

7th icCSBs 2018
**The Annual International Conference on Cognitive - Social,
and Behavioural Sciences**

**MANIFESTATIONS OF REGRESSION IN THE STRUCTURE OF
SEMANTIC EXPERIENCE**

Sipovskaya Yana Ivanovna (a)*

(a) Laboratory of abilities and mental resources named after V.N. Druzhinin, Institute of Psychology, Russian Academy of Sciences, 129366 Moscow, Yaroslavskaya st., b. 13, Russia, syai@mail.ru, +7-915-413-82-32

Abstract

The hierarchical structure of sensory semantic abilities (Kholodnaya, 1983; Lickliter, Bahrick, 2000; Sechenov, 2001) of different types of modality: tactile, taste, auditory, olfactory and visual sensations - is considered in the article from the perspective of the development principle (Kholodnaya, 2012). The ratio of manifestations of sensory semantic experience in the context of intellectual competence is marked as a characteristic of the productivity of intellectual activity. Also, the structure of sensory semantic abilities is shown in accordance with the rate of differentiation of the components of the mental experience. In addition, the established regression of individual experience is operationalized as the stages of ontogenetic development of a person developed over time. That statement causes a preliminary argument in favor of the difference in the functional load and the degree of differentiation of conceptual sensory semantic structures. This fact, along with the very attitude to the concept of regression in the world psychological literature, has been developed insufficiently, despite a number of pioneering studies (Aleksandrov et al., 2017) where regression is determined by the way of learning, coping with a stressful situation or, summarizing what has been said, as a stage of development. In accordance with the results, the regression of conceptual experience goes from sensory semantic abilities of the visual type through the taste, olfactory and auditory seniority to sensory semantic abilities of tactile type. The results deepen our understanding of the structure and principles of the organization of the most basic weakly differentiated kind of conceptual experience - the semantic abilities of the sensory type.

© 2019 Published by Future Academy www.FutureAcademy.org.UK

Keywords: Regression, conceptual experience, sensory semantic abilities.



The Author(s) 2019. This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

In the person's psychological reality from the point of the evolutionary approach, there is a kind of determination in stadiality of person's developmental stages with irreversible new formations that determine a sharp jump from one stage of individual development to another. The present research inspired to be the search to uncover the entire structure of individual experience in its components. Defining mental experience as a system of individual resources that determine the characteristics of subject's cognitive attitude to the world, several of its components distinguished to be different in the functions performed (Sipovskaya, 2017; Lickliter, Bahrick, 2000; Gregory, 2003; Kholodnaya, 2012). In terms of conceptual experience, such manifestations are semantic, categorical and conceptual abilities. It is the degree of their formation, differentiation and integration that determine the adaptive subject's behavior, his competence in this or that field of activity. Along with this, it should be noted that these abilities are also heterogeneous, metasystems in relation to more particular and less differentiated abilities. Such systematic nature of the sphere of conceptual experience is still poorly understood, which determines the conduct of the present study. This approach will allow us to distinguish the stages of mental development and individual formation of the person's mental experience, highlighting the earliest structures of the psychic structure in their continuous interaction with higher mental functions (Alexandrov & Sams, 2005). It is assumed that the earliest structures are less differentiated, which is expressed in the specifics of the connection, for example, with competence indicators. Meanwhile, it is less developed forms of behavior that person turn to in the case they encounter an obstacle, stressful situation, learning a new skill. Thus, regression appears as an adaptive behavior aimed at finding or forming a new solution to the problem area at a certain stage of the subject's development (Aleksandrov et al., 2017).

The sample of the presented empirical study was made by older adolescents because of the special sensitivity of person's psyche at that age for various spheres of human activity, including a mental one (Arshavsky, 1980).

2. Problem Statement

Thus, the manifestations of conceptual experience's components are manifested as variables of research, namely: sensory semantic abilities of different modalities - tactile, taste, olfactory, auditory and visual, and also - manifestations of intellectual competence.

3. Research Questions

The theoretical hypothesis of research: indicators of conceptual (semantic) abilities are heterogeneous in their connections with manifestations of intellectual competence due to the different degree of differentiation of sensory characteristics.

