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**INFLUENCE OF THE FACTOR OF SEX ON THE DEGREE OF**  
**SEMANTIC ABILITIES**

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*Abstract*

The article examines the manifestations of the intensity of the semantic sensory abilities of different types of modality: tactile, auditory, taste, olfactory and visual, defined as mental properties related to the productivity of semantic processes, in older teens of different sexes. The study involved 99 schoolchildren at the age of 15 years. Methodological basis of the study was the method "Modified version of the method "Semantic differential ". The results of the study did not reveal significant differences in the degree of manifestation of sensory semantic abilities of the taste type in adolescents. Probably, such basic cognitive components of thinking as semantic abilities are so low-grade that differences between representatives of different sex are insignificant. These results emphasize both the theoretical and practical novelty of the proposed approach in view of a number of factors: 1) a new method for diagnosing semantic sensory abilities; 2) studying the regression of semantic sensory abilities as a variant of mental development and adaptive behaviour; 3) data on the absence of differences in the degree of expression of sensory semantic abilities of all types of modality in older adolescents. The established facts improve our understanding of the most basic, low-differentiated component of the conceptual experience-semantic abilities and one of its manifestations-sensory sensations, directing factors of heterogeneity in the semantic constructions of older adolescents to research. In addition, a special significance is the study of manifestations of semantic sensory sensitivity in other age periods, allowing revealing the temporal dynamics of development of this component of conceptual experience.

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**Keywords:** Modality, senior adolescence, semantic sensory capacity, sex.



## 1. Introduction

Defining the semantic abilities of the sensory type as a component of the con-ceptual experience, as it is shown by Kholodnaya's study (2002, 2012), as it was shown in by Sipovskaya (2017), but also about taking into account the gender of the participants in the study (the importance of this factor was proven by Lynn & Irwing (2004). In view of the fact that in 2015, Sipovskaya's study have demonstrated the importance of taking the latter into account in measuring intellectual competence, the empirical study presented, which studies the most basic component of the conceptual experience - semantic abilities, was initiated. This aspect of mental reality in the world psychological literature has not been adequately studied, despite a number of pioneering scientific works, for example, the studies by Janosik, Creamer, & Kowalski (2004) and the study by Alexandrov et al. (2017). Nevertheless, Alexandrov et al. (2017) postulate the fact that the development of mental processes is associated with a continuous increase in the degree of differentiation associated predominantly with smell, taste and tac-tile sensations is less differentiated than behavior predominantly associated with hearing or vision. Meanwhile, the visual abilities of Descartes (2011) called subtle, and Sechenov (2001) characterized their high degree of fragmentation, whereas, for example, Gregory (2003) indicates the evolutionary later maturation of visual abilities in comparison with the sense of touch.

Moreover, empirically revealed differences in the language apparatus used to convey the sensations of various modalities. For example, the research data of Arshavsky (1980), demonstrating the fact that the visual - especially the color - conceptual sphere 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 his subconscious nature and cultural prohibitions (p. 17).

Speaking of other modalities, except for the visual, for example, Slobin (2003) notes that people operate with a large arsenal of words describing sensations obtained through the organs of sight and hearing, rather than from proximal sensations (smell, taste, touch). The latter are very meager in terms of expression. Slobin (2003) explains this fact by tabooing these (proximal) sensations, in view of the fact that they are more connected with the emotions of pleasure and disgust than the sensations received from the distal receptors.

99 senior adolescents were sampled because of the particularly qualitative changes in a number of spheres of human life activity that characterize it, as it was shown by Vygotsky's studies (1984,1999). Schoolchildren of adolescence were chosen on the grounds that this period is critical, that is, a critical period of a person's life characterized by sharp qualitative changes marking the end of one stage of mental development and the beginning of the next. At this age, a structure of conceptual thinking takes shape, which ensures a qualitative increase in the intellectual resources of the adolescent. Thus, in Vekker's (1976) study it was suggested, that the formation of concepts acts as a prerequisite for higher forms of intellectual activity, characterized by maximum resolving capabilities. The choice of the school was of no fundamental importance, since a unified mechanism for the development of mental processes in ontogeny is assumed, and the methods did not make specific demands for specialized schools. To the study, the students were volunteered to replace one of the lessons - those who did not want to participate in the study could, without disturbing others, do their homework or listen to music on their headphones with their players or phones. The schoolchildren were also informed that upon completion of the whole research and processing of the

data received, a voluntary individual consultation will be held, in which each participant of the study will be able to learn about his "strengths and weaknesses of the mind", about his intellectual characteristics. This consultation was a procedure for debriefing.

