents are required to pay attention to the various properties and aspects of the psychic phenomena that occur in the process of their actualization in order to distinguish and fix them properly (Iliasov, 1974: 109). With this objective in view, an effective presupposition method in organizing a direct empirical reflection of the properties of internal processes is an interview of the researcher with the recipient(s) in the focused questions and answers session, which tend to contribute better and more accurate responses given as their reflexive report (Iliasov, 1974: 110).

Why is this method so important for empirical observations? Let us turn to the interpretation of this method in the “Psychological Explanatory Dictionary of Modern Terms” (by Shapar), where the interview, although determined as a supplementary method, is given a significant propaedeutic role, since during its implementation, various issues between the researcher and the recipients can be revealed, including distrust, incomprehensibility of certain questions, the purpose of the formulated tasks, etc. A conversation is necessary at different stages of the empirical research both for the primary

survey and clarification of the results and conclusions obtained with the help of other methods of observation (Psychological Explanatory Dictionary of Modern Terms, 2009: 38). With this in view, the following types of conversation are distinguished: 1) “introduction to experiment” – the stage of engagement in cooperation; 2) “experimental conversation” – the stage of checking the working hypothesis; 3) “conversation-interview” – the stage (my specification – *N. S.*) of obtaining information through an oral interview. Compared with the questionnaire, the conversation provides more freedom of the respondent in the formulation of answers, comprehensive response, and so on.

There are two types of interviews: 1) free interviews – not regulated by the topic and structure of conversation, and 2) standardised interviews – their structure is close to the questionnaire with closed questions. The differentiation of these types depends on the complexity of the problem, the purpose and the stage of the research. The extent of freedom to choose the answers of participants in empirical observation is measured by the availability and form of questions; the level of information received – by the complexity of the answers. Interview questionnaires are stacked by type of sociological questionnaires, which aim to get typical answers to a great number of questions (Psychological Explanatory Dictionary of Modern Terms, 2009: 39). They are pertinent in the first stage of empirical research for initial orientation in a scientific problem. However, questionnaires can provide the necessary information during further refinement of the properties under study and formulation of the new hypotheses (Psychological Explanatory Dictionary of Modern Terms, 2009:169).

According to Iliasov, compiling [...] questionnaires, forms, cards etc., facilitates a methodical organization of the procedure for direct reflection of properties of internal processes (Iliasov, 1974: 110).

Generally, above-mentioned two main types of empirical observation method – direct and indirect – make up the basis of the differentiation of psycholinguistic methods of study of speech, depending on the disciplines they are borrowed from. There are three main groups of empirical research methods of psycholinguistic aspects of speech on the basis of observation and experiment: 1) psychological (direct methods of studying the mental processes underlying the speech, and indirect methods of studying these processes through other parameters of one or another mental process), 2) physiological (indirect methods of studying mental processes that ensure the implementation of speech activity through the parameters of physiological processes associated with them, and also direct and indirect methods for studying objective processes associated with speech), 3) linguistic (which are tangent to psychological but differ from the latter only by those particular subjective parts of the mechanism of speech activity that are the subject of linguistics and studied by means of linguistic methods) (Iliasov, 1974: 112–113).

### ***3. Experimental Linguistic Research as a Reconstruction Tool for Cognitive Mechanism of Human Associations.***

One of the effective tools for combining methods and separate techniques of linguistic and psychological empirical research, which was consistently described in the already mentioned collective monograph “Fundamentals of speech activity theory”, is a linguistic experiment. But as it is shown by modern psycholinguistic studies (Bisovetska, Zahorodnia, Korolev, Terekhova, etc.) purely linguistic experiments do not exist.

For this purpose, let us clarify the scientific scope of the term “experiment” in “Psychological explanatory dictionary of the modern terms”, which is defined as “one of the main, along with empirical observation, methods of scientific knowledge in general and psychological research – in particular [...], which involves a special organization of the research situation [...] and the purpose of which is to register changes in the behaviour of the object under study”. Traditionally, there are three types of experiments: 1) laboratory,

2) natural, and 3) field [...]. In addition, it is possible to distinguish the ascertaining and forming parts of experiment (Psychological Explanatory Dictionary of the Modern Terms, 2009: 112).