4. Purpose of the Study

- 4.1. The purpose of the research: the disclosure of the specificity of conceptual abilities (sensory semantic abilities).

- 4.2. The task of the study is to determine the specificity of the conceptual abilities (semantic).
- 4.3. Thus, the subject of research is the specificity of the sensory semantic abilities of the participants in the study. The object of the study is older teens.

5. Research Methods

5.1. Sample

Participants: 71 students (45 girls and 26 boys) at the age of 15 years.

5.2. Techniques

5.2.1. Techniques for extracting conceptual (categorical, conceptual and semantic) abilities

5.2.1.1."Generalization of the three words" (Kholodnaya, 2002).

The material of methodology "Generalization of the three words" consists of 10 triads of words. Each triad is read out to the participants sequentially. Students should think what is common between these three words and write down this feature in one or two words. 25 seconds are given to find out and to write the answer for each triad of words. The answer should be filled into the form.

Each answer was rated by the range from 0 to 2 points for each of the 10 triads. The criteria: 0 points - lack of generalization; thematic generalization based on the spatial or temporal proximity of objects; 1 point – analytic generalization; formal generalization; 2 points - strict categorical generalization using generic terms. The overall score is the sum of points for all triads. Variables: categorical abilities.

5.2.1.2. "Conceptual synthesis" (Kholodnaya, 2002; Sipovskaya, 2014)

The material of methodology "conceptual synthesis" consists of three triads of the words, which are unrelated by the meaning. The participants asked to make the maximum number of meaningful sentences containing all these words.

One triad of words is printed on each A4 form. Participants were given instructions verbally, in accordance with which the participants were asked make different versions of semantic connections between these three words, write each connection into the form in one or two sentences so that all three words were used. Three minutes are given for each triad.

Each answer was rated by the range from 0 to 3 points for each of the three triads. The criteria: 0 points - lack of sentences; no semantic connections, or used only two words; 1 point - a simple listing of words in a sentence; 2 points - creating a context within the description of a specific situation; 3 points - a sentence with comparisons, analogies; all three words are summarized by category or by detailed casual connections. The overall score is the sum of points for all triads. Variables: conceptual abilities.

5.2.1.3. "Visual semantics of words" (Artemieva, 1980)

Participants are given a white A4 sheet. Graphic representation of indeterminate shape is given in the upper part of that sheet. Students should answer one question about each image: "What properties applied to this object?" (List of these properties is written down). There were given 5 images:



Figure 1. Examples of graphic images in the "Visual semantics" technique (Artemieva, 1999)

Analyzation of the semantic features allocated different subtypes of semantic features:

- semantic sensory features of a tactile type (cold, soft, rough, etc.);
- semantic sensory features of taste type (bitter, sour, etc.);
- semantic sensory features of olfactory type (pleasant odor, etc.);
- semantic sensory features of auditory type (loud, noisy, sounding, etc.);
- semantic sensory features of the visual type (colorful, bright, etc.).

Points of the selected subtypes are summed with the points corresponding to the subtype for the rest of pictures.

Variables: the ability to form semantic sensory features of a tactile type(tactile), the ability to form semantic sensory features of taste type (taste), the ability to form olfactory features (olfactory), the ability to form semantic sensory features of a auditory type(auditory), the ability to form semantic sensory features of a visual type(visual).

5.2.2. Methodology to extract intellectual competence "Narrative" (Sipovskaya, 2014)

A narrative is an essay on a free theme. It reveals features of structuring and transformation of the data in the process of generation of a new context. Students were given 2 white A4 sheets for writing essays. Participants were asked to write an essay on any theme they prefer. There was no information about standards or volume of the narrative. Participants were reported only that they should write as much text as it would be necessary to disclose the topic.

Indicators of the methodology "Narrative": general score. In particular, the measure of mental narrative's complexity. Criteria: 0 points - lack of written narrative; 1 point - a formal written narrative with descriptive sentences without expressing any point of view; 2 points - a narrative with the causal relationships; 3 points – a narrative with an argued position or contemplation; 4 points - two essays. Also, the texts were analyzed by sentences.