Thus, the variables of the empirical study are the manifestations of sensory semantic abilities of various types of modality, such as tactile, auditory, olfactory, taste and visual sensations, and the sex of the participants in the study.

Theoretical hypothesis of the study: indicators of sensory semantic abilities of different types of modality: tactile, auditory, olfactory, taste and visual sensations do not depend on the sex of individuals.

The purpose of the study: the disclosure of the specificity of the sex factor in relation to the manifestation of the sensory semantic abilities of the tactile, auditory, olfactory, taste and visual types in the older adolescence.

## 2. Research Methods

Participants: 99 schoolchildren (54 girls and 45 boys) at the age of 15 years.

Method for identifying semantic abilities. Modified version of the method "Semantic differential" by Kholodnaya (1983).

This technique was used to evaluate the measure of participation of sensory-emotional experience in the process of semantification of undefined visual forms (Fig. 1). The form included 13 bipolar scales in the form of adjectives that denote sensory and emotionally-evaluative symptoms (calm-anxious, small-large, colorful-colorless, etc.), through which the participants in the study had to evaluate each of the five vague visual forms.



**Figure 01.** Examples of graphic images in the "Visual semantics" technique by Artemieva (1999)

For each of the five images, the protocol was filled: the subject had to check in one of the 7 graphs - "strong", "medium", "weak", "no", "weak", "medium", "strong" - by each of the 20 scales, assessing to what extent, in his senses, one of the two poles of the scale is expressed as applied to a certain image (the choices in the graphs are "weak", "medium", "strong") or to record the absence of any impressions (the choice in the column "no"). The time for completing the assignment is not limited, but the study participants were asked to try to work faster, focusing on their first impressions.

The evaluation was carried out for each of the five graphic images by counting the number of choices in the columns "no", "weak", "medium" and "strong" for each kind of sensations (tactile, auditory or visual). The number of elections in the columns "no", "medium", "weak" and "strong" was summarized in 5 images.

Indicators: 1) the number of elections in the column "no" SD is an indicator of the measure of insufficient participation of sensory-emotional impressions in the process of semantic identification of

undefined visual forms (TNo, AuNo and VNo, respectively, for each kind of sensations - tactile, auditory and visual);

2) the number of elections in four "medium and low" graphs is an indicator of the measure of the differentiated participation of sensory-emotional impressions in the process of semantification of indefinite visual forms (the weak and average, "middle" degree of participation of the emotional component of the activity - TMiddle, AuMiddle, VMiddle and TWeak, AuWeak, VWeak respectively);

3) the number of elections in two columns of "heavily" SD is an indicator of the measure of excessive expression of sensory-emotional impressions in the process of semantification of undetermined visual forms (TStrong, AuStrong, VStrong, respectively).

Statistical processing: Kraskel-Wallace method using modern packages of sta-tistical data processing (SPSS 20.01).

### 3. Findings

At the first stage of the work, the study participants were divided into 2 groups according to their sex (Table 1):

**Table 01.** Ranked statistics: average ranks for boys and girls in terms of intensity of semantic sensory sensations

Variables	Sex	n	Average Rank
TStrong	male	45	50,81
	female	54	49,32
TMiddle	male	44	46,50
	female	54	51,94
TWeak	male	45	52,76
	female	54	47,70
TNo	male	45	50,01
	female	54	49,99
AuStrong	male	45	49,77
	female	54	50,19
AuMiddle	male	44	52,48
	female	54	47,07
VMiddle	male	45	50,88
	female	54	49,27
VStrong	male	43	46,72
	female	52	49,06
VNo	male	45	45,87
	female	52	51,71
VWeak	male	45	54,39
	female	54	46,34
AuNo	male	45	43,94
	female	53	54,22
AuWeak	male	45	50,42
	female	54	49,65

Notes: n - the number of participants in the study.