The authors of the dictionary note that “a properly organized experiment allows us to test hypotheses for cause-effect relationships, and not only to establish the connection between variable characteristics” (Psychological Explanatory Dictionary of the Modern Terms, 2009:113).

In linguistics, according to Shahnarovich, one of the first researchers who began to discuss the need to verify the particular nature of a particular language phenomenon experimentally, was Shcherba (Shahnarovich, 1974: 125). He believed that the researcher of natural languages, having constructed some abstract system on the linguistic facts, should check it on new facts (this has been discussed at the beginning of this study), that is to see if the facts derived from this system correspond to reality (Shcherba, 2007: 31–32). These his ideas became the basic for conducting experiments in linguistic works.

The researcher assumed that the method of linguistic experiment is especially productive for syntax and lexicography, and, definitely, for stylistics. And in general, Shcherba was right to claim that without experiment it was almost impossible to study these areas or directions of linguistics objectively (Shcherba, 2007: 32). We are convinced that it refers not only to the named directions but also to other various aspects – as purely linguistic as interdisciplinary areas. Shcherba expressed interesting self-reflection ideas on this subject, in particular, about close connection between psychological methods with experimental ones: “something that I once called the psychological method [...], was a method of experiment, only back then I did not realize this completely [...]. Experimenting with various linguistic forms and observing what happens to their meanings, what senses they produce in their new qualities, etc.” (Shcherba, 2007: 33), – these were the first steps of the researcher, which were later followed up by the modern representatives of psycholinguistics.

As to the problem of developing effective methods of disclosing the meaning of the word, Sternin notes that exactly the psycho-linguistic approach demonstrates the real complexity of the matter. The meanings manifested through psycholinguistic experiments are always much more extensive and deeper than their representation in traditional explanatory dictionaries (Sternin, 2007: 12). This again confirms the existence of various scientific positions on interpretation of the nature of values in linguistic paradigms (structural and cognitive) and on the ways of its presentation in dictionaries.

In the context of this discussion, Popova suggests differentiating terminologically two types of meanings: 1) the meaning presented in the explanatory dictionary, and 2) the meaning reflected in the consciousness of native speaker (Popova, Sternin, 2007: 94).

Accordingly, this implies a different methodological approach to its analysis: purely linguistic – to detect the first type, and psycholinguistic – the experimental one – to reconstruct it as an element of the structure of native speaker’s consciousness and the language world view in the whole. Kochergan emphasizes that associative connections are important for the reproduction of the language world view (Kochergan, 2006: 314).

“Lexicographic meaning, according to Sternin, can be considered as a set of basic nuclear semes, which constitute, as lexicographers consider, the main essence of meaning” (Sternin, 2011: 13). Meanwhile, Popova is convinced that “there is another type of meaning – the psychological, real or psycholinguistic meaning of the word as an ordered unity of all semantic components that are actually associated with a certain sound envelope in the consciousness of the native speakers. This is the content of semantic components that actualizes a separate (isolated) word in the human mind in the unity of all its semantic features: more and less expressive, nuclear and peripheral. The psycho-linguistic meaning is

structured according to the field principle, and the components that make it are built hierarchically according to the expressiveness of actualization in the consciousness” (Popova, Sternin, 2007: 97). The motivational continuum of value senses (as a complex matrix reciprocity of some components of various meanings, configuration of which creates layers of value concepts) of social axioconceptospheres is organized according to this principle. Their ethnosemiometric measurements are carried out most effectively through psycholinguistic experiments.

In this case we agree with Sternin, who notes that the experimental description of the semantics of the linguistic units makes it possible to imagine the content of the word as a certain psychological reality, to discover such semantic components that are not fixed by other methods and approaches of semantic analysis. Anthropometric methods (methods of measuring the reflection degrees of the phenomena of being in a human consciousness – my specification – *N. S.*) provide for acquiring of knowledge about language via addressing the native speakers with the language various questions and tasks consisting of two procedures: the actual linguistic experiment and linguistic interviewing (Sternin, 2011:13).

#### ***4. Linguistic Experiment and Linguistic Interview and Their Procedural Methods for Detection of Associations.***

The scientist distinguishes between these two procedures: a linguistic experiment and linguistic interview (polls), with one often meaning another in the practice of psycholinguistic research (Sternin, 2011: 18). An experiment involves an indirect inquiry of information – receiving from recipients (surveyed) some new linguistic material, which is subject to interpretation, and only afterwards the results obtained are used for generalization and conclusions. Meanwhile, linguistic interviewing is aimed at a direct request for information – questions are formulated, and the answers to them are directly the result of the study, and on their basis generalizations and conclusions are made.