There were: 1) the narrative of a factual type (facts, for example: "The Moscow Battle took place in 1941"), "Factual"; 2) narrative of systematizing type (selection of general categories, such as: "The Stalingrad Battle consisted of 3 stages: Stage 1: defense; Stage 2: the battle for the city, the 3rd stage: counteroffensive"), "Systematizing"; 3) narrative of argument type (argument of a statement such as: "He had not eaten for a few days: there was the famine in Leningrad"), "Arguing"; 4) narrative of a question type (questions, suggestions, for example: "Could I fight against people?"), "Question"; 5) narrative of evaluative type (alternative or more general context, for example: "But if we had not defeated Napoleon, the whole world would be ruled by the French – it wouldn't be normal"), "Evaluative"; 6) narrative of motivational type (an impersonal assessment in broad categories, such as: "Let us remember the heroism!"),

"Motivational"; 7) narrative of emotional type (personal position to the described events, for example: "I cry when I watch movies about the war"), "Emotional".

Points for each of the selected narrative types are calculated for each of these types separately throughout the essay.

Variables: intellectual competence (general score), factual-type narratives, systematizing-type narratives, argument-type narratives, question-type narratives, evaluative-type narratives, incentive type narratives and emotional type narratives.

Statistical processing: descriptive statistics methods, correlation analysis (Spearman method), application of the Friedman criterion, Wilcoxon sign correlation criterion using packages of statistical data processing (SPSS 20.0).

6. Findings

Non-parametric methods were used for statistical analysis due to the small number of participants of the study (71 people) and, accordingly, the distribution of data significantly different from normal.

So, the first step of the statistical analysis was the conduct of the Spearman correlation analysis, the results of which are presented in Table 1.

Table 1. Correlations of the indicators of conceptual abilities, categorical abilities, sensory semantic abilities of tactile, taste, olfactory, auditory and visual type (tactile, taste, olfactory, auditory, visual), total score according to the method "Narrative" (Narrative) and particular manifestations of intellectual competence in the form of narrative of factual, emotional, motivational, systematizing, question, evaluative, argumentative type.

Variables	Tactile	Taste	Olfactory	Auditory	Visual
Narrative	.339**	.388**	,145	,058	.444**
Factual	.310**	.345**	,133	-,026	.315**
Emotional	.243*	,228	,040	-,019	,145
Motivation	.293*	.356**	,147	-,076	.363**
Systematizing	.256*	,140	-,060	,109	.216
Question	.326**	.360**	.262*	,039	.397**
Evaluative	.254*	.270*	,154	,139	.343**
Arguing	.164	,190	,068	,023	.309**
Conceptual abilities	.121	,050	,151	,152	.220
Categorical abilities	.253*	,175	-,078	,071	,134

Notes: * - p≤0.05, ** - p≤0.01

As follows from the data in Table 1, the indicators of sensory semantic abilities of different types differentially correlate with the manifestations of intellectual competence in the senior adolescence. In this regard, it should be noted that these types of sensory semantic structures, in turn closely associated with human behavior through the appropriate sense organs, were formed at various stages of ontogenetic development. For example, it has been established that in the ontogenesis of mammals, tactile sensitivity begins to form earlier than hearing and vision (Trifonova, 2015b; Vekker, 1976). Accordingly, the early stage of development of organisms is characterized by less-differentiated structures of interaction with the environment.

In the obtained results, this fact is described by correlations of sensory semantic abilities of the tactile type with practically all manifestations of the competence type, except for propositions of argumentative type and conceptual abilities. In the first case, it is a highly organized and highly differentiated intellectual activity, which includes the protection of one's position through a number of facts. With respect to the lack of a correlation of sensory-type semantic abilities with manifestations of conceptual abilities, it is first of all necessary to point out the definition of this construct. Thus, the latter act as psychic properties that are relevant to the productivity of conceptualization processes and provide the possibility of generating new mental contents not represented in the available information (identifying implicit connections and regularities, constructing metaphors, interpreting, modeling, thought experiment, etc.) (Sipovskaya, 2015; Kholodnaya, 1983). Conceptual abilities neither functionally nor structurally correlate with the simplest methods of subject's interaction with the environment, which is why the connection of these highly organized constructs with manifestations of sensory semantic abilities of the tactile type has not been revealed. But the correlation with the categorical abilities of the conceptual experience with sensory semantic tactical abilities is present, which is argued by the similarity of the functional load that these constructs bear: to carry out the primary definition of an object and referring it to a group.