Going further, the testing of the research hypothesis was conducted (Table 2).

**Table 02.** Checking the research hypothesis about the difference in adolescents of different sex in terms of the level of manifestation of the manifestation of semantic sensory abilities of different types of modality by the Kraskel-Wallace method

Variables	Chi-square	P-level of significance
TStrong	,066	,797
TMiddle	,893	,345
TWeak	,762	,383
TNo	,000	,997
AuStrong	,006	,941
AuMiddle	,902	,342
AuWeak	,019	,891
AuNo	3,316	,069
VStrong	,172	,679
VMiddle	,080	,778
VWeak	1,992	,158
VNo	1,085	,298

Notes: grouping variable - gender, degree of freedom – 1.

Based on the results presented in Table 2, it can be concluded that there are no differences in the groups of boys and girls on the basis of the varying intensity of sensory-emotional impressions of different types of modality.

Meanwhile, Lynn & Irwing (2004) postulated statistically significant differences in the level of development of intellectual abilities in men and women, which manifest themselves only after 16 years (in this study the subjects were older teenagers of 15 years). Lynn's data were also corrected by Alekseeva Barsukova, Pallotta, and Skovorodnikova (2017), who recorded the differences between boys and girls in the sub-title "Coding" ( $t = 2.22$ ,  $p = 0.03$ ). Scientists suggest that the differences they re-veal may depend on the parents' different attitudes toward children. Besides, for other, more highly organized mental abilities, for example, metacognitive abilities, Kashapova's (2012) research results say that it is legitimate to share metacognitive knowledge, which includes such mental processes as thinking, memory, attention, as well as the ability to learn, acquire new knowledge, and metacognitive activity-the organization and regulation of one's cognitive activity. The author con-ducts his research on a sample of young people (31 men and 45 women) to 30 years. Kashapova (2012) notes that it was on the scale of metacognitive knowledge, in his study, that the male sample significantly differed from the female one (according to the Student's criterion,  $t = 2.83$  for  $p \leq 0.006$ ), whereas in assessing the level of differences based on metacognitive activity, there were no such (by the Student's test- $t = 0.20$  at  $p \leq 0.84$ ). According to the author, these results mean that men, in com-parison with women, appreciate the level of their cognitive processes and point out that it is easier and quicker than women to acquire and absorb new knowledge. He assumes the existence of a certain gender stereotype, which, as Bernard (as cited in Kashapova, 2012), imposes certain restrictions, due to "masculinity." For example, the so-called "norm of mental hardness", which involves the expectation of competent action and knowledge. Such unspoken predictions suggest a certain cognitive behaviour, which is reflected in the results obtained by Kashapova (2012).

Probably, the differences between the male and female parts of the sample that are not found in our study are due to the low differentiation of the semantic sensory abilities of a person's conceptual experience, which does not allow for the appearance of differences. Apparently, the semantic sensory abilities are the basic abilities of man. In addition, these differences with the position of the author can be explained by the age features of the sample (adolescence vs. juvenile). Perhaps, it is a question of insufficient acceptance by older teenagers of stereotypes of cognitive behaviour, and faster physical maturation of girls in comparison with boys. In addition, in view of the fact that, according to Danilova (2004), "... The influence of sex on intellectual functions manifests itself more in the nature of mental abilities, and not in the general level of intelligence measured by IQ" (p. 282).

The obtained facts can be interpreted in the context of the Kholodnaya's (2002, 2012) research data, which indicates the arguments in favor of the hierarchical structure of conceptual experience. In accordance with the views of Kholodnaya, there are 3 types of conceptual abilities:

- semantic abilities - mental properties related to the performance of the content of verbal signs;
- categorical abilities - mental properties related to ensuring the attribution of the relevant object to a certain category;
- conceptual abilities - mental properties that provide the possibility of generating some new mental contents not presented in the available information.