Sternin considers a method of linguistic interviewing in the form of a questionnaire as a not completely psycholinguistic but a sociolinguistic research, which is a direct appeal to the consciousness of native language speakers with direct questions for the detection of studied signs of speech phenomena (Sternin, 2011: 18–19). Linguistic interviews are conducted both orally with individual informants and in written form with large groups of informants; respondents’ (informants’) answers are recorded by the researcher or by the respondents themselves in writing. A written form (questionnaire) is most commonly used (Sternin, 2011: 19).

The experimenter directs native speakers to a conscious comprehension of the content of the linguistic units or concepts that verbalize them as well as the verbal formulation of their reflection (Sternin, 2011: 29). After receiving the answers, the researcher summarizes and statistically processes the results.

Sternin highlights the following methods (methods of analysis – my specification – *N. S.*) of linguistic interviewing method: procedure of direct linguistic interviewing, procedure of semantic differentiation (technique of detection of differential signs of a linguistic unit), procedure of evaluative differentiation, receptive approach, exemplification approach (Sternin, 2011: 19–20).

The procedure of direct linguistic interviewing aims at identifying the direct knowledge of the native speaker about the meaning of words, the possibility of word usage etc., and reliably reveals the mechanisms of designation of objects and phenomena of the real world (Sternin, 2011: 29–30). The procedure of direct linguistic interviewing takes place in several successive stages (with my correction – *N. S.*):

- 1) submission of the list of questions and written questionnaires to informants;
- 2) generalization of answers which differ in form but are close in meaning;

- 3) formulation of semantic components on the basis of the answers received;
- 4) ranking of the obtained semantic components by the frequency of their presentation in the questionnaires;
- 5) formulation of association meanings of the word (Sternin, 2011: 30);
- 6) comment on the word usage in a given construction, which makes it possible to establish which semes are actualized in the word when it is used.

Sternin argues that direct linguistic interviewing is appropriate in solving tasks related to the allocation of an empirical component of meaning as well as for the allocation of peripheral and dispositional semes. Although this procedure can also be used to identify the main, permanent, vivid semantic components, but for this purpose, it is necessary to develop a clear system of purposeful questions based on the specific study group of vocabulary (Sternin, 2011: 32).

The method of semantic differentiation as a procedure for the method of linguistic interviewing (the method of identifying the differential features of the linguistic unit) aims to obtain answer from the informants in the form of formulated differences in the semantics of words offered by researcher. This procedure is effective in identifying the peripheral components of the word meaning. The method of evaluative differentiation as a procedure is oriented on fixing the evaluative component of semantics in the proposed register of words and their subsequent differentiation for this component. The receptive method involves determining the meaning of the linguistic unit in the context and receiving answers to the question: what meaning from the suggested list has the word used in the context? The method of exemplification analysis – in another terminology – illustrative analysis consists in selecting linguistic examples-illustrations for one or another proposed linguistic concept or word by informants) (Sternin, 2011: 33).

The method of a linguistic experiment is an appeal to informants with the task of extending, modifying, supplementing, completing, etc. some text, phrase, forming a phrase with some word-stimulus (Sternin, 2011:20). There are two basic and the most demanded types of psycholinguistic studies (Belianin, Bisovetska, Goroshko, Zagorodnia, Sternin, Frumkina, Grimm, Engelkamp): 1) *a free association experiment*, in which an informant has to respond to the word-stimulus by the first word which comes to mind without limiting in any way the formal or semantic features of the reaction-word; 2) *targeted association experiment*, in which the experimenter restricts the choice of the word-response, for example, gives the instruction to respond with nouns only, etc. [Goroshko 2001: 16]. An association experiment in its two varieties is aimed at identifying the associations that have developed in the individual in his previous experience (Ibid.).

The researchers of various spheres of expertise, and not only psycholinguists, tried to reconstruct the history of these procedural experimental tools.