Also, at first glance, the connection of the general indicator of intellectual competence with semantic sensory tactical types of abilities. In this situation, we are talking about the integrative function, which has such metasystem as an intellectual competence. It includes many types of abilities, including tactile sensitivity.

Analyzing the connections of sensory semantic abilities of the visual type, we also identified a number of significant correlations with the manifestations of intellectual competence and conceptual abilities, but in this case, we are talking about more generalized and differentiated abilities. So, the development is characterized by an increase in the rate of differentiation, it was suggested that behavior, mainly associated with smell, taste and tactile sensations, is less differentiated than behavior, mainly associated with hearing or vision (Gottlieb, 1971; Alexandrov & Sams, 2005). The ability of visual sensation R. Descartes (2011) for example, called an ability subtle, and Sechenov (2001) - highly divided. In addition, as R.L. Gregory writes, vision appears evolutionarily later than touch (Gregory, 2003).

In addition, the language apparatus describing the sensations of various modalities is also different. Thus, for example, in the studies of Chernigovkaya (2003) and Arshavsky (1980), where the words from a number of languages used to describe various types of sensitivity were analyzed, The authors concluded that the visual conceptual sphere (especially color) is probably the most carefully developed in most human languages, whereas the sense of smell is the least verbalized of all sensory modalities, probably because of its subconscious nature and cultural prohibitions.

With regard to the studies of other modalities, for example, Slobin (2003) said that children learn a large arsenal of words which describe sensations obtained through the organs of sight and hearing, while their language means of expressing proximal sensations (smell, taste, touch) remain scanty. The author suggests this paradoxical situation occur because of circumstance that these (proximal) sensations are more connected with the emotions of pleasure and disgust, which, in turn, are more tabooed than the sensations, received from the distal receptors (Slobin, 2003).

Returning to the results of Spearman's correlation with sensory semantic abilities, it should be noted that the data are heterogeneous in terms of the strength of the correlation links with the manifestations of intellectual competence. Thus, the greatest connections are in the visual modality, whereas, for example, there are none of the auditory modalities. This circumstance points to the complexity, multifacetedness, the systematic nature of the construct of sensory abilities. It leads to the necessity to consider the structure of sensory semantic abilities, in addition to functional and purely linguistic features, there are also structural sensory features.

In order to test the hypothesis about the significance of the differences between the semantic sensory features of a different modality, we used the Friedman criterion (Table 2):

Table 2. Testing the hypothesis of the difference between the five groups: indicators of sensory semantic tactile type, sensory semantic taste, sensory semantic olfactory type, sensory semantic auditory type and sensory semantic visual type by the Friedman method

Variables	Average Rank	N	chi-square	d.f.	Asymptotic significance
Tactile	4,63	71	192,287	4	0,000
Taste	2,63				
Olfactory	1,93				
Auditory	2,12				
Visual	3,70				

Notes: N – the number of participants in the study, d.f.- degree of freedom.

In accordance with the results obtained in the research, intermediate conclusions were drawn that the differences between different types of sensory semantic abilities are statistically significant. Consequently, the internal heterogeneity of the structure of the sensory semantic abilities of the conceptual experience was demonstrated. And that differentiation is explained by, firstly, the degree of generalization and cognitive-personal complexity, secondly, - by the age of formation, thirdly, by the degree of differentiation of the semantic sensory structures, and fourthly, - by the development of the linguistic apparatus describing the corresponding sensations. Ontogenetically, earlier semantic abilities satisfy the needs of the individual as long as he needs more differentiated, developed modes of activity. Nevertheless, the Friedman criterion does not allow us to talk about the direction of the differences, i.e. Lower case is no reason to say that the level of expression of any particular sensory semantic capacity is higher or lower than the other one. To answer this question, the data was analyzed by the Wilcoxon method (Table 3):

Table 3. Testing the hypothesis about intergroup differences between tactile, taste, olfactory, auditory, and visual sensory semantic faculties using the Wilcoxon method.