Speaking about conceptual thinking (conceptual abilities), one should not talk about simply "borrowing" conventional forms of knowledge or learning outcomes, but about self-enriching generalized concepts, giving them individual meaning (Vygotsky, 1999; Likhachev, 1993; Lakoff & Johnson, 1980; Kholodnaya, 2012). Along with the formation of concepts, the child learns not only the formal logical logic of thinking, but also a hierarchically organized system of meanings, which in turn increases the productivity of intellectual activity. In the process of concept formation, Vygotsky (1984) distinguishes two simultaneously functioning lines of development - from the private to the general and from the general to the particular. In other words, a certain mental "concept pyramid" is taking shape, which determines the "embedding" of new concepts in a certain hierarchy by means of connections between concepts of different degrees of generalization. According to Vygotsky (1999), the ability to operate with generalized concepts is the highest stage of intellectual development.

Further study of conceptual thinking took place in the works of Vecker (1976). According to Vecker (1976), the conceptual thought includes all the lower levels of cognitive structures and acts as the highest integral level of thought processes. He distinguishes the following distinctive qualities of conceptual thinking ("conceptual thought"): intellectual decentration; consistency of content and volume, expressed in logical classes and based on the principle of invariance), inductive-deductive system (inclusion of processes of generalization and concretization into the operational composition of the concept); hierarchy; completeness of reversibility of operations; sensitivity to contradictions and portable sense as an expression of the fullness of understanding.

Thus, the conceptual structure (the concept), as a mental structure, is an integral cognitive formation characterized by different ways of coding information, the hierarchical nature of the organization of semantic features and the complexity of the cognitive composition, including the inclusion of sensory-

emotional impressions (Kholodnaya, 2002). Note that the participation of sensory-emotional impressions as part of intellectual activity is a prerequisite of implicit (personal) knowledge, therefore, elements of sensory-emotional experience should be represented as part of intellectual competence mechanisms.

According to Harvey, Hunt, & Schroeder (1961), the features of the organization of the concept sphere have a decisive role in the development of the personality. Considering the "concept" as a mental "intermediary" between the subject and external influence, the authors distinguished the following structural characteristics of the individual conceptual experience: clarity - uncertainty (a measure of discrimination between concepts); connectivity - compartmentalization (measure of conjugacy or isolation of concepts); centrality - periphery (a measure of the significance of a certain concept in relation to others); openness - closeness (a measure of the sensitivity of the conceptual system to external influences). Thus, as the complexity of the conceptual system grows, its clarity, coherence, centering and openness increase.

Returning to the classification of conceptual abilities according to Kholodnaya (2002), the semantic abilities belong to the most basic level of conceptualization of reality, on which subjects' differences of on the basis of sex, if present, are not insignificant. This interpretation is reinforced by earlier research data, obtained by Sipovskaya (2015), where differences between different sexes were revealed in relation to more highly organized abilities - arbitrary metacognitive abilities.

The findings of the study, however, contrast with the results of research by Alexandrov et al. (2017), whence the conclusion follows that visual sensations, being more differentiated, in contrast to early proximal analysers, are more correlated with higher forms of mental activity. In these studies, it is noted that conscious activity is marked by a lower degree of emotionality (in terms of our study - an inadequate degree of representation of sensory-emotional sensations). However, it is likely that the construct "intellectual competence" with all its components (in this case, conceptual abilities) requires emotions to be included in its composition. Nevertheless, it should be noted that this emotionality is present exclusively in a differentiated measure (the answers are "medium" and "weak" with graphs of the semantic differential). In this case, Alexandrov's unified concept of emotions and consciousness explains the absence of strong (excessive) manifestations of emotions in correlation with higher mental processes.

Thus, the results argue that there is no significance to the sex' factor in the context of the semantic sensory abilities of the tactile, auditory, olfactory, taste and visual modality.

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