It is assumed (Yaroshevsky) that “sphere of imagery” (according to Aristotelian terminology – a sphere of imagination) was discovered as an object of scientific research even by Aristotle. Before, in the cognitive process there were two forms: feeling and thinking, then Aristotle showed that these forms did not exhaust the work of the cognitive mechanism. An important role in it belongs to the imagination. Aristotle not only identified such a cognitive ability of human as the representation of objects, which is a specific level of its cognitive activity, but also formulated the hypothesis that representations occur according to certain rules / mechanisms, which modern science calls laws of association, and cognitive linguistics – cognitive mechanisms (mechanisms of connections of representations by adjacency, similarity (metaphorical and metonymic) and contrast (binary)). It is apparent that Aristotle is the founder of one of the most powerful psychological theories – cognitive-associative (Yaroshevsky, 1976: 68–69).

The method of free association began to be actively applied in the early XX century in the practice of psychoanalysis as a way of reconstructing subconscious layers of the human psyche. Jung, the German psychiatrist and psychoanalyst, considered the association experiment as a valuable diagnostic tool, since he discovered that a latent period increased when words-stimuli were associated with circumstances that injured the respondent. During the reading of the stimulating words, the patient had to say the first thing that came to mind; the reaction time, changes in the breathing rhythm, and other indicators that would indicate the emotional response of patients were recorded in this process. If psychophysiological reactions to a certain word were different from reactions to the rest of the words, Jung concluded that the respondent had certain subconscious emotional problems associated with the stimulus word or possible response to it (cit. by Zagorodnya, 2018: 61).

Jung's ideas in psychology were developed by Luria (early XX century), who developed an "adjoint motorial method", which was a modified version of Jung's test and involved the discovery of hidden reactions of affect. In the early XX century the first psycholinguistic studies created associative norms based on association experiments of G. Kent and A. Rozanov, the American psychologists (Ibid. 2018, 61–62).

We should note that the modern cognitive vector of psycholinguistics aims researchers at the study of the specifics of language consciousness. Studying the language, according to Karaulov, is not possible without referring to a person as a specific linguistic personality (Karaulov, 1996: 7). And direct reproduction of vocabulary can be carried out [...] mainly by means of addressing the consciousness of the native speaker, that is, using the data of the free association experiment (Zolotova, 2001: 72). Associations have the status of a universal factor of language development (see Chabanenko): "all structural organization of the lexical system of language is determined by associative relations, which are constantly diversified due to changes in thinking and its replenishment with new concepts" (Chabanenko, 2005: 135). The association as a connection between certain objects or phenomena that is based on the subjective experience of a person is so automated that it cannot be understood (Frumkina, 2001: 189–192). And this gives reason to suppose that while studying the associations a researcher turns to the unconscious depth of the human psyche, to archetypes of collective unconscious (Frumkina, 2001: 192).

A free association experiment provides an opportunity to get information about the semantic connections of words that objectively exist in native speaker's mind. Linguistic consciousness, according to Karaulov, is manifested in two modes: active, or sense-forming, and passive, or sign-forming. Associative-verbal network is a material analogue and a source of sense formation, where the relation of stimulus-response is its initial stage (Karaulov, 2006:89). According to associative reactions, it is possible to find compatibility of words in speech; what is more, the regularities of the distribution of words in a free association experiment and the probability of their appearance in the speech flow are extremely close (Ufimtseva, 2004: 4).

The reactions obtained during the association experiments can be considered the associative profile of images of consciousness which is specific to a particular culture and language. They integrate mental and sensible knowledge accumulated by a certain ethnic group (Ufimtseva, 2004: 5). The reaction in the free association experiment is free, which makes it possible to interpret it as a verbal actualization of the semantic component of a word-stimulus – the most expressive, important for linguistic consciousness of informant (Sternin, 2001: 36). That is why associative reaction essentially depends on age, sex, profession, social status of the informant, and many others factors (Sternin, 2001: 37). In contrast to the free experiment, the targeted association experiment is conducted with one or another restriction on the reaction that is proposed to be given to recipients (Sternin, 2001:



37). The procedural stage of the targeted association experiment is a research operation on the completion of an experimental phrase (incomplete structure). The researcher forms phrases containing the words necessary for analysis and proposes them to the recipients, but at the same time he sets a purposeful task to disclose in a response a certain semantic component of the word (necessary for the researcher) (Sternin, 2001: 38). The results obtained are generalized through the formulation of the corresponding senses, and the frequency of mentioning one or another sense in the experiment allows determining its expressiveness in the structure of the meaning (Sternin, 2001: 39).