Variables	Z-score	Asymptotic significance
Taste - Tactile	-7,022	0,000
Olfactory - Tactile	-7,073	0,000
Auditory - Tactile	-6,993	0,000
Visual - Tactile	-5,915	0,000
Olfactory – Taste	-4,615	0,000
Auditory – Taste	-3,456	0,001
Visual - Taste	-4,467	0,000
Auditory – Olfactory	-2,495	0,013
Visual – Olfactory	-6,393	0,000
Visual - Auditory	-6,245	0,000

Following the results presented in Table 3, we can conclude that in the structure of the sensory semantic abilities of the conceptual experience there are hierarchical levels, namely:

- 1) the ability to generate features of the semantic sensory tactile type;
- 2) the ability to generate signs of a semantic sensory taste type;
- 3) the ability to generate signs of a semantic sensory olfactory type;
- 4) the ability to generate features of the semantic sensory auditory type;
- 5) the ability to generate signs of a semantic sensory visual type.

The data are consistent with the stages of development of individual experience from tactile sensory to more differentiated visual sensory semantic abilities. These results are consistent with the unified concept of consciousness and emotions (Alexandrov, 2016; Trifonova, 2015a), where emotions characterize the more low-differentiated systems formed ontogenetically before conscious cognitive processes (Alexandrov & Sams, 2005). The proximal tactile and taste sensitivities follow before the olfactory and auditory and characterized by less differentiation. The inadequacy of linguistic means of their expression probably did not allow them to have significant multiple connections with manifestations of intellectual competence and with more generalized types of conceptual abilities. The most complex kinds of low-differentiated sensory semantic abilities - the ability to generate sensory semantic features of the visual type - are formed in the last turn, which was demonstrated by the results obtained in the study.

Thus, the regression of conceptual experience was recorded from sensory tactical semantic abilities through the ability of the taste type, and then of the olfactory and auditory type, to sensory semantic abilities of the visual type. The obtained results are correlated with the principle of development in the order of increasing differentiation of individual experience.

7. Conclusion

The obtained results demonstrate the probability of considering regression in the conceptual experience from the subject's stages of intellectual development from low-discriminated tactile sensory semantic abilities through the semantic sensory abilities of the taste type, and then, bypassing the semantic sensory abilities of the olfactory and auditory type, to sensory semantic abilities of the visual type.

Thus, one can draw a conclusion about the plausibility of the hypothesis in relation to conceptual sensory semantic abilities: indicators of conceptual (semantic) abilities are heterogeneous in their connections with manifestations of intellectual competence, which is due to different degrees of differentiation. Moreover, in the empirical study, it was proved that the sensory semantic ability of the tactile, taste, olfactory, auditory and visual type are distinguished in accordance with the degree of differentiation.

Answering the question about the structural organization of the subject's sensory semantic conceptual experience, this empirical research poses new challenges. For example, the question of what causes - the lack of linguistic means of expression, the degree of differentiation, onto- and phylogenetic age of the formation of the sensory structure, cultural norms and limitations, the novelty (stressogenicity) of the research task or some other reason in the greatest degree affect the measure of the severity of the

sense semantic abilities of different modalities. The direction of finding new methodological means for diagnosing psychological constructs and expanding statistical methods for analyzing the obtained data is also especially actual.