##### **5. Procedural Methods for Free and Targeted Association Experiments.**

Methods of free and targeted association experiments as tools of an effective combination of procedures of direct psychological methods with linguistic ones were successfully developed and tested by various scientific schools of psycholinguistics during experimental researches. One of such integrated methods was the method of "measurement of meaning" developed by Osgood and tested under the name of "semantic differential" (Iliasov, 1974:114). This method makes it possible to identify components of the word meaning by selective procedures of each of the association experiments.

Chernivtsi scholar school, headed by Professor Levitsky, worked in this direction in Ukraine. This school was one of the first ones whose followers used similar tools to study the meaning of the word in experimental ways. This procedure is to provide recipients with words along with scales containing polar concepts (in the concept of this study, which deals with value concepts, we use the term binary concepts such as: good / evil, truth / false, favour / harm, right / left, etc.). Using these scales, recipients should characterize the meaning of each word, indicating its place on the semantic scale. Levitsky called this procedure the "multidimensional scaling". This method suggests the respondents choose between two binary concepts (Levitsky, 1989: 142).

At the same time Levitsky explains the following: "if the experimenter wants to get the word's evaluation using the semantic differential method in its "pure form", i. e. to find out only the speaker's attitude to the subject, phenomenon etc. marked by the word, then he should develop certain procedural conditions for this. Nevertheless, according to Levitsky, those conditions which should be avoided due to their broad semantic context (for example, 'warm-cold' – for the word *winter*), we believe they are just necessary to reconstruct the associative meaning of the word under study, in comparison with the denotative meaning. Moreover, the researcher claims that, "no procedural conditions can eliminate the influence of different types of context: the influence of phraseological units, set combinations (phraseological context), the influence of the figurative meaning of the analysed word (metaphorical and metonymic contexts) etc., the influence of mythological artifacts (mythological context) as a fragment of national ethnopsychology". Levitsky recommends introducing into the experiment only those scales that allow revealing the denotative signs of meaning, but we consider this procedure to be experimentally inappropriate, because the denotative meanings have already been found and recorded in the explanatory lexicographic sources (Levitsky, 1989:145). For the experimental detection of the semantic structure of the word under study, it is expedient to measure the degrees of overlap (coincidence) of both meanings or the predominance of the association meaning over the denotative, and vice versa (see Zagorodnya).

Levitsky's method of "multidimensional scaling" is the most suitable procedural tool for the study of the semantic structure of the word, which is aimed at verifying the semantic components, previously allocated by means of other methods of analysis and, most importantly, oriented to measure the level of comprehension of individual semantic components of word by native speakers. We assume that by other methods, Levitsky

understood either a definitive analysis or rather a method of component analysis as an integral part of the structural method.

This experimental procedure involves the following stages of its implementation. The first stage is the making list of semes based on meanings of words from various explanatory dictionaries, which can be supplemented by intuitively distinguished features and isolated in previous experiments. The second stage – the informants are offered to identify the presence of each seme from the proposed seme list in the structure of the meaning of the word using a certain scale. With this aim, the researcher formulates the question: “is this seme included in the meaning of the word?” It is possible to use a six-point digital scale to answer the question, for example: 0 – I do not know; 1 – yes; 2 – more like yes; 3 – probable; 4 – most likely not; 5 – no. The results obtained from each seme are averaged out (Levitsky, 1989: 131).

The third stage is the calculation of seme knowledge indices by recipients of the experiment. For the separate semes we can calculate: 1) the average seme index on the semantic scale (as the arithmetic mean of grades set by all informants on the given sign); 2) the index of knowledge (as the ratio of positive grades of informants of a certain seme, grades which differ from 0 – I do not know, to the total number of informants). In terms of the average seme index on the semantic scale, we can determine solid semes (index 1–1,5), relatively solid (1,6–2,5) and indeterminate (2,6–3,5). Solid and relatively solid semes are also allocated in the negative part of the scale. The structure relevant meanings are solid and relatively solid indications with a rather high knowledge index (Levitsky, 1989: 132).

This procedure was improved by Sternin and Sternina and successfully tested by many students of Voronezh scholar school as “comparative and parametric method”. According to the scholars of this method, “its essence lies in the development and application of formalized parameters of the analysis of different languages, conceptospheres and their national specifics. Characteristics of a language or cognitive phenomenon in the framework of the corresponding parameter is expressed as a certain index represented in a numerical form. Comparison of the same indices in different languages and conceptospheres makes it possible to claim the existence or lack of national specificity for this parameter as well as the degree of its manifestation in each language” (Sternina, 2014:3).

This method is also effective for studying the expressiveness of the semes (which was discussed above and can be carried out by using the procedure elements of a targeted association experiment). It also possible to carry out in accordance with the Levitsky’s procedure to demonstrate their national specificity in studied languages (Sternina, 2014:51).

Within the framework of further research it is supposed to find out the seme composition of the evaluative-marked word (where the score acts as a parameter) based on the following 5 indices (developed by the followers of the academic school of Sternin and Sternina): 1) index of seme expressiveness (which is effective in carrying out an association experiment, since it shows the ratio of the number of recipients, who actualized the evaluative seme in word-stimulus during the experiment, to the total number of participants); 2) cumulative index of the meaning expressiveness – the sum of the expressiveness indices of all semes, which form the evaluative meaning; 3) index of seme vocabulary fixation (Sternin, Liubova 2014) – amount of fixations of each evaluative seme in the whole set of definitions in the analyzed dictionaries; 4) cumulative index of vocabulary fixation of a specific lexicographic meaning – a set of indices of vocabulary fixation of individual evaluative semes of this meaning; 5) index of the equivalence of the evaluative semes of LG is measured on the basis of the ratio of evaluative semes number of studied LG which have equivalent evaluative semes in the language of comparison, to the total (sum) number of evaluative semes of the LG under study.

Sternin highlights the method of subjective definitions in the procedure of targeted association experiment. According to this method, during experimental study of the word semantics recipients are offered to provide their own verbal definition of the word meaning that researcher is interested in. They are offered a verbal pattern that focuses on determination of verbal definition, which is one of the procedures of a targeted associative experiment (Sternin, 2014: 39).

The associative line of experimental research was actively developed by representatives of the American school of psycholinguistics and is known as method of Bendix. This method was aimed at identifying the components of the meanings of words not necessarily associated with a specific LG by forming experimental structures in which the explored word is opposed to other words in one test phrase. Recipients are offered to answer if the structure (a linguistic structure formed by the researcher) contains the opposition, i. e. whether the words are opposed by meaning in the tested phrase. The revealed opposition gives grounds to suggest in this case the existence of differential features (semes) on which this opposition is based. Informants should complete or expand the test structure, and explain (explore) a differential feature that contrasts the semantics of the studied words.

This procedure is a targeted association method, since the recipients are purposefully directed to the verbal formulation of semantic differences in the form of oppositions, which should complete the structure in the linguistic and semantic aspects. The obtained results are interpreted as an objectification of differential semes of the studied word meanings (Sternin, 2011: 41).

However, according to Sternin, the specifics of the method of Bendix that differ it from the similar techniques is that it can be used to study words that do not form a clear LG (while component analysis necessarily involves the analysis of a certain LG) (Sternin, 2011: 42). Nevertheless, it is expedient, since it makes it possible to find out the same composition of units with abstract semantics, which are the symbols of binary notions.

### ***6. Chain Experiment.***

Apart from two most proven techniques of linguistic association experiment: free and targeted ones, which were described above, Goroshko highlights the third kind – the chain experiment, when recipients are offered to respond by any number of words  $R_i$  (responses), the first ones that come to their minds when  $S$  (stimulus word) is offered, without limiting either formal or semantic peculiarities of words.

The chain associative reaction is understood as uncontrolled, spontaneous continuation of the reproduction process of fragments of the person's conscious and subconscious minds. The experience of the chain experiment is described in details by Leontiev, who believes that “the chain of associative series is the sequence of individual speech responses (words) of recipient on proposed stimulus for his psyche, which is a special word, spoken by the experimenter, and his task is to pronounce the words immediately, which at this moment fall into his mind. The results of this experiment allow us to consider the associative series not as a simple sum of individual associations (stimulus-response), but rather to record the complex interaction of individual moments of the associative process, which transforms associative series into cognitive structures, understanding of which is possible only with the special analysis of these structures” (Leontiev, 1983: 53).

### ***7. Advantages and Disadvantages of Association Experiments.***

Each of the three types of association experiments has its advantages and disadvantages and aims to solve specific research tasks.

Results of free association experiments are the most reliable. Nevertheless, some weak point in the methodological approach of the allocation of some consists, above all, in the

semantic interpretation of received associations which depends on the competence of the researcher, which reduces the objectivity of procedure results.

According to Goroshko's observations, the targeted experiment also limits the association process and directs the association in the required way, for example, the method of uncompleted sentences imposes some frameworks that can reduce the reliability of the results and distort the real picture of associations (Goroshko, 2005: 53–54).

In the chain association experiment, respondents are offered to name any possible number of words in a limited time. According to the researcher, “it also shows a certain dependence between the sequences of associations that arise in the minds of a speaker. Occasionally, it turns out that i-response is actually a reaction not to the initial stimulus, but to the previous reaction, which became a new stimulus. It is difficult to clearly distinguish the real stimuli, which have led to this or that association because they are in certain connections, most often – in semantic connections between them” (Goroshko, 2005: 54).

### 8. Conclusions.

In conclusion, it should be noted that for the disclosure of such a complex cognitive mechanism as the inference, which is based primarily on a variety of human associations, the methodological tools of psycho and sociolinguistics will be relevant. Thus, one can get the results of reflection in the human consciousness of the connections between things, objects, phenomena, processes, and states of the surrounding world, and also its internal subjective state recorded in the meanings of linguistic units. The most relevant results are obtained during psycholinguistic experimental study of the associative component of word meaning as an ordered set of all semantic components reflected in native speakers' consciousness: a more or less expressive, nuclear and peripheral things etc. The main of these empirical methods of observation (direct and indirect) are as follows: free association experiment and targeted association experiment, during which the following methods were developed and applied: Osgood method of semantic differential, Levitsky method of multidimensional scaling, comparative and parametric method of Sternin and Sternina, method of Bendix. As a result of numerous psycholinguistic studies, the experimenters pointed to the advantages (mostly) and disadvantages of these methods, which require further improvement of the developed experimental procedures.

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### Анотація

У статті обґрунтовано необхідність розробки нової методології у психолінгвістиці для розкриття такого складного когнітивного механізму продукування смислів, яким є інференція, що заснована, передовсім, на різноманітних асоціаціях людини. Зроблено припущення, що для реконструкції цього механізму найбільш доцільним є інструментарій методу емпіричного спостереження, що полягає в отриманні даних за допомогою органів чуття, які беруть участь у відображенні відношень між речами, предметами, явищами, процесами і станами як навколишнього світу, так і власне внутрішнього суб'єктивного стану людини. Виходячи з цього докладно розглядається процес емпіричного вивчення дійсності, який передбачає три основні процедури: 1) актуалізацію за спостережуваним явищем, 2) його відображення у вигляді наукових гіпотез та 3) фіксацію отриманих результатів дослідження. Оскільки процес відображення є найбільш суттєвим, то у статті здійснено критичний огляд розроблених у психолінгвістиці й почасти – у соціолінгвістиці – апробованих у численних когнітивно-орієнтованих працях експериментальних методів і методик для його аналізу. Доведено, що найбільш об'єктивні результати дослідники-психолінгвісти отримали під час експериментального вивчення відображеного у свідомості носіїв мови асоціативного значення слова як упорядкованої сукупності усіх його семантичних складників: більш і менш яскравих, ядерних і периферійних тощо. Основними з цих експериментальних методів спостереження (прямих і опосередкованих) виявилися: вільний асоціативний експеримент і спрямований асоціативний експеримент, у ході яких паралельно були розроблені й застосовані: метод “семантичного диференціалу Ч. Осгуда, метод семантичного шкалування В. В. Левицького і Й. А. Стерніна, зіставно-параметричний метод Й. А. Стерніна і М. А. Стерніної, метод Е. Бендікса. У результаті проведення численних психолінгвістичних досліджень експериментатори вказали на переваги (більшою мірою) і недоліки цих методів, які потребують подальшого вдосконалення розроблених експериментальних процедур.

**Ключові слова:** когнітивний механізм інференції, асоціативне значення слова, вільний асоціативний експеримент, спрямований асоціативний експеримент, процес відображення, емпіричне спостереження.