References

- Alexandrov, Yu.I. (2016). Regression. *Seventh International Conference on Cognitive Science: Abstracts*. (pp.100-101). In Yu. I. Aleksandrov, & K.V. Anokhin (Eds.). Moscow: Publishing house of Moscow University.
- Alexandrov, Yu.I., & Sams, M.E. (2005). Emotion and consciousness: Ends of a continuum, *Cognitive brain research*, 25, 387–405. <https://doi.org/10.1016/j.cogbrainres.2005.08.006>
- Aleksandrov, Yu.I., Svarnik, O., Znamenskaya, I.I., Kolbeneva, M.G., Arutyunova, K.R., Krylov, A.K., & Bulava A.I. (2017). Regression as a stage of development. Moscow: Publishing house of Moscow University.
- Artemieva, E.Yu. (1980). *Psychology of subjective semantics*. Moscow: Publishing house of Moscow University.
- Artemieva, E.Yu. (1999). Fundamentals of psychology of subjective semantics. In I. B. Khanina (Ed.). Moscow: Science; Sense - Series: Fundamental psychology.
- Arshavsky, I.A. (1980). Not shy and endocrine mechanisms of stress. ex. In OG Gazeiko (Ed.). Chisinau: Shtiintsa.
- Chernigovskaya, T.V. (2003). Children with Specific Language Disorders in the Light of Contemporary Discussions in Linguistics and Psychology. *Proceedings of the II International Conference, dedicated to the 100th anniversary of the birth of AR Luria*. (pp.189-194). In T.V. Akhutina, Zh. M. Glozman. (Eds.). Moscow: Sense.
- Descartes, R. (2011). *The First Principles of Philosophy: The reasoning about the method to correctly direct your mind and find truth in the sciences and other philosophical works*. Moscow: Academic Project.
- Gottlieb, G. (1971). *Ontogenesis of sensory function in birds and mammals. The biopsychology of development*. (pp.67–128). In E. Tobach, L. A. Aronson, & E. Shaw (Eds.). N. Y. L.: Academic Press.
- Gregory, R.L. (2003). *Reasonable eye*. (2nd ed.). Moscow: Editorial URSS. [English translation]
- Kholodnaya, M.A. (1983). *Integral structures of conceptual thinking*. Tomsk: Tomsk University Press.
- Kholodnaya, M.A. (2012). *Psychology of conceptual thinking: from conceptual structures to conceptual abilities*. Moscow: Institute of Psychology, Russian Academy of Sciences.
- Kholodnaya, M.A. (2002). *Psychology of the intellect: paradoxes of research*. St. Petersburg: Peter.
- Lickliter, R., & Bahrick, L.E. (2000). The development of infant intersensory perception: advantages of a comparative convergent-operations approach, *Psychological bulletin*, 126(2), 260–280. <https://doi.org/10.1037/0033-2909.126.2.260>
- Sechenov, I.M. (2001). *Elements of thought*. St. Petersburg: Peter.
- Sipovskaya, Ya.I. (2015). Conceptual, metacognitive and intentional descriptors of intellectual competence in the senior adolescence, *Bulletin of St. Petersburg State University*, 12(4), 22 - 31.
- Sipovskaya, Ya.I. (2014). Descriptors of intellectual competence in the senior adolescence, Psychology and pedagogy: theoretical and practical aspects of modern science. *Materials XXVII International Scientific and Practical Conference*. (pp.34-36). Moscow: The scientific center of psychology and pedagogy.
- Sipovskaya, Ya.I. (2017). Manifestations of regression in the structure of the conceptual experience of older adolescents. *American scientific journal*, 14, 28-35.
- Slobin, D., & Green J. (2003). *Psycholinguistics. Chomsky and psychology*. Moscow: Editorial URSS. [English translation].
- Trifonova, A. V. (2015a). *Ponyatiynye sposobnosti kak osnova individual'nogo intellektual'nogo resursa. [Conceptual basis of individual ability as an intellectual resource]*. (Doctoral dissertation).

<https://dx.doi.org/10.15405/epsbs.2019.02.02.11>

Corresponding Author: Sipovskaya Yana Ivanovna

Selection and peer-review under responsibility of the Organizing Committee of the conference

eISSN: 2357-1330

Trifonova, A.V. (2015b). Development of conceptual abilities in the senior adolescence and youthful age.
Acmeology, 2, 144-148.

Vekker, L.M. (1976). *Psychological processes*. St. Petersburg, Russia: Publishing house of the Leningrad